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

FINAL REQUEST FOR PROPOSALS

DESIGN-BUILD PROJECT

TIP I-6064A, B & C / I-5879

July 15, 2021
Includes
Addendum No. 1 - March 9, 2021
Addendum No. 2 - April 16, 2021
Addendum No. 3 - May 11, 2021
Addendum No. 4 - June 11, 2021
Addendum No. 5 - July 15, 2021

VOID FOR BIDDING

DATE AND TIME OF TECHNICAL PROPOSAL SUBMISSION: **August 31, 2021** BY **4:00 PM**

DATE AND TIME OF PRICE PROPOSAL SUBMISSION: **September 14, 2021** BY **4:00 PM**

DATE AND TIME OF PRICE PROPOSAL OPENING: **September 21, 2021** AT **2:00 PM**

CONTRACT ID: C204596

WBS ELEMENT NOS. 49067.3.1, 49067.3.2 and 49067.3.3

FEDERAL-AID NO. 0095077

COUNTY: Robeson

ROUTE NO. I-95

MILES: 8.0

LOCATION: I-95 widening and pavement rehabilitation from I-74 (Exit 13) to south of US 301 (Exit 22) and I-95 / SR 1536 (Carthage Road) interchange improvements

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

NOTICE:

ALL PROPOSERS SHALL COMPLY WITH ALL APPLICABLE LAWS REGULATING THE PRACTICE OF GENERAL CONTRACTING AS CONTAINED IN CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA WHICH REQUIRES THE PROPOSER TO BE LICENSED BY THE N.C. LICENSING BOARD FOR CONTRACTORS WHEN BIDDING ON ANY NON-FEDERAL AID PROJECT WHERE THE BID IS $30,000 OR MORE, EXCEPT FOR CERTAIN SPECIALTY WORK AS DETERMINED BY THE LICENSING BOARD. PROPOSERS SHALL ALSO COMPLY WITH ALL OTHER APPLICABLE LAWS REGULATING THE PRACTICES OF ELECTRICAL, PLUMBING, HEATING AND AIR CONDITIONING AND REFRIGERATION CONTRACTING AS CONTAINED IN CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA. NOT WITHSTANDING THESE LIMITATIONS ON BIDDING, THE PROPOSER WHO IS AWARDED ANY PROJECT SHALL COMPLY WITH CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA FOR LICENSING REQUIREMENTS WITHIN 60 CALENDAR DAYS OF BID OPENING, REGARDLESS OF FUNDING SOURCES.

_____

5% BID BOND OR BID DEPOSIT REQUIRED

_____

PROPOSAL FORM FOR THE CONSTRUCTION OF CONTRACT NO. C204596

IN ROBESON 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. C204596; 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. C204596 in Robeson County by no later than the dates(s) specified in the Final RFP or Technical Proposal, whichever is earlier, and in accordance with the requirements of the Engineer, the Final RFP and Addenda thereto, the 2018 *Standard Specifications for Roads and Structures*, specifications prepared by the Department, the Technical Proposal prepared by the Design-Build Team, at the lump sum price(s) bid by the Design-Build Team in their Price Proposal.

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

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

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

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

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

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

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

If the Design-Build Proposal is accepted and the award is made, the Technical Proposal submitted by the Design-Build Team is by reference, incorporated and made part of this contract. The contract is valid only when signed either by the Contract Officer or such other person as may be designated by the Secretary to sign for the Department of Transportation. The conditions and provisions herein cannot be changed except by written approval as allowed by the Request for Proposals.

Accompanying the Price Proposal shall be a bid bond secured by a corporate surety, or certified check payable to the order of the Department of Transportation, for five percent of the total bid price, which deposit is to be forfeited as liquidated damages in case this bid is accepted and the Design-Build Team fails to provide the required payment and performance bonds with the Department of Transportation, under the condition of this proposal, within 14 calendar days after the written notice of award is received by them, as provided in the 2018 *Standard Specifications for Roads and Structures*; otherwise said deposit will be returned to the Design-Build Team.

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*** PROJECT SPECIAL PROVISIONS ***

CONTRACT TIME AND LIQUIDATED DAMAGES

(7-12-7) DB1 G04A

The date of availability for this contract is November 1, 2021, except that the Design-Build Team shall only begin ground disturbing activities as allowed by this Request for Proposals (RFP). The Design-Build Team shall consider this factor in determining the proposed completion date for this project.

The completion date for this contract is defined as the date proposed in the Technical Proposal by the proposer who is awarded the project. The completion date thus proposed shall not be later than November 1, 2026.

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

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

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

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

INTERMEDIATE CONTRACT TIME NUMBER 1 AND LIQUIDATED DAMAGES

(3-22-07) DB1 G07

Intermediate Contract Time #1 is for the completion of coring eight-inch diameter PVC sleeves through the existing I-95 concrete median barrier from Station 438+00 -L- to Station 446+00 -L-. The PVC sleeves shall be installed at a spacing of five-foot on center with the invert of the sleeve no more than five inches above the bottom of the concrete median barrier.

The date of availability for Intermediate Contract Time #1 is the date of availability for this contract. The completion date for Intermediate Contract Time #1 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 December 15, 2021.

Liquidated Damages for Intermediate Contract Time #1 are **$2,500.00** per calendar day or any portion thereof.

OTHER LIQUIDATED DAMAGES AND INCENTIVES

(3-22-7) (Rev. 2-14-8) DB1 G11

Reference the Transportation Management, ITS, and Traffic Signals and Signal Communications Scopes of Work found elsewhere in this RFP for more information on the following time restrictions and liquidated damages:

Liquidated Damages for Intermediate Contract Time #2 for lane narrowing, lane closures, holiday and special event time restrictions on I-95 are $2,500.00 per 15-minute period or any portion thereof.

Liquidated Damages for Intermediate Contract Time #3 for lane narrowing, lane closures, holiday and special event time restrictions on all ramps and loops are $1,000.00 per 15-minute period or any portion thereof.

Liquidated Damages for Intermediate Contract Time #4 for lane narrowing, lane closures, holiday and special event time restrictions on NC 72 / NC 711 (Caton Road) and NC 211 (North Roberts Avenue) are $1,500.00 per 15-minute period or any portion thereof.

Liquidated Damages for Intermediate Contract Time #5 for lane narrowing, lane closures, holiday and special event time restrictions for a lane on all other roads are $500.00 per 15-minute period or any portion thereof.

Liquidated Damages for Intermediate Contract Time #6 for road closure time restrictions for construction operations on I-95 are $5,000.00 per 15-minute period or any portion thereof.

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

Liquidated Damages for Intermediate Contract Time #8 for road closure time restrictions for construction operations on NC 72 / NC 711 (Caton Road) and NC 211 (North Roberts Avenue) are $2,500.00 per 15-minute period or any portion thereof.

Liquidated Damages for Intermediate Contract Time #9 for road closure time restrictions for ramp reconstruction at the I-95 southbound exit ramp onto NC 72 / NC 711 (Caton Road) are $2,000.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #10 for road closure time restrictions for ramp reconstruction at the I-95 southbound entrance ramp from NC 72 / NC 711 (Caton Road) are $500.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #11 for road closure time restrictions for ramp reconstruction at the I-95 northbound exit ramp onto NC 72 / NC 711 (Caton Road) are $500.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #12 for the road closure time restrictions for ramp reconstruction at the I-95 northbound entrance ramp from NC 72 / NC 711 (Caton Road) are $2,000.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #13 for road closure time restrictions for ramp reconstruction at the I-95 southbound exit ramp onto SR 1536 (Carthage Road) are $500.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #14 for road closure time restrictions for ramp reconstruction at the I-95 southbound entrance ramp from SR 1536 (Carthage Road) are $500.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #15 for road closure time restrictions for ramp reconstruction at the I-95 northbound exit ramp onto SR 1536 (Carthage Road) are $500.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #16 for road closure time restrictions for ramp reconstruction at the I-95 northbound entrance ramp from SR 1536 (Carthage Road) are $500.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #17 for road closure time restrictions for ramp reconstruction at the I-95 southbound exit ramp onto NC 211 (North Roberts Avenue) are $1,000.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #18 for road closure time restrictions for ramp reconstruction at the I-95 southbound entrance loop from NC 211 (North Roberts Avenue) are $500.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #19 for road closure time restrictions for ramp reconstruction at the I-95 southbound entrance ramp from NC 211 (North Roberts Avenue) are $1,000.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #20 for road closure time restrictions for ramp reconstruction at the I-95 northbound exit ramp onto NC 211 (North Roberts Avenue) are $1,000.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #21 for road closure time restrictions for ramp reconstruction at the I-95 northbound entrance loop from NC 211 (North Roberts Avenue) are $500.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #22 for road closure time restrictions for ramp reconstruction at the I-95 northbound entrance ramp from NC 211 (North Roberts Avenue) are $500.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #23 for interchange closure time restrictions for the I-95 / NC 211 (North Roberts Avenue) interchange are $2,500.00 per 15-minute period or any portion thereof.

Liquidated Damages for Intermediate Contract Time #24 for road closure time restrictions for bridge removal and reconstruction at the I-95 / SR 1536 (Carthage Road) interchange are $2,000.00 per calendar day or any portion thereof.

Liquidated Damages for Intermediate Contract Time #25 for interchange closure time restrictions for the I-95 / SR 1536 (Carthage Road) interchange are $2,000.00 per calendar day or any portion thereof.

Liquidated Damages for Intermediate Contract Time #26 for road closure time restrictions for culvert and roadway construction on SR 1791 (Dawn Drive) and Wellington Road are $1,000.00 per calendar day or any portion thereof.

Liquidated Damages for Intermediate Contract Time #27 for road closure time restrictions for culvert and roadway construction on SR 1792 (Kahn Drive) and Tartan Road are $1,000.00 per calendar day or any portion thereof.

Liquidated Damages for Intermediate Contract Time #28 for road closure time restrictions for roadway construction on SR 1593 (Jonathan Drive) are $1,000.00 per calendar day or any portion thereof.

Liquidated Damages for Intermediate Contract Time #29 for road closure time restrictions for roadway construction on SR 1791 (Dawn Drive) and Nelson Way are $1,000.00 per calendar day or any portion thereof.

Liquidated Damages for Intermediate Contract Time #30 for lane closure time restrictions for road reconstruction on SR 1592 (Hester Drive) are $500 per calendar day or any portion thereof.

Liquidated Damages for Intermediate Contract Time #31 for road closure time restrictions for road reconstruction of the SR 1592 (Hester Drive) northbound lane at Dunn Road are $250.00 per day or any portion thereof.

Liquidated Damages for Intermediate Contract Time #32 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 #33 for failure to reestablish NCDOT fiber optic communications within 24 hours are $2,500.00 per day or any portion thereof.

Liquidated Damages for Intermediate Contract Time #34 for failure to provide a plan that defines 1) an anticipated NCDOT fiber optic communications disruption timeframe and 2) a plan of action for reestablishing NCDOT communications a minimum of 21 calendar days prior to a proposed disruption in service are $10,000.00 per failure.

Liquidated Damages for Intermediate Contract Time #35 for failure to restore communication or provide a replacement device within 24 hours are $500.00 per hour or any portion thereof.

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

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

FUNDING DIFFERENTIATION

The Itemized Proposal Sheet and the Cover Sheet of this Request for Proposals identify three separate wbs elements, each with a corresponding lump sum line item in the Itemized Proposal Sheet. The wbs elements and the work associated with each are as noted below:

49067.3.1 All work required by this contract to complete the design and construction of the I-6064A project. I-6064A consists of all improvements, except I-95 pavement rehabilitation and I-95 / SR 1536 (Carthage Road) interchange modifications, from the beginning of the project to Station 359+00 -L-.

49067.3.2 All work required by this contract to complete the design and construction of the I-6064B project. I-6064B consists of all improvements, except I-95 pavement rehabilitation and I-95 / SR 1536 (Carthage Road) interchange modifications, from Station 359+00 -L- to the end of the project.

49067.3.3 All work required by this contract to complete the design and construction of the I-6064C and I-5879 projects. I-6064C consists of I-95 pavement rehabilitation from the beginning of the project to the end of the project. I-5879 consists of all modifications at the I-95 / SR 1536 (Carthage Road) interchange.

A separate Table of Quantities and Schedule of Values shall be required for each of these three line items and funding wbs elements. (Reference the Division One Standard Special Provision found elsewhere in this RFP)

REQUIRED PROVISION FOR BUILD GRANT

The Prime Contractor is hereby notified that this project will be partially financed with Better Utilizing Investments to Leverage Development (BUILD) Funds. The Prime Contractor shall assure that all subcontracts, and other contracts for services for a BUILD funded project shall also have this Project Special Provision in their contracts. As such, the Department may require the Prime 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 BUILD Grant.

PAYOUT SCHEDULE

(11-16-09) DB1 G13

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

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

MOBILIZATION

(3-11-19) DB1 G15B

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

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

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

800-2 MEASUREMENT AND PAYMENT

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

SUBSTANTIAL COMPLETION
(3-22-07) DB1 G16

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

1. 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.

2. 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.

3. Excluding signs on intersecting roadways, all signs are complete and accepted.

4. All guardrails, drainage devices, ditches, excavation and embankment are complete.

5. Remaining work along the project consists of permanent pavement markings, permanent pavement markers or incidental construction that is away from the paved portion of the roadway.

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

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

1/23/14 DB1 G43

(A) Submittal of Quantities

Submit quantities on the *Fuel Usage Factor Chart and Estimate of Quantities* sheets, located in the back of this RFP, following the Itemized Proposal Sheet. Each sheet corresponds to a Lump Sum Pay Item on the Itemized Proposal Sheet.

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

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

Trade Secret - Information submitted on the *Fuel Usage Factor Chart and Estimate of Quantities* sheets 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 **$2.2313** per gallon.

(C) Opt Out of Fuel Price Adjustment

If the Design-Build Team elects not to pursue reimbursement for Fuel Price Adjustments for the lump sum items on the Itemized Proposal Sheet, a quantity of zero shall be entered for all quantities in the *Fuel Usage Factor Chart and Estimate of Quantities* and the declination box shall be checked on both *Fuel Usage Factor Chart and Estimate of Quantities* sheets. Failure to complete both of these forms 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* sheets are 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 both of the completed *Fuel Usage Factor Chart and Estimate of Quantities* sheets separately with the Technical Proposal and in the Price Proposal will result in the Technical and Price Proposal being considered irregular by the Department and the Technical and Price Proposal may be rejected.

INDIVIDUAL MEETINGS WITH PROPOSERS
(9-1-11) DB1 G048

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

**** NOTE **** Deleted paragraph regarding a meeting between each individual proposer and the affected utility owners.

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

EXECUTION OF BID, NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION
(1/24/13) DB1 G52

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

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

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

1. Applicable Signature Sheets: 1, 2, 3, 4, 5, or 6 (Bid)

2. Bid Bond dated the day of the Price Proposal submission

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

SUBMISSION OF DESIGN-BUILD PROPOSAL
(9-1-11) (Rev. 8-30-17) DB1 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 Design-Build 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 2018 *Standard Specifications for Roads and Structures,* or Article 102-10 of the 2018 *Standard Specifications for Roads and Structures* and as amended in the Standard Special Provisions, Division One (found elsewhere in this RFP) may result in a Design-Build Proposal being rejected.

ALTERNATIVE TECHNICAL CONCEPTS AND CONFIDENTIAL QUESTIONS

(6-8-11) (Rev. 7-20-17) 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 (10) 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 and (2) ATCs that are deemed to take advantage of an error or omission in the RFP, all ATCs submitted by the Design-Build Team shall count towards the maximum number of allowable ATCs, regardless of the Department's response. (e.g. an ATC submitted by the Design-Build Team that 1) the Department deems does not qualify as an ATC, 2) is not permitted, and 3) is disqualified shall count towards the maximum number of allowable ATCs). Should the Design-Build Team submit a single ATC with multiple concepts, the Department may (1) return the unevaluated ATC to the Proposer requiring resubmittal(s) as an individual concept or (2) consider the ATC submittal multiple ATCs that count towards the maximum number of allowable ATCs.

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 eight (8) ATCs after the Final RFP distribution provided:

  - The ATC submittal does not exceed the aforementioned maximum number of allowable ATCs.

  - All but one of the ATCs are received by the Department no later than ten weeks prior to the deadline for submitting the Technical Proposal.

  - Any remaining ATCs (maximum of one) are received by the Department no later than seven weeks prior to the deadline for submitting the Technical Proposal.

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. 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 two weeks prior to the deadline for submitting the Technical Proposal.

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 two weeks prior to the deadline for submitting the Technical Proposal.

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 further 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) any obligation that may arise under applicable laws and regulations; and (3) any obligation mandated by the regulatory agencies as a permit condition.

ATC Submittals

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

Formal ATCs

Each Formal ATC submittal shall include the following information:

1) **Description -** A detailed description and schematic drawings of the ATC configuration or other appropriate descriptive information (including, if appropriate, product details [i.e., specifications, construction tolerances, special provisions, etc.] and a traffic operational analysis, if appropriate)

2) **Usage -** Where and how the ATC would be used on the project

3) **Deviations -** References to all RFP requirements, or other documents incorporated into the contract by reference, that are inconsistent with the proposed ATC, an explanation of the nature of the deviations from said requirements, and a request for approval of such variance(s)

4) **Analysis -** An analysis justifying use of the ATC and why the variance to the RFP requirements, or other documents incorporated into the contract by reference, should be allowed. **All intersection and interchange reconfigurations shall include corresponding electronic traffic analyses files and a signing concept.**

5) **Impacts -** Discussion of potential vehicular traffic impacts, environmental impacts, community impacts, safety and life-cycle project impacts, and infrastructure costs (including impacts on the cost of repair and maintenance)

6) **History -** A detailed description of other projects where the ATC has been used, the success of such usage, and names and telephone numbers of project owners that can confirm such statements

7) **Risks -** A description of added risks to the Department and other entities associated with implementing the ATC

8) **Costs -** An estimate of the ATC implementation costs to the Department, the Design-Build Team, and other entities (right of way, utilities, mitigation, long term maintenance, etc.)

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

Review of ATCs

A panel will be selected to review each ATC, which may or may not include members of the Technical Review Committee. The Design-Build Team shall make no direct contact with any member of the review panel, except as may be permitted by the State Contract Officer. Unapproved contact with any member of the review panel shall result in a disqualification of that ATC. At any time, the Department may request additional information regarding a proposed ATC. To the greatest extent possible, the Department will return responses to, or request additional information from, the Design-Build Team within 15 business days of the original submittal of a Formal ATC. If additional information is requested, the Department will provide a response within five business days of receipt of all requested information.

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

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

The Department Response to Formal ATCs

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

1) The Formal ATC is approved.

2) The Formal ATC is not approved.

3) The Formal ATC is not approved in its present form, but may be approved upon satisfaction, in the Department's sole discretion, of certain identified conditions that shall be met or certain clarifications or modifications that shall be made (conditionally approved).

4) The submittal does not qualify as an ATC but may be included in the Design-Build Proposal without an approved ATC (i.e., the concept complies with the baseline requirements of the RFP).

5) The submittal does not qualify as an ATC and may not be included in the Design-Build Proposal.

6) 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.

7) 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.

8) 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.

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

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

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

Preliminary ATCs

At the Design-Build Team's option, a Preliminary ATC submittal may be made that presents a concept and a brief narrative of the concept's benefits. The purpose of allowing a Preliminary ATC is to limit the Design-Build Team's expense in the pursuit of a Formal ATC that may be quickly denied by the Department.

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

1) The Preliminary ATC would be considered as a Formal ATC if the Team so elects to pursue a Formal ATC submission.

2) The Preliminary ATC is denied.

3) An ATC is not required.

4) The Preliminary ATC takes advantage of an error or omission in the RFP or other documents incorporated into the contract by reference, in which case the Preliminary ATC will not be considered, and the RFP will be revised to correct the error or omission without further regard for confidentiality.

5) A documented question has been received outside of the ATC process on the same topic and the RFP will be revised to address that question without further regard for confidentiality.

6) More than one ATC has been received on the same topic and the Department has elected to exercise its right to revise the RFP without further regard for confidentiality. This response could also follow and supersede one of the other previously supplied responses above.

7) The Preliminary ATC contains multiple concepts and has not been considered. Should the Design-Build Team wish to pursue one or more of the concepts presented in the Preliminary ATC, a submittal for each individual concept shall be required.

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

SCHEDULE OF ESTIMATED COMPLETION PROGRESS

(9-1-11) (Rev. 3-30-20) DB1 G58

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

Fiscal Year	Progress (% of Dollar Value)
2022 (07/01/21 - 06/30/22)	8% of Total Amount Bid
2023 (07/01/22 - 06/30/23)	19% of Total Amount Bid
2024 (07/01/23 - 06/30/24)	30% of Total Amount Bid
2025 (07/01/24 - 06/30/25)	28% of Total Amount Bid
2026 (07/01/25 - 06/30/26)	13% of Total Amount Bid
2027 (07/01/26 - 06/30/27)	2% of Total Amount Bid

In accordance with Article 108-2 of the 2018 *Standard Specifications for Roads and Structures,* the Design-Build Team shall also furnish its own progress schedule. Any acceleration of the progress as shown by the Design-Build Team's progress schedule over the progress as shown above shall be subject to the approval of the Engineer.

DISADVANTAGED BUSINESS ENTERPRISE

(10-16-07) (Rev. 11-7-19) 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 at the time of bid 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 at the time of bid 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).

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, committed DBE participation along with a listing of the committed DBE firms.

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

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

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

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

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

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

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

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

Letter of Intent - Form signed by the Contractor and the DBE subcontractor, manufacturer or regular dealer 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) listed at the time of bid.

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

Listing of DBE Subcontractors Form - Form for entering DBE subcontractors on a project that will meet this DBE goal contained elsewhere in this RFP.

http://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/08%20DBE%20Subcontractors%20(Federal).docx

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.

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

DBE Goal

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

Disadvantaged Business Enterprises **9.0**%

(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. 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.

Listing of DBE Subcontractors

At the time of bid, Proposers shall submit all DBE participation that they anticipate to use during the life of the contract. Only those identified to meet the DBE goal will be considered committed, even though the listing shall include both committed DBE subcontractors and additional DBE subcontractors. Additional DBE subcontractor participation submitted at the time of bid will be used toward the Department's overall race-neutral goal. Only those firms with current DBE certification at the time of Price Proposal opening will be acceptable for listing in the Proposer's submittal of DBE participation. The Design-Build Team shall indicate the following required information:

(1) *If the DBE goal is more than zero,*

(a) Proposers, at the time the Price Proposal is submitted, shall submit a listing of DBE participation, including the names and addresses on *Listing of DBE Subcontractors* contained elsewhere in the contract documents in order for the Price Proposal to be considered responsive. Proposers shall indicate the total dollar value of the DBE participation for the contract.

(b) If Proposers have no DBE participation, they shall indicate this on the *Listing of DBE Subcontractors* by entering the word "None" or the number "0." This form shall be completed in its entirety. **Blank forms will not be deemed to represent zero participation**. Price Proposals submitted that do not have DBE participation indicated on the appropriate form will not be read publicly during the opening of the Price Proposals. The Department will not consider these Price Proposals for award and the proposal will be rejected.

(c) The Proposer shall be responsible for ensuring that the DBE is certified at the time of bid by checking the Directory of Transportation Firms. If the firm is not certified at the time of the opening of the Price Proposals, that DBE's participation will not count towards achieving the corresponding goal.

(2) *If the DBE goal is zero*, entries on the *Listing of DBE Subcontractors* are not required for the zero goal, however any DBE participation that is achieved during the project shall be reported in accordance with requirements contained elsewhere in this special provision.

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 Sections A and B listed under *Listing of DBE Subcontractor* just as a non-DBE proposer would.

Written Documentation - Letter of Intent

The Proposer shall submit written documentation for each DBE that will be used to meet the DBE goal of the contract, indicating the Proposer'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 received in the office of the State Contractor Utilization Engineer or at DBE@ncdot.gov no later than 10:00 a.m. on the sixth calendar day following opening of Price Proposals, unless the sixth day falls on an official state holiday. In that situation, it is due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day.

If the Proposer fails to submit the Letter of Intent from each committed DBE to be used toward the DBE goal, or if the form is incomplete (i.e. 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, the Design-Build Team shall submit evidence of good faith efforts, completed in its entirety, to the State Contractor Utilization Engineer or DBE@ncdot.gov no later than 10:00 a.m. on the eighth calendar day following opening of the Price Proposals, unless the eighth day falls on an official state holiday. In that situation, it is due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day.

Submission of Good Faith Effort

If the Proposer fails to meet or exceed the DBE goal the Proposer with the apparent adjusted low price shall submit to the Department documentation of adequate good faith efforts made to reach the DBE goal.

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

Note: Where the information submitted includes repetitious solicitation letters, it will be acceptable to submit a representative letter along with a distribution list of the firms that were

solicited. Documentation of 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.

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

Adequate good faith efforts mean that the Proposer 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 Proposer 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 Proposer has made. Listed below are examples of the types of actions a proposer will take in making a good faith effort to meet the 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. The Proposer must solicit this interest within at least ten days prior to the opening of the Price Proposals to allow the DBEs to respond to the solicitation. Solicitation shall provide the opportunity to DBEs within the Division and surrounding Divisions where the project is located. The Proposer 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 Prime Contractor might otherwise prefer to perform these work items with its own forces.

(2) Negotiate with subcontractors to assume part of the responsibility to meet the contract DBE goal when the work to be sublet includes potential for DBE participation (2^{nd} and 3^{rd} 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 Proposer'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. Evidence of

such negotiation includes the names, addresses, and telephone numbers of DBEs that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBEs to perform the work.

(2) A proposer 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 proposer'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 Proposer of the responsibility to make good faith efforts. Proposing 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 Proposer's standing within its industry, membership in specific groups, organizations, or associates and political or social affiliations (for example, union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the Proposer'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 proposer.

(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 within seven days from the Price Proposals opening the Business Opportunity and Work Force Development Unit at BOWD@ncdot.gov to give notification of the Proposer's inability to get DBE quotes.

(I) Any other evidence that the Proposer submits which shows that the Proposer has made reasonable good faith efforts to meet the DBE goal.

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

(1) Whether the Proposer's documentation reflects a clear and realistic plan for achieving the DBE goal.

(2) The Proposer's past performance in meeting the DBE goals.

(3) The performance of other proposers in meeting the DBE goal. For example, when the Proposer with the apparent adjusted low price fails to meet the DBE goal, but others meet it, you may reasonably raise the question of whether, with additional reasonable efforts the Proposer with the apparent adjusted low price could have met the goal. If the Proposer with the apparent adjusted low price fails to meet the DBE goal, but meets or exceeds the average DBE participation obtained by other proposers, the Department may view this, in conjunction with other factors, as evidence of the Proposer with the apparent adjusted low price having made a good faith effort.

If the Department does not award the contract to the Proposer with the apparent adjusted low price, the Department reserves the right to award the contract to the Proposer with the next apparent adjusted low price that can satisfy the Department that the DBE goal can be met or that an adequate good faith effort has been made to meet the DBE goal.

Non-Good Faith Appeal

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

Counting 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 actually 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 <u>not</u> 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) Suppliers

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

(F) Manufacturers and Regular Dealers

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

(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 nor a regular dealer, count the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on a job site (but not the cost of the materials and supplies themselves), provided the fees are determined to be reasonable and not excessive as compared with fees customarily allowed for similar services.

Commercially Useful Function

(A) 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 actually 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 actually 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 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 and / or substitute, 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 after receiving the Department's written approval based upon a finding of good cause for the proposed termination and / or substitution. For purposes of this section, good cause shall include the following circumstances:

(a) The listed 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.

(j) Other documented good cause that compels the termination of the DBE subcontractor. Provided, that good cause does not exist if the Prime Contractor seeks to terminate a DBE it relied upon to obtain the contract so that the Prime Contractor can self-perform the work for which the DBE contractor was engaged or so that the Prime Contractor can substitute another DBE or non-DBE contractor after contract award.

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 of bid 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 of bid 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 Design-Build Team 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.

(2) When a committed DBE is decertified prior to the Department receiving the SAF (*Subcontract Approval Form*) for the named DBE firm, the Design-Build Team 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 (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, 2nd 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 2018 *Standard Specifications for Roads and Structures* may be cause to disqualify the Prime Contractor or any affiliated companies within the Design-Build Team from further bidding for a specified length of time.

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)

(7-1-19) DB1 G092

The Design-Build Team shall adhere to all Federal, State and Local regulations and guidelines for the use of Unmanned Aircraft Systems (UAS). This includes, but is not limited to, US 14 CFR Part 107 *Small UAS Rule*, NC GS 15A-300.2 *Regulation of launch and recovery sites*, NC GS 63-95 *Training required for the operation of unmanned aircraft systems*, NC GS 63-96 *Permit required for commercial operation of unmanned aircraft system*, and NCDOT UAS Policy. The required operator certifications include possessing a current Federal Aviation Administration (FAA) Remote Pilot Certificate, a NC UAS Operator Permit, as well as operating a UAS registered with the FAA.

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

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

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

EQUIPMENT IDLING GUIDELINES

(12-29-20) 107 DB1 G096

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.

U.S. DEPARTMENT OF TRANSPORTATION HOTLINE

(11-22-94) 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 is operated under the direction of the DOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

CARGO PREFERENCE ACT

(2-16-16) DB1 G100

Privately owned United States-flag commercial vessels transporting cargoes are subject to the Cargo Preference Act (CPA) of 1954 requirements and regulations found in 46 CFR 381.7. Contractors are directed to clause (b) of 46 CFR 381.7 as follows:

(b) Contractor and Subcontractor Clauses. "Use of United States-flag vessels: The contractor 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.

(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 Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590.

(3) To insert the substance of the provisions of this clause in all subcontracts issued pursuant to this contract."

SUBSURFACE INFORMATION

(10-2-20) DB1 G112C

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

COOPERATION BETWEEN CONTRACTORS

(9-1-11) (Rev. 9-7-17) DB1 G133

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

- Project B-5985 is located on NC 41 / NC 72 (2nd Street) and SR 1600 (West 5th Street) east of Project I-6064A, B & C / I-5879 and replaces Bridge Nos. 770125 and 770175 over the Lumber River. Project B-5985 has an anticipated December 2022 Let date.

- Design-Build Project I-5986A / I-5877 is located north of Project I-6064A, B & C / I-5879. Project I-5986A was Let in August 2019 and has an anticipated May 2024 Final Completion date.

- Project I-5986B / I-5878 / I-5883 is located north of Project I-6064A, B & C / I-5879. Project I-5986B / I-5878 / I-5883 has an anticipated July 2021 Let date.

- Project I-5987A, B, and C is located north of and adjacent to Project I-6064A, B & C / I-5879. Project I-5987A, B, and C has an anticipated July 2022 Let date.

- Project HO-0002A, B & C / R-5777D / I-5986C is located on the US 74, US 70 and I-95 corridors. The project includes the installation of broadband fiber on US 74 from the eastern end of the Monroe Bypass to I-40 in Wilmington, on US 70 from I-40 (Exit 309) to the Morehead City Port, and on I-95 from the South Carolina State Line to the Virginia State Line. Project HO-0002A, B & C / R-5777D / I-5986C has an anticipated March 2021 Let Date.

- Project R-5751 is located east of Project I-6064A, B & C / I-5879 and converts the US 74 / NC 72 / NC 130 at grade intersection to an interchange. Project R-5751 has an anticipated January 2023 Let date.

- Project U-5797 is located east of Project I-6064A, B & C / I-5879 and widens SR 1997 (Fayetteville Road) between Farrington Street and East 22nd Street. Project U-5797 has an anticipated May 2024 Let date.

- W-5806E is located east of Project I-6064A, B & C / I-5879 and installs signalized pedestrian crossings at the NC 41 (Martin Luther King Jr. Drive) / NC 72 (West 2nd Street) intersection. Project W-5806E has an anticipated July 2022 Let date.

- The West Lumberton Floodgate project is located at the bridge on I-95 over CSX Railroad and future maintenance roads. The West Lumberton Floodgate project has an anticipated Fall / Winter 2021 construction date.

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

BID DOCUMENTATION

(7-31-12) (Rev. 8-3-15) DB1 G142

General

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

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

Terms

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

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

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

Escrow Agreement Information

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

Failure to Provide Bid Documentation

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

Submittal of Bid Documentation

(A) Appointment - Email **specs@ncdot.gov** or call 919.707.6900 to schedule an appointment.

(B) Delivery - A representative of the Bidder shall deliver the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation to the Department, in a container suitable for sealing, within ten days after the notice of award is received.

(C) Packaging - The container shall be no larger than 15.5 inches in length by 12 inches wide by 11 inches high and shall be water resistant. The container shall be clearly marked on the face and the back of the container with the following information: Bid Documentation, Bidder's Name, Bidder's Address, Date of Escrow Submittal, Contract Number, TIP Number if applicable, and County.

Affidavit

Bid documentation will be considered a certified copy if the proposer includes an affidavit stating that the enclosed documentation is an EXACT copy of the original documentation used by the Proposer to determine the bid for this project. The affidavit shall also list each bid document with sufficient specificity so a comparison may be made between the list and the bid documentation to ensure that all of the bid documentation listed in the affidavit has been enclosed for escrow. The affidavit shall attest that the affiant has personally examined the bid documentation, that the affidavit lists all of the documents used by the proposer to determine the bid for this project, and that all bid documentation has been included. The affidavit shall be signed by a chief officer of the company, have the person's name and title typed below the signature, and the signature shall be notarized at the bottom of the affidavit.

Verification

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

Confidentiality of Bid Documentation

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

the bid documentation and affidavit may become the property of the Department for use in considering any claim or in litigation as the Department may deem appropriate.

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

Duration and Use

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

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

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

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

Release of Bid Documentation to the Contractor

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

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

Payment

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

TWELVE-MONTH GUARANTEE

(7-15-03) DB1 G145

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

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

This guarantee provision shall be invoked only for major components of work in which the Design-Build Team would be wholly responsible for under the terms of the contract. Examples include pavement structures, bridge components, and sign structures. This provision will not be used as a mechanism to force the Design-Build Team to return to the project to make repairs or perform additional work that the Department would normally compensate the Design-Build Team for. In addition, routine maintenance activities (i.e. mowing grass, debris removal, ruts in earth shoulders, etc.) are not parts of this guarantee.

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

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

PERMANENT VEGETATION ESTABLISHMENT

(6-11-15) (Rev. 8-30-17) 104 DB01 G160

Establish permanent vegetation stands of the Long Term Stabilization mixtures identified in the Erosion and Sedimentation Control Scope of Work found elsewhere in this RFP. During the period between initial vegetation planting and final project acceptance, perform all work necessary to establish 80% coverage of permanent vegetation within the project limits, as well as, in borrow and waste pits. This work shall include erosion control device maintenance and installation, repair seeding and mulching, supplemental seeding and mulching, mowing, and fertilizer topdressing, as directed. All work shall be performed in accordance with the Erosion and Sedimentation Control Scope of Work found elsewhere in this RFP and the applicable sections of the 2018 *Standard Specifications for Roads and Structures*.

Once the Engineer has determined that 80% coverage of permanent vegetation has been established, the Design-Build Team will be notified to remove the remaining erosion control devices that are no longer needed. The Design-Build Team shall be responsible for, and shall correct, any areas disturbed by operations performed in permanent vegetation establishment and the removal of temporary erosion control measures, whether occurring prior to or after placing traffic on the project.

EROSION & SEDIMENT CONTROL / STORMWATER CERTIFICATION

(1-16-07) (Rev. 10-26-20) 105-16, 225-2, 16 DB1 G180

General

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

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

(A) *Certified Supervisor* - Provide a certified Erosion and Sediment Control / Stormwater (E & SC / SW) Supervisor to manage the Design-Build Team and subcontractor(s) operations, ensure compliance with Federal, State and Local ordinances and regulations, and manage the Quality Control Program.

(B) *Certified Foreman* - Provide a certified, trained foreman for each construction operation that increases the potential for soil erosion or the possible sedimentation and turbidity of surface waters.

(C) *Certified Installer* - Provide a certified installer to install or direct the installation for erosion or sediment / stormwater control practices.

(D) *Certified Designer* - Provide a certified designer for the design of the erosion and sediment control / stormwater component of reclamation plans and, if applicable, for the design of the project erosion and sediment control / stormwater plan.

Roles and Responsibilities

(A) *Certified Erosion and Sediment Control / Stormwater Supervisor* - The Certified Supervisor shall be Level II and shall be responsible for ensuring the erosion and sediment control / stormwater plan is adequately implemented and maintained on the project and for conducting the quality control program. The Certified Supervisor shall be on the project within 24 hours notice from initial exposure of an erodible surface to the project's final acceptance. The Certified Supervisor shall perform the following duties:

(1) Manage Operations - Coordinate and schedule the work of subcontractors so that erosion and sediment control / stormwater measures are fully executed for each operation and in a timely manner over the duration of the contract.

(a) Oversee the work of subcontractors so that appropriate erosion and sediment control / stormwater preventive measures are conformed to at each stage of the work.
(b) Prepare the required National Pollutant Discharge Elimination System (NPDES) Inspection Record and submit to the Engineer.
(c) Attend all weekly or monthly construction meetings to discuss the findings of the NPDES inspection and other related issues.
(d) Implement the erosion and sediment control / stormwater site plans requested.
(e) Provide any needed erosion and sediment control / stormwater practices for the Design-Build Team's temporary work not shown on the plans developed by the Design-Build Team, such as, but not limited to, work platforms, temporary construction, pumping operations, plant and storage yards, and cofferdams.
(f) Acquire applicable permits and comply with requirements for borrow pits, dewatering and any temporary work conducted by the Design-Build Team in jurisdictional areas.
(g) Conduct all erosion and sediment control / stormwater work in a timely and workmanlike manner.
(h) Fully perform and install erosion and sediment control / stormwater work prior to any suspension of the work.
(i) Coordinate with Department, Federal, State and Local Regulatory agencies on resolution of erosion and sediment control / stormwater issues due to the Design-Build Team's operations.
(j) Ensure that proper cleanup occurs from vehicle tracking on paved surfaces and / or any location where sediment leaves the right of way.
(k) Have available a set of erosion and sediment control / stormwater plans that are initialed and include the installation date of Best Management Practices. These practices shall include temporary and permanent

groundcover and be properly updated to reflect necessary plan and field changes for use and review by Department personnel, as well as regulatory agencies.

(2) Requirements set forth under the NPDES Permit - The Department's NPDES Stormwater Permit (NCS000250) outlines certain objectives and management measures pertaining to construction activities. The permit references *NCG010000, General Permit to Discharge Stormwater* under the NPDES, and states that the Department shall incorporate the applicable requirements into its delegated Erosion and Sediment Control Program for construction activities disturbing one or more acres of land. The Department further incorporates these requirements on all contracted bridge and culvert work at jurisdictional waters, regardless of size. Some of the requirements shall be, but are not limited to:

(a) Control project site waste to prevent contamination of surface or ground waters of the state, e.g. from equipment operations / maintenance construction materials, concrete washout, chemicals, litter, fuels, lubricants, coolants, hydraulic fluids, any other petroleum products, and sanitary waste.

(b) Inspect erosion and sediment control / stormwater devices and stormwater discharge outfalls at least once every seven calendar days, and within 24 hours after a rainfall event equal to or greater than 1.0 inch that occurs within a 24-hour period. At the discretion of Division of Water Resources personnel, additional monitoring may be required if the receiving stream is 303(d) listed for turbidity and the project has had documented problems managing turbidity.

(c) Maintain an onsite rain gauge or use the Department’s Multi-Sensor Precipitation Estimate website to maintain a daily record of rainfall amounts and dates.

(d) Maintain erosion and sediment control / stormwater inspection records for review by Department and Regulatory personnel upon request.

(e) Implement approved reclamation plans on all borrow pits, waste sites and staging areas.

(f) Maintain a log of turbidity test results as outlined in the Department's Procedure for Monitoring Borrow Pit Discharge.

(g) Provide secondary containment for bulk storage of liquid materials.

(h) Provide training for employees concerning general erosion and sediment control / stormwater awareness, the Department's NPDES Stormwater Permit NCS000250 requirements, and the applicable requirements of the General Permit, NCG010000.

(i) Report violations of the NPDES Permit to the Engineer immediately who will notify the NC Department of Environmental Quality Regional Office within 24 hours of becoming aware of the violation.

(3) Quality Control Program - Maintain a quality control program to control erosion, prevent sedimentation and follow provisions / conditions of permits. The quality control program shall:

(a) Follow permit requirements related to the Design-Build Team and subcontractors' construction activities.
(b) Ensure that all operators and / or subcontractor(s) on site have the proper erosion and sediment control / stormwater certification.
(c) Notify the Engineer when the required certified erosion and sediment control / stormwater personnel are not available on the job site when needed.
(d) Conduct the inspections required by the NPDES Permit.
(e) Take corrective actions in the proper timeframe as required by the NPDES Permit for problem areas identified during the NPDES inspections.
(f) Incorporate erosion control into the work in a timely manner and stabilize disturbed areas with mulch / seed or vegetative cover on a section-by-section basis.
(g) Use flocculants approved by state regulatory authorities where appropriate and where required for turbidity and sedimentation reduction.
(h) Ensure proper installation and maintenance of temporary erosion and sediment control devices.
(i) Remove temporary erosion or sediment control devices when they are no longer necessary as agreed upon by the Engineer.
(j) The Design-Build Team's quality control and inspection procedures shall be subject to review by the Engineer. Maintain NPDES inspection records and make records available at all times for verification by the Engineer.

(B) *Certified Foreman* - At least one Certified Foreman shall be onsite for each type of work listed herein during the respective construction activities to control erosion, prevent sedimentation and follow permit provisions:

(1) Foreman in charge of grading activities
(2) Foreman in charge of bridge or culvert construction over jurisdictional areas
(3) Foreman in charge of utility activities

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

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

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

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

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

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

Preconstruction Meeting

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

Ethical Responsibility

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

Revocation or Suspension of Certification

Upon recommendation of the Chief Engineer to the certification entity, certification for Supervisor, Certified Foremen, Certified Installer and Certified Designer may be revoked or

suspended with the issuance of an Immediate Corrective Action (ICA), Notice of Violation (NOV), or Cease and Desist Order for erosion and sediment control / stormwater related issues.

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

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

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

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

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

Failure to appeal within ten calendar days shall result in the proposed adverse action becoming effective on the date specified on the certified notice. Failure to appeal within the time specified shall result in a waiver of all future appeal rights regarding the adverse action taken. The certificant will not be allowed to perform duties associated with the certification during the appeal process. The Chief Engineer will hear the appeal and make a decision within seven days of hearing the appeal. The decision of the Chief Engineer shall be final and will be made in writing to the certificant.

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

Measurement and Payment

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

PROCEDURE FOR MONITORING BORROW PIT DISCHARGE

(1-22-13) (Rev. 9-7-17) DB1 G181

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

If during any operating day, the downstream water quality exceeds the standard, the Design-Build Team shall do all of the following:

(A) Either cease discharge or modify the discharge volume or turbidity levels to bring the downstream turbidity levels into compliance, or

(B) Evaluate the upstream conditions to determine if the exceedance of the standard is due to natural background conditions. If the background turbidity measurements exceed the standard, operation of the pit and discharge can continue as long as the stream turbidity levels are not increased due to the discharge.

(C) Measure and record the turbidity test results (time, date and sampler) at all defined sampling locations 30 minutes after startup and at a minimum, one additional sampling of all sampling locations during that 24-hour period in which the borrow pit is discharging.

(D) Notify DWR within 24 hours of any stream turbidity standard exceedances that are not brought into compliance.

During the Environmental Assessment required by Article 230-4 of the 2018 *Standard Specifications for Roads and Structures*, the Design-Build Team shall define the point at which the discharge enters into the State's surface waters and the appropriate sampling locations. Sampling locations shall include points upstream and downstream from the point at which the discharge enters these waters. Upstream sampling location shall be located so that it is not influenced by backwater conditions and represents natural background conditions. Downstream sampling location shall be located at the point where complete mixing of the discharge and receiving water has occurred.

The discharge shall be closely monitored when water from the dewatering activities is introduced into jurisdictional wetlands. Any time visible sedimentation (deposition of sediment) on the wetland surface is observed, the dewatering activity will be suspended until turbidity levels in the stilling basin can be reduced to a level where sediment deposition does not occur. Staining of wetland surfaces from suspended clay particles, occurring after evaporation or infiltration, does

not constitute sedimentation. No activities shall occur in wetlands that adversely affect the functioning of a wetland. Visible sedimentation shall be considered an indication of possible adverse impacts on wetland use.

The Engineer will perform independent turbidity tests on a random basis. These results will be maintained in a log within the project records. Records will include, at a minimum, turbidity test results, time, date and name of sampler. Should the Department's test results exceed those of the Design-Build Team's test results, an immediate test shall be performed jointly with the results superseding the previous test results of both the Department and the Design-Build Team.

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

https://connect.ncdot.gov/resources/roadside/FieldOperationsDocuments/TurbidityReductionOptionSheet.pdf

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

Except as required otherwise below, perform clearing on this project to the limits established by Method III shown on Roadway Standard Drawing No. 200.03. In areas with Permanent Utility Easements, clearing shall extend to the right of way limits. Excluding jurisdictional areas, where Method III clearing results in a single tree or single line of trees remaining within the right of way limits (existing or proposed), the Design-Build Team shall clear to the right of way limits.

BUILDING AND APPURTENANCE REMOVAL / DEMOLITION

(9-1-11) (Rev. 9-7-17) DB2 R12A

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

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

MANUFACTURED QUARRY FINES IN EMBANKMENTS

(11-30-16) (Rev. 9-7-17) 235 DB02 R72

Description

This specification addresses the use of manufactured quarry fines that are not classified as select materials. The specification allows the Design-Build Team an option, with the approval of the Engineer, to use manufactured quarry fines (MQFs) in embankments as a substitute for conventional borrow material. Furnish and place geotextile for pavement stabilization in accordance with the *Geotextile for Pavement Stabilization* Project Special Provision found elsewhere in this RFP and the detail developed by the Design-Build Team. Geotextile for pavement stabilization shall be required to prevent pavement cracking and provide separation between the subgrade and pavement section at embankment locations where manufactured quarry fines are utilized and as directed by the Engineer.

Manufactured Quarry Fines (MQF)

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

The following MQFs are unacceptable:

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

Collect and transport MQFs in a manner that will prevent nuisances and hazards to public health and safety. Moisture condition the MQFs as needed and transport in covered trucks to prevent dusting. If MQFs are blended with natural earth material, follow Borrow Criteria in Section 1018 of the 2018 NCDOT *Standard Specifications for Roads and Structures.*

Geotextiles

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

Preconstruction Requirements

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

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

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

Construction Methods

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

Construct embankments by placing MQFs in level uniform lifts with no more than a lift of ten inches and compacted to at least a density of 95 percent as determined by test methods in AASHTO T-99, Determination of Maximum Dry Density and Optimum Moisture Content, Method A or C depending upon particle size of the product. Provide a moisture content at the time of compaction of within 4.0 percent of optimum but not greater than one percent above optimum as determined by AASHTO T-99, Method A or C.

DRAINAGE PIPE

(9-1-11) DB3 R36

Description

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

- All pipe types shall be subject to the maximum and minimum fill height requirements as found in the Roadway Standard Drawing No. 300.01 - Sheet 3 of 3, the North Carolina Division of Highways *Guidelines for Drainage Studies and Hydraulics Design* or the *NCDOT Pipe Material Selection Guide*. In case of conflicting design parameters in the resources noted above, the maximum and minimum fill heights shall adhere to the most conservative values. The appropriate Reinforced Concrete Pipe class and the appropriate gage thickness for Corrugated Aluminum Alloy Pipe and Welded Steel Pipe shall be selected based on fill height.

- Site specific conditions may limit a particular material beyond what is identified in this Project Special Provision. These conditions include, but are not limited to, abrasion, environmental, soil resistivity and pH, high ground water and special loading conditions. The Design-Build Team shall determine if additional restrictions are necessary.

- Slope drains shall be Corrugated Aluminum Alloy Pipe, Corrugated Polyethylene Pipe (HDPE Pipe) or Polyvinyl-Chloride Pipe (PVC Pipe).

- Excluding walled roadway sections and areas of potential Volatile Organic Compound contamination, transverse median drains, storm drainage system pipes, and open-ended cross drains shall be Reinforced Concrete Pipe unless the pipe slope is greater than 10%, in which case the pipe shall be Corrugated Aluminum Alloy Pipe. (Reference the Hydraulics Scope of Work and GeoEnvironmental Scope of Work found elsewhere in this RFP)

CEMENT TREATED BASE COURSE

(7-22-13) (Rev. 9-8-17) DB5 R21A

General

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

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

Sampling Aggregate

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

Job Mix Formula

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

Determine Required Portland Cement Rate

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

Submittals for Review and Approval Prior to Construction

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

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

Construction of Cement Treated Base Course

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

Unconfined Compressive Strength

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

Submittals for Review During Construction

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

PRICE ADJUSTMENTS FOR ASPHALT BINDER

(9-1-11) (Rev. 8-23-18) DB6 R25

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

**** NOTE **** Deleted paragraph pertaining to the CEI firm's responsibilities.

The base price index for asphalt binder for plant mix is **$499.55** per ton.

This base price index represents an average of F.O.B. selling prices of asphalt binder at supplier's terminals on July 1, 2021.

PRICE ADJUSTMENTS - ASPHALT CONCRETE PLANT MIX

(9-1-11) (Rev. 9-8-17) DB6 R26

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

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

Add the following paragraph before the first paragraph:

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

FIELD OFFICE

(6-1-07) (Rev. 6-22-15) DB 08-01

Description

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

Procedures

The field office and equipment shall remain the property of the Design-Build Team upon completion of the contract. The field office must be separated from buildings and trailers used by the Design-Build Team and shall be erected and functional as an initial operation. Failure to have the field office functional when work first begins on the project shall result in withholding payment of the Design-Build Team's monthly progress estimate. The field office must be operational throughout the duration of the project and be removed upon completion and final acceptance of the project.

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

Provide a field office with a minimum floor space of 500 square feet and that is equipped with the following:

Number	Item
1	Double-pedestal desk (approximately 60 by 34 inches, at least 2,000 square inches)
1	Plan and drafting table (approximately 30 by 96 inches) with adjustable stool
1	Computer table having a minimum size of 48 by 30 by 29 inches
1	Plan rack for 24-inch by 36-inch drawings with six plan clamps
1	Printing calculator
2	Two-drawer fire protection file, 15-inch drawer width, minimum UL rating of Class 350
6	Office chairs with a minimum of two having casters
2	Wastebaskets
1	Pencil sharpener
1	Copy machine (8-inch x 11-inch copies)
1	Telephone
1	Fax Machine
1	Answering machine
1	Internet Connection Service (modem for Wi-Fi)

Windows and Doors

Provide a field office with at least three windows, with blinds, each having an area of at least 540 square inches, capable of being easily opened and secured from the inside and having at least two exterior passage doors. Provide doors at least 30 inches in width and 78 inches in height. Provide screens for windows and doors. Equip exterior passage door(s) with lock(s), and furnish at least two keys to the Engineer or inspector.

Steps

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

Storage Facility for Nuclear Gage

Furnish the field office with an outside storage facility for the Department's nuclear gage. The storage facility shall not be located within ten feet of any other structure including the field office.

Lighting, Heating, and Air Conditioning

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

Fire Extinguishers

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

Toilets

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

Utilities

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

Storage Facility for Test Equipment

Provide the field office with a storage facility, separate from the office for storage of test equipment, other than the nuclear gage. Provide a facility that has a minimum floor space of 64 square feet, is weatherproof, tightly floored and roofed, and has a tamper resistant key operated lock.

Miscellaneous Items

The field office must also include the following:

1. A certification that the office is free of asbestos and other hazardous materials.
2. A broom, dust pan, mop and bucket, and general cleaning supplies.

3. Provide and maintain an all-weather parking area for six vehicles, including graveled access to the paved surface.

DYNAMIC MESSAGE SIGN (DMS)

DESCRIPTION

To ensure compatibility with the existing DMS Control Software deployed in the State, furnish NTCIP compliant DMSs that are fully compatible with Daktronics, Inc. Vanguard V4 or latest version software (also referred to hereinafter as the "Control Software"). Contact the engineer to inquire about the current version being used.

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

Add and configure the new DMSs in the system using the Control Software and computer system. Furnish, install, test, integrate and make fully operational the new DMSs 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 Type 2 - Walk-in Type 3 - Embedded Type 4 - Lane Control	A - Amber - 66 mm C - Full Color - 20 mm

- **DMS Type 1A** - Front Access Amber 66 mm - 27 pixels high by 60 pixels wide
    - 3 lines, 10 characters per line, using 18" high characters.
- **DMS Type 1C** - Front Access Full Color 20 mm - 96 pixels high by 208 pixels wide
    - 3 lines, 11 characters per line, using 18" high characters.
- **DMS Type 2A** - Walk-in Amber 66 mm - 27 pixels high by 90 pixels wide
    - 3 lines, 15 characters per line, using 18" high characters.
- **DMS Type 2C** - Walk-in Full Color 20 mm - 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 66 mm - 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 20 mm - 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 20 mm - 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 Requirements

Construct the DMS and DMS controller cabinet so the equipment within is protected against moisture, dust, corrosion, and vandalism.

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 developed by the Design-Build Team) 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 no internal

frame connections or external skin attachments rely upon adhesive bonding or rivets. 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. Design and construct the DMS unit for continuous usage of at least 20 years. 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 visible to the motorist. 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. 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. Ensure that exterior seams and joints, except the finish coated face pieces, are continuously welded using an inert gas welding method. 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

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.

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

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 -40º F to +176º 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 +140º F, when the outdoor ambient temperature is +115º F or less.

The ventilation system shall 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 ball bearing-type ventilation fans at each intake port. These fans shall 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 shall 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 140º F. The DMS shall provide an output to the controller to notify the Vanguard client 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

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.

Design Type 3A and 3C DMS with at least the following message displays:

- A static display, green in color, reading “OPEN”
- A static display, red in color, reading “CLOSED”
- A static display, amber in color, with the ability to display a toll rate in the following format “$ XX.XX”

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° F to +140° 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° 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° F to 140° F. Power supply output at 140° F must not deteriorate to less than 65% of its specified output at 70° 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.

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 66 mm or 20 mm 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 40 Cd 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 an LCD / keypad interface. Size the LCD 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 the most recent version of the *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*, currently in use by the Department and the section titled "DMS Assemblies" 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 four feet. Ensure a minimum of 3' x 3' level 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 for local laptop computer
- 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 NEMA 3R 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 visible to the motorist.

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 one 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 15-watt fluorescent 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 Hz ± 3 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 developed by the Design-Build Team signed and sealed by a NC registered PE and submit the plans for review and acceptance.

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^{o} F to +158^{o} 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)

Provide the cabinet with an industrial grade power conditioning UPS unit to supply continuous power to operate the equipment connected to it if the primary power fails. **The UPS must continue to condition power supplied to the DMS controller in the event of battery failure within the UPS.** The UPS must detect a power failure and provide backup power within 20 milliseconds. Transition to the UPS source from primary power must not cause loss of data or damage to the equipment being supplied with backup power. Provide an UPS with at least three outlets for supplying conditioned AC voltage to the DMS controller. Provide a unit to meet the following requirements:

Input Voltage Range	120VAC +12%, -25%
Power Rating	1000 VA, 700 Watts
Input Frequency	45 to 65 Hz
Input Current	7.2A
Output Voltage	120VAC +/- 3%
Output Frequency	50/60 +/-1 Hz
Output Current	8.3A
Output Crest Factor Ratio	@ 50% Load Up to 4.8:1 @ 75% Load Up to 3.2:1 @ 100% Load Up to 2.4:1
Output THD	3% Max. (Linear) 5% Max. (Non-Linear)
Output Overload	110% for 10 min; 200% for 0.05 sec.
Output Dynamic Response	+/- 4% for 100% Step Load Change 0.5 ms Recovery Time
Output Efficiency @ 100% Load	90% (Normal Mode)
Operating Temperature	-40° F to +165 ° F
Humidity	0% to 95% Non-condensing
Remote Monitoring Interface	RS-232
Protection	Input / Output Short Circuit Input / Output Overload Excessive Battery Discharge
Specifications	UL1778, FCC Class A, IEE 587

Provide the UPS unit capable of supplying **30 minutes** of continuous backup power to the cabinet equipment connected to it when the equipment is operating at full load.

Controller Communications Interface

Provide the controller with the following interface ports:

- 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
- RJ45 ports for communication with the sign using CAT-5 cable
- RJ45 ports for communication with mini controller located inside the sign enclosure

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
- LCD 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 LCD display with a minimum size of 240 x 64 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

Provide a parts list that contains all information needed to describe the characteristics of the individual parts, as required for identification. 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, manufacturer'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

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

Provide complete and detailed schematic diagrams to component level for all DMS assemblies and subassemblies such as driver boards, control boards, DMS controller, power supplies, 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 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 the recommended preventative maintenance procedures and checks at pre-operation, monthly, quarterly, semiannual, annual, and "as required" periods to assure equipment operates reliably. 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 section titled “Wiring Diagrams and Theory of Operation.”

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 defects for a minimum of five (5) years from the date of final acceptance by the Engineer.

CONSTRUCTION METODS

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 Design-Build Team shall determine the location of each DMS assembly and obtain the Engineer's approval of the locations prior to installation. It shall be 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 shall show: the DMS, controller, and service pole locations; DMS enclosure and controller cabinet wiring layouts; and wire and conduit routing. Show 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 2018 *Standard Specifications for Roads and Structures* 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 DMS 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 4 feet for conduit 1.5 inches and larger or 6 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 5 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 this Project Special Provision 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 4 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. These tests shall 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 four 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 shall be the Design-Build Team’s responsibility to ensure the system functions properly even after the Engineer accepts the CCTV test results.

Provide four 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 shows 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 shall be 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. The Design-Build Team shall be 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.

      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 this Project Special Provision and the 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 for information on the current status of NTCIP standards.

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

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.

Code	Feature
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 CD-ROM 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 this Project Special Provision 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 of 25 feet clearance from the high point of the road to the bottom of the DMS enclosure.

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 shall prepare such computations and drawings. These must bear his signature, seal, and date of acceptance.

The provisions of Section 900 of the 2018 *Standard Specifications for Roads and Structures* 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/2018-Specifications-and-Special-Provisions.aspx

It shall be 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 2018 *Standard Specification for Roads and Structures*
- 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 2018 *Standard Specification for Roads and Structures*
- 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 will be 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 opens 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 4" x 4" 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. Access to the ladder shall not be obstructed by the DMS foundation. 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 six 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.

Furnish and install a level concrete pad a minimum of four inches deep, 24 inches wide, and 36 inches long to service as a landing pad for accessing the ladder. Design the landing pad to be directly below the bottom rung. Access to the ladder shall not be obstructed by the DMS foundation. Provide pre-formed or cast-in place concrete pads.

DIGITAL CCTV CAMERA ASSEMBLY

DESCRIPTION

Furnish and install a Digital CCTV Camera Assembly as described in these Project Special Provisions. All new CCTV cameras shall be fully compatible with the video management software currently in use by the Region and the Statewide Traffic Operations Center (STOC). Provide a Pelco Spectra Enhanced low light 30X minimum zoom, Axis Dome Network Camera low light 30X minimum zoom or an approved equivalent that meets the requirements of this Project Special Provision.

Materials

A. **General**

Furnish and install new CCTV camera assembly at the locations shown on the plans developed by the Design-Build Team and as approved by the Engineer. Each assembly shall consist 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.

B. Camera and Lens

Cameras

Furnish a new CCTV camera that utilizes charged-coupled device (CCD) technology or Complementary Metal-Oxide-Semiconductor (CMOS) technology. The camera shall meet the following minimum requirements:

- Video Resolution: Minimum 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 (EIS)
- Automatic focus with manual override

Zoom Lens

Furnish each camera with a motorized zoom lens that is a 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 minimum optical zoom, and 12X minimum digital zoom
- Preset positioning: minimum of 128 presets

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

Communication Standards

The CCTV camera shall support the appropriate NTCIP 1205 communication protocol (version 1.08 or higher), ONVIF Profile G protocol, 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, IP6
- 130 db Wide Dynamic Range (WDR)

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 10/100BaseTX 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.

C. Camera Housing

Furnish new dome style enclosure for the CCTV assembly. Equip each housing with mounting assembly for attachment to the CCTV camera pole. The enclosures shall be equipped with a sunshield and be fabricated from corrosion resistant aluminum and finished in a neutral color of weather resistant enamel. The enclosure shall meet or exceed NEMA 4X ratings. The viewing area of the enclosure shall be tempered glass. The pendant shall meet NEMA Type 4X, IP66 rating and use 1-1/2-inch NPT thread. The sustained operating temperature shall be -50 to 60C (-58 to 144F), condensing temperature 10 to 100% Relative Humidity (RH).

B. Pan and Tilt Unit

Equip each new dome style assembly with a pan and tilt unit. The pan and tilt unit shall be integral to the high-performance integrated dome system. The pan and tilt unit shall be rated for

outdoor operation, provide dynamic braking for instantaneous stopping, prevent drift, and have minimum backlash. The pan and tilt units shall meet or exceed the following specifications:

- Pan: continuous 360 Degrees rotation
- Tilt: up / down +2 to -90 degrees minimum
- Motors: Two-phase induction type, continuous duty, instantaneous reversing
- Preset Positioning: minimum of 128 presets
- Low latency for improved Pan and Tilt Control
- FCC, Class A; UL/cUL Listed

C. Video Ethernet Encoder

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

Encoders shall have the following minimum features:

- Network Interface: Ethernet 10/100Base-TX (RJ-45 connector)
- Protocols: IPv4, Ipv6, HTTP, UpnP, DNS, NTP, RTP, RTSP, 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
- Aspect Ratio: 16:9
- 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

D. Control 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 shall provide the following functions:

- Zoom in / out
- Automatic focus with manual override
- Tilt up / down
- Automatic iris with manual override
- Pan right / left
- Minimum 128 preset positions for pan, tilt, and zoom, 16 Preset Tours, 256 Dome Presets

- Up to 32 Window Blanks.

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

E. Electrical

The camera assembly shall support Power-over-Ethernet (PoE) in compliance with IEEE 802.3. Provide any external power injector that is required for PoE with each CCTV assembly.

F. CCTV Camera Attachment to Pole

Furnish and install an attachment assembly for the CCTV camera unit. Use stainless steel banding approved by the Engineer.

Furnish CCTV attachments that allow for the removal and replacement of the CCTV enclosure as well as providing a weatherproof, weather tight, seal that does not allow moisture to enter the enclosure.

Furnish a CCTV Camera Attachment Assembly that can withstand wind loading at the maximum wind speed and gust factor called for in these Special Provisions and can support a minimum camera unit dead load of 45 pounds (20.4 kg).

G. Riser

Furnish material meeting the requirements of Section 1091-3 and 1098-4 of the 2018 *Standard Specifications for Roads and Structures*. Furnish a one-inch riser with weatherhead for instances where the riser is only carrying an Ethernet cable. For installations where fiber optic cable is routed to the cabinet through a two-inch riser with heat shrink tubing the Design-Build Team may elect to install the Ethernet cable in the same riser with the fiber cable.

H. Data line Surge Suppression

Furnish data line surge protection devices (SPD) shall meet the following minimum requirements:

- UL497B
- Service Voltage: < 60 V
- Protection Modes: L-G (All), L-L (All)
- Response Time: <5 nanoseconds
- Port Type: Shielded RJ-45 IN / Out
- Clamping Level: 75 V
- Surge Current Rating: 20 kA/Pair

- Power Handling: 144 Watts
- Data Rate: up to 10 GbE
- Operating Temperature: -40º F to + 158º F
- Standards Compliance: Cat-5e, EIA/TIA 568A and EIA/TIA 568B
- Warranty: Minimum of 5-year limited warranty

The data line surge protector shall be designed to operate with Power Over Ethernet (POE) devices. The SPD shall be designed such that when used with shielded cabling, a separate earth ground is not required. It shall be compatible with Cat-5e, Cat 6, and Cat-6A cablings.

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.

I. POE Injector

Furnish POE Injectors meeting the following minimum performance requirements and that is compatible with the CCTV Camera and Ethernet Switch provided for the project.

- Working temp / humidity: 14º F to 131º F / maximum 90%, non-condensing
- Connectors: Shielded RJ-45, EIA 568A and EIA 568B
- Input Power: 100 to 240 VAC, 50 to 60 Hz
- Pass Through Data Rates: 10/100/1000 Mbps
- Regulatory: IEEE 802.3at (POE)
- Number of Ports: 1 In and 1 Out
- Safety Approvals: UL Listed

Ensure the POE Injector is designed for Plug-and-Play installation, requiring no configurations and supports automatic detection and protection of non-standard Ethernet Terminal configurations.

CONSTRUCTION METHODS

General

Obtain approval of the camera locations and orientation from the Engineer prior to installing the CCTV camera assembly.

Mount CCTV camera units at a height to adequately see traffic in all directions and as approved by the Engineer. The maximum attachment height shall be 45 feet above ground level unless specified elsewhere or directed by the Engineer.

Mount the CCTV camera units such that a minimum five feet of clearance is maintained between the camera and the top of the pole.

Mount CCTV cameras on the side of poles nearest intended field of view. Avoid occluding the view with the pole.

Install the data line surge protection device and POE Injector in accordance with the manufacturer's recommendations.

Install the riser in accordance with Section 1722-3 of the 2018 *Standard Specifications for Roads and Structures*. Install the Ethernet cable in the riser from the field cabinet to the CCTV camera.

Electrical and Mechanical Requirements

Install an "Air Terminal and Lightning Protections System" in accordance with the Air Terminal and Lightning Protection System Specification for the CCTV Camera Assembly. Ground all equipment as called for in the Standard Specifications, these Special Provisions, and the plans developed by the Design-Build Team.

Install surge protectors on all ungrounded conductors entering the CCTV enclosure.

GENERAL TEST PROCEDURE

Test the CCTV Camera and its components in a series of functional tests and ensure the results of each test meet the specified requirements. These tests shall 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 four 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 shall be the Design-Build Team's responsibility to ensure the system functions properly even after the Engineer accepts the CCTV test results.

Provide four 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 shall sign the test results and data forms.

COMPATIBILITY TESTS

A. CCTV System

Compatibility Tests shall be applicable to CCTV cameras 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 shall be 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)

B. CCTV System

Final CCTV locations shall be field verified and approved by the Engineer. Perform the following local operational field tests at the camera assembly field site in accordance with the test plans. The Design-Build Team shall be 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 camera, PTZ, camera control receiver, 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 CCTV assembly manufacturer's initial power-on test in accordance with the manufacturer's recommendation.
- Set the camera control address.
- Exercise the pan, tilt, zoom, and focus operations along with preset positioning, and power on / off functions.
- Demonstrate the pan, tilt and zoom speeds and movement operation meet all applicable standards, specifications, and requirements.
- Define, test and / or change presets.
- Ensure camera field of view is adjusted properly and there are no objects obstructing the view.
- Ensure camera lens is dust-free.
- Ensure risers are bonded and conduits entering cabinets are sealed properly.
- Lightning arrestor bonded correctly.

Central Operations Testing

- Interconnect the CCTV Camera'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 CCTV camera is fully operational at the TOC.

      OR

    - to the DOT furnished cellular modem and verify a transmit / receive LED is functioning and that the CCTV camera is fully operational at the TOC.
- Exercise the pan, tilt, zoom, and focus operations along with preset positioning, and power on / off functions.
- Demonstrate the pan, tilt and zoom speeds and movement operation meet all applicable standards, specifications, and requirements.
- Define, test and / or change presets.

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 CCTV 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.

CCTV FIELD EQUIPMENT CABINET

DESCRIPTION

For standalone CCTV Camera installations, furnish 336S pole mounted cabinets to house CCTV control and transmission equipment. The cabinets shall consist of a cabinet housing, 19-inch EIA mounting cage, and power distribution assembly (PDA #3 as described in the CALTRANS TSCES).

The cabinet housing shall conform to Sections 6.2.2 (Housing Construction), 6.2.3 (Door Latches and Locks), 6.2.4 (Housing Ventilation), and 6.2.5 (Hinges and Door Catches) of the CALTRANS TSCES. Do not equip the cabinet housings with a police panel.

The cabinet cage shall conform to Section 6.3 of the CALTRANS TSCES.

Terminal blocks on the PDA #3 Assembly have internal wiring for the Model 200 switch pack sockets. Do not use terminal blocks on PDA #3 as power terminals for cabinet devices. Do not furnish cabinet with "Input Panels" described in Section 6.4.7.1 of the TSCES. Do furnish cabinet with "Service Panels" as described in Section 6.4.7.1 of the TSCES and as depicted on drawing TSCES-9 in the TSCES. Use service panel #2.

Do not furnish cabinets with C1, C5, or C6 harness, input file, output file, monitor units, model 208 unit, model 430 unit, or switch packs.

Furnish terminal blocks for power for cabinet CCTV and communications devices as needed to accommodate the number of devices in the cabinet.

Furnish all conduits, shelving, mounting adapters, and other equipment as necessary to route cabling, mount equipment and terminate conduit in the equipment cabinet.

MATERIALS

A. Shelf Drawer

Provide a pull out, hinged-top drawer, having sliding tracks, with lockout and quick disconnect feature, such as a Vent-Rak Retractable Writing Shelf, #D-4090-13 or equivalent in the equipment cabinet. Furnish a pullout drawer that extends a minimum of 14 inches that is capable of being lifted to gain access to the interior of the drawer. Minimum interior dimensions of the drawer are to be one inch high, 13 inches deep, and 16 inches wide. Provide drawers capable of supporting a 40-pound device or component when fully extended.

B. Cabinet Light

Each cabinet shall include two (2) fluorescent lighting fixtures (one front, one back) mounted horizontally inside the top portion of the cabinet. The fixtures shall include a cool white lamp and shall be operated by normal power factor UL-listed ballast. A door-actuated switch shall be

installed to turn on the applicable cabinet light when the front door or back door is opened. The lights shall be mounted not to interfere with the upper door stay.

C. Surge Protection for System Equipment

Each cabinet shall be provided with devices to protect the CCTV and communications equipment from electrical surges and over voltages as described below.

Main AC Power Input

Each cabinet shall be provided with a hybrid-type, power line surge protection device mounted inside the power distribution assembly. The protector shall be installed between the applied line voltage and earth ground. The surge protector shall be capable of reducing the effect of lighting transient voltages applied to the AC line. The protector shall be mounted inside the Power Distribution Assembly housing facing the rear of the cabinet. The protector shall include the following features and functions:

- Maximum AC line voltage: 140 VAC
- Twenty pulses of peak current, each of which shall rise in 8 microseconds and fall in 20 microseconds to ½ the peak: 20000 Amperes
- The protector shall be provided with the following terminals:
    - Main Line (AC Line first stage terminal)
    - Main Neutral (AC Neutral input terminal)
    - Equipment Line Out (AC line second state output terminal, 19 amps)
    - Equipment Neutral Out (Neutral terminal to protected equipment)
    - GND (Earth connection)
- The Main AC line in and the Equipment Line out terminals shall be separated by a 200 Microhenry (minimum) inductor rated to handle 10 AMP AC Service.
- The first stage clamp shall be between Main Line and Ground terminals.
- The second stage clamp shall be between Equipment Line Out and Equipment Neutral.
- The protector for the first and second stage clamp shall have an MOV or similar solid state device rated at 20 KA and shall be of a completely solid-state design (i.e., no gas discharge tubes allowed).
- The Main Neutral and Equipment Neutral Out shall be connected together internally and shall have an MOV similar solid-state device or gas discharge tube rated at 20 KA between Main Neutral and Ground terminals.
- Peak Clamp Voltage: 350 volts at 20 KA. (Voltage measured between Equipment Line Out and Equipment Neutral Out terminals. Current applied between Main Line and Ground Terminals with Ground and Main Neutral terminals externally tied together).
- Voltage shall never exceed 350 volts.

- The Protector shall be epoxy-encapsulated in a flame-retardant material.
- Continuous service current: 10 Amps at 120 VAC RMS.
- The Equipment Line Out shall provide power to cabinet CCTV and communications equipment.

Ground Bus

Provide a neutral bus that is not connected to the earth ground or the logic ground anywhere within the cabinet. Ensure that the earth ground bus and the neutral ground bus each have ten compression type terminals, each of which can accommodate wires ranging from number 14 through number 4 AWG.

Uninterruptible Power Supply (UPS)

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

Output

- Output Power Capacity 480 Watts / 750 VA
- Max Configurable Power 480 Watts / 750 VA
- 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
- Cord Length 6 feet
- 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
• Control panel	LED status display with load and battery bar-graphs

Surge Protection and Filtering

• Surge energy rating	480 Joules

Environmental

• Operating Environment	-32 - 104 °F
• Operating Relative Humidity	0 - 95%
• Storage Temperature	5 - 113 °F
• Storage Relative Humidity	0 - 95%

Conformance

• Regulatory Approvals	FCC Part 15 Class A, UL 1778

CONSTRUCTION METHODS

A. General

For each field equipment cabinet installation, use stainless steel banding or other methods approved by the Engineer to fasten the cabinet to the pole. Install field equipment cabinets so that the height to the middle of the enclosure is four feet from ground level. No risers shall enter the top or sides of the equipment cabinet.

Install all conduits, condulets, and attachments to equipment cabinets in a manner that preserves the minimum bending radius of cables and creates waterproof connections and seals.

Install a UPS in each cabinet and power all CCTV cameras from the UPS.

CCTV WOOD POLE

DESCRIPTION

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

Furnish an air terminal and lightning protection system in accordance with the *Air Terminal & Lightning Protection System* Project Special Provision found elsewhere in this RFP.

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

MATERIALS

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

CCTV Wood Pole

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

CONSTRUCTION METHODS

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

Install the required Air Terminal & Lightning Protection System as described in the *Air Terminal & Lighting Protection* Project Special Provision found elsewhere in this RFP and as referenced in the following Typical Details:

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

CELLULAR MODEMS FOR COMMUNICATIONS

DESCRIPTION

For equipment cabinets designated to communicate via an NCDOT furnished cellular modem, install cellular modems provided by the Department to establish a communications link to the NCDOT Division 6 Traffic Services Office and the Statewide Traffic Operations Center.

MATERIALS

Obtaining Cellular Modem

To obtain cellular modems in a timely manner make request to the Engineer a minimum of 8 (eight) weeks in advance of deployment. Cellular modems will be provided with all necessary network configuration data and IP addressing for plug-and-play operations. Cellular modems will be supplied with a power supply, antenna with coaxial cabling, nuts and washers for installation by the Design-Build Team.

Cellular Modem Antenna Mounting Bracket

Fabricate, furnish and install an L-Shaped mounting bracket to be secured to the outside of the cabinet to hold the cellular modem antenna. Design the L-Shape bracket out of 5052-H32

aluminum that is 0.125” thick by 3“ wide by 6” long. Place a 90-degree bend along the 6” axis at ½ its length. Provide two ¼” mounting holes on one side of the L-Bend and provide 1/4'' stainless-steel bolts, washers and nuts, for mounting the L-Bracket to the outside of the cabinet. On the other half of the bracket provide a 5/8” hole centered in the plate to accept the cellular antenna and coaxial cable.

CONSTRUCTION METHODS

Cellular Modem

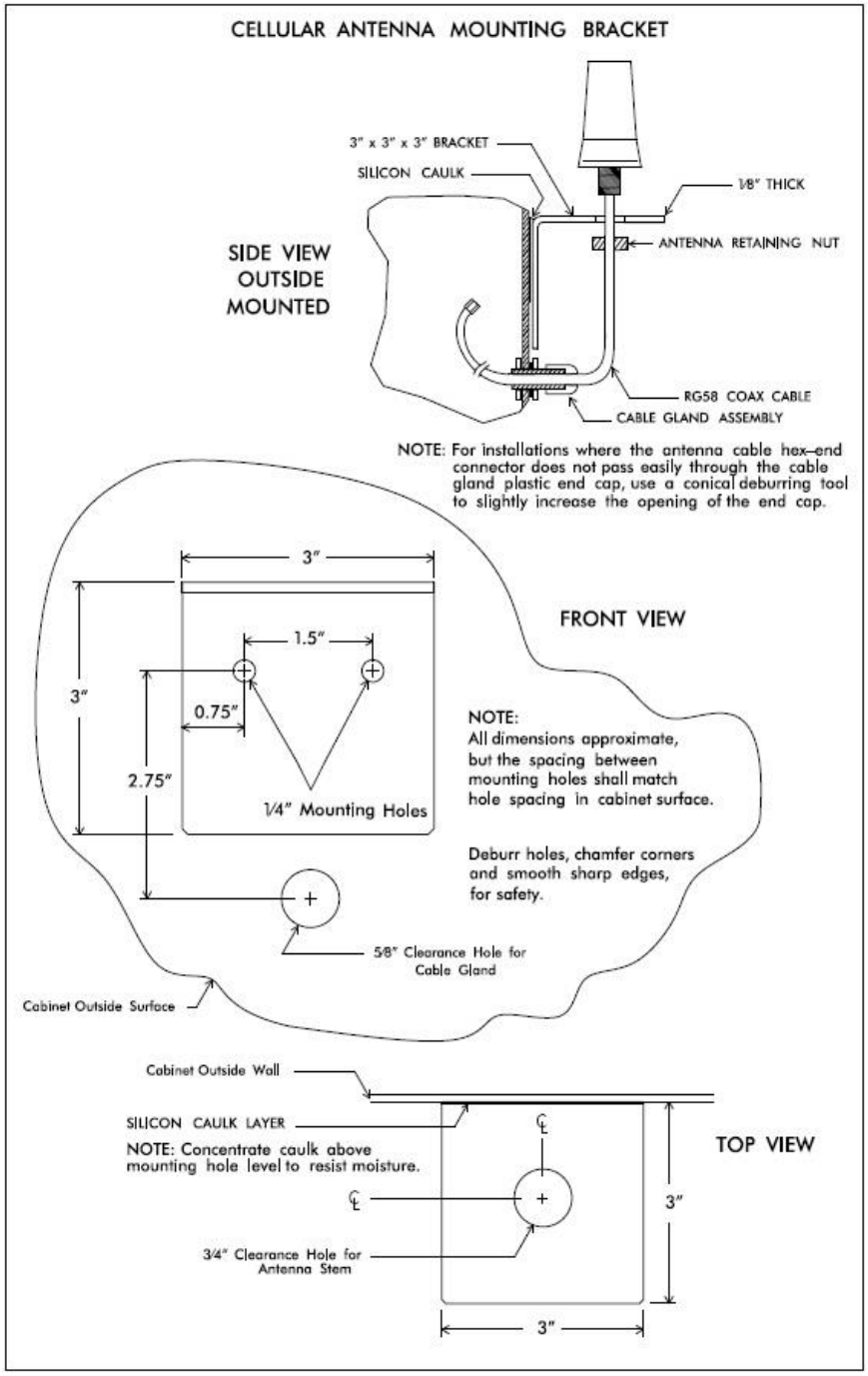
Mount the modem in the cabinet so as not to interfere with access or visually inspecting other equipment located in the cabinet. Arrange all cables (power, antenna and network cables) in a neat workmanship like manner. Use zip ties or other means to neatly route and secure the various cables so they are not subject to becoming pinched in the cabinet doors or be subject to fraying as they bend around objects in the cabinet interior. Secure the modem in a manner approved by the Engineer.

Cellular Modem Antenna Mounting Bracket

Filed drill mounting holes in the cabinet to match up with the bracket mounting holes. Drill one (1) additional 5/8” hole centered under the bracket into the side of the cabinet to provide an entryway for the antenna’s coaxial cable. For all drilling operations that require field manufacturing of holes in a cabinet shell, ensure caution is taken to not allow metal shavings to fall into or on equipment inside the cabinet.

Prior to mounting the L-Bracket to the cabinet, run a ¼” bead of silicon calk near the back-top area of the L-Bracket and around each field drilled ¼” cabinet mounting holes. Install stainless steel bolts, washers and nuts and secure the bracket to the cabinet. Install the coaxial antenna cable through the cable gland (Bud Industries - Nylon Cable Gland: Part No: NG-9512, or equivalent) and into the cabinet. If necessary, lightly ream the nylon compression nut opening for insertion of the RG-58 antennae hex nut and coaxial cable. Tighten the cable gland to the cabinet shell and tighten the compression nut on the nylon cable gland to provide a water-tight seal around the coaxial antenna cable.

Reference the drawing below for additional details regarding the Mounting Bracket construction and mounting.


CELLULAR ANTENNA MOUNTING BRACKET
3" x 3" x 3" BRACKET
SILICON CAULK
1/8" THICK
ANTENNA RETAINING NUT
SIDE VIEW
OUTSIDE
MOUNTED
RG58 COAX CABLE
CABLE GLAND ASSEMBLY
NOTE: For installations where the antenna cable hex-end connector does not pass easily through the cable gland plastic end cap, use a conical deburring tool to slightly increase the opening of the end cap.
3"
1.5"
3"
0.75"
2.75"
1/4" Mounting Holes
FRONT VIEW
NOTE:
All dimensions approximate, but the spacing between mounting holes shall match hole spacing in cabinet surface.
Deburr holes, chamfer corners and smooth sharp edges, for safety.
5/8" Clearance Hole for Cable Gland
Cabinet Outside Surface
Cabinet Outside Wall
SILICON CAULK LAYER
NOTE: Concentrate caulk above mounting hole level to resist moisture.
TOP VIEW
3"
3/4" Clearance Hole for Antenna Stem
3"

ETHERNET CABLE

DESCRIPTION

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

MATERIALS

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

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

Meets the following Minimum Electrical Operating Characteristics:

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

The Ethernet cable shall be factory tested on reels for each pair's mutual capacitance, crosstalk loss, insulation resistance, and conductor resistance. Furnish the Engineer with a certified factory report for each reel showing compliance with this Project Special Provision, the factory test results, and the manufactured date of the cable. The Design-Build Team shall not use Ethernet cable manufactured more than one year before the date of installation.

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

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

CONSTRUCTION METHODS

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

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

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

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

PORTABLE CCTV CAMERA and TRAILER

DESCRIPTION

The Design-Build Team shall furnish, install, operate, maintain, relocate and remove a Portable CCTV Camera, designed to be towed by a ½ ton and ¾ ton pickup truck and erected in work zones and on roadside right of ways for remote video monitoring and incident management. Ensure the CCTV Camera equipment is fully compatible with all features of the existing video management software (Protronix Video Pro) currently in use by NCDOT in this region and at the Statewide Traffic Operations Center (STOC).

Furnish, deploy, install, test, integrate and make fully operational the new Portable CCTV Camera assembly at the location described or shown in the plans developed by the Design-Build Team and / or as directed by the Engineer. Contact the Engineer to confirm the Portable CCTV Camera assembly location prior to deploying in the field.

Each unit shall be new, and of the latest design of a model in current production or an update of an existing model. Prototype equipment shall not be acceptable. Each unit shall be furnished with identical and interchangeable equipment, options and features. It shall be furnished completely assembled, fully serviced, and ready for immediate operation.

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

Trailer

The trailer shall be specifically designed to support and secure the Portable CCTV assembly, photovoltaic power source and other systems both in a deployed and travel position. It shall be capable of being towed at 65 miles per hour over extensive distances. Provide trailers that comply with Federal Motor Safety Regulations 393.

Trailer Construction

The frame including the trailer tongue shall be designed, constructed, and rated for the full capacity of the trailer. The frame shall be constructed of 3” x 3” and 3” x 5” square steel tubing (ASTM A36) with a minimum of 3/16 inch wall thickness and welded in accordance with applicable American Welding Society (AWS) standards. If counterweights are required, they shall be incorporated as an integral part of the frame. Provide a mast support assembly that shall safely support the camera mount and CCTV Camera when they are not deployed, and the trailer is in travel mode and when the camera mount and CCTV Camera are deployed. Provide the trailer with heavy-duty fenders capable of supporting a minimum of 200 lbs. Ensure the fenders are designed to minimize road surface water and debris from being thrown up on to the trailer equipment when being transported.

The towing tongue or drawbar shall be removable and shall include a two-inch ball hitch. The trailer shall tow level when attached to a two-inch ball mounted 18" high. Ensure the trailer tongue is removable and that no tools are required to remove or re-install the tongue. Provide an electrical connector for separation of the trailer safety lighting system where the trailer tongue connects to the trailer. Ensure the trailer tongue is rated for 6,000 lbs. Provide a tongue jack stand shall be heavy-duty; swivel mount castor wheel type design with a 1,200 lb. capacity (minimum). Ensure the tongue jack stand can be swiveled up and out of the way and held in place by a locking mechanism for transporting the trailer.

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

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

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

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

Lights / Reflectors and Safety Markings

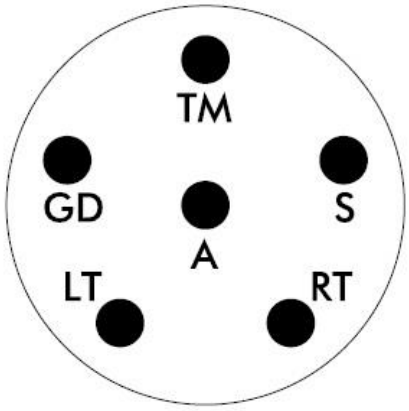
The trailer shall be equipped with lights and reflectors in compliance with applicable North Carolina motor vehicle laws and the Federal Motor Safety Carrier Regulations, including turn signals, dual taillights, and brake lights.

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

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

Provide a standard six-way plug and receptacle connector, equal to and interchangeable with a Velvac 055049 assembly, and a heavy-duty jacketed multi-conductor cable shall be furnished for connecting the truck and trailer wiring system. All wiring shall be properly protected and secured. The receptacle shall be furnished loose, while the cable and plug shall be attached to the trailer in sufficient length to reach a truck-mounted receptacle, additionally provide an intermediate electrical connector where the wiring harness leaves the removeable tongue and the trailer body. The plug shall be connected to the trailer wiring system in accordance with the following drawing:

6–Way Trailer Connection



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

Solar Power System

The CCTV Camera shall be powered by a photovoltaic system consisting of photovoltaic panels, deep-cycle batteries, solar charge controller and ancillary equipment and wiring. Under normal conditions, the power system should automatically recharge the battery system with no manual intervention. A motorized power supply requiring fossil fuels (i.e. gas, diesel generators, etc.) is not acceptable, however the system shall be designed and supplied with a NEMA L6-20 locking receptacle in an outdoor rated enclosure to allow for use of a stand-by generator or land-power (120V, single phase) when necessary. Land-Power can be used to charge the batteries when the units are in storage.

The unit shall satisfactorily operate in all weather conditions between -40 degrees F and +165 degrees F.

A bank of batteries forming a 12 VDC system shall power the unit during standard operations. The battery bank shall consist of 6 VDC deep cycle heavy duty lead / acid batteries wired in series / parallel as to form a 12 VDC system. Warranty service for the power source batteries shall be locally available on a nationwide basis.

The charging system for a trailer mounted device shall be solar, consisting of a photovoltaic array supplying electrical energy to the batteries through a solar regulator. The system shall provide “on demand” charging consistent with battery condition and with the ambient solar luminance at the photovoltaic array. The trailer shall also be equipped with a standard 120 VAC receptacle as well as a temperature-stable 120 VAC battery trickle charger and ammeter. The 120 VAC charging system shall initiate charging automatically when 120 VAC service is connected and shall be capable of completely charging the battery pack within a 24 to 48 - hour time period. The actual charging time will vary depending upon conditions and state of charge / discharge of the batteries.

A Maximum Power Point Tracking (MPPT) solar charge controller shall be provided and solar charging circuitry shall include voltage regulators and automatic battery temperature compensation control circuitry components to prevent battery overcharging. Batteries shall be of the, deep-cycle golf cart type / acid batteries (BCI Group GC-2) type. Ensure the battery capacity

is adequate to operate the CCTV Camera continuously for at least 20 days with no external charging (no sunlight). Additionally, provide a trickle charger circuitry to allow for standby generator or Land-Power operation when necessary. The system shall have the ability to remotely disconnect the power to the camera load when the available operating power falls below a specified threshold voltage.

The photovoltaic panels shall be mounted to the trailer structure in a rigid steel frame. The photovoltaic panel assembly shall be designed with tilt and rotation capabilities. For travel, ensure that the photovoltaic panel assemble is mounted so as not to interfere with the mast and camera. The panels and panel assembly shall be attached using anti-theft fasteners. Panels shall have tempered glass faces and be sealed.

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

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

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

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

The power system including solar panels shall be mounted onto the trailer and shall not exceed the dimensions of the trailer or cause the trailer GVWR (2,500 lb.) to be exceeded.

Equipment Variables (Typical) for Power Usage Calculations

1) Sierra Wireless Modem (Typical) - Provided by NCDOT
   Transmit / Receive (Typical / Max) - 230 mA/440mA @12 VDC
   Idle - 180 mA @ 12VDC

Camera Mast

The camera shall be mounted on a self-supporting mast allowing a camera to be raised to a height of 30 feet. The mast shall be made from galvanized steel and shall allow for telescoping action.

The unit shall satisfactorily operate in all weather conditions including up to a 100 mph wind load with the vertical post fully extended per the ASHTO Wind Load Standard. The mast may be raised and lowered by a single individual using a manual winch. In the raised position the camera mast shall be capable of being rotated 360 degrees. The mast shall mechanically lock in the raised position.

Once lowered, the mast may rotate down to be secured for transport. The mast shall mechanically lock in the lowered position for transport without removing the installed camera.

The vendor shall provide a drawing that shows camera mounting provisions provided. Camera wiring shall spiral around the mast to allow the mast to raise and lower. A two-inch diameter minimum (or acceptable equivalent) grommeted entrance way shall be provided to feed wiring through mount into camera.

Data Plaques and Serial Number

Each unit shall be provided with data plaque containing the manufacturer's serial number, model number and other manufacturer’s data unique to each unit, permanently attached and easily identified. The serial number shall be used by the Department and the manufacturer to identify units for recall, to aid in the recovery of stolen units, to establish ownership, and for other similar reasons. At a minimum, the serial number shall contain 17 characters and shall conform to Federal Vehicle Identification Numbering Standards (49 CFR 565).

A permanent data plaque shall be attached to each unit indicating serial number and model number using block lettering. Decals are not permitted.

Safety Plaques or Details

Product safety plaques or decals shall be furnished and affixed at the operator's station and at any hazardous area. The safety plaques or decals shall describe the nature of the hazard, level of hazard seriousness, how to avoid the hazard, and the consequence of human interaction with the hazard.

Permanent plaques mechanically attached are preferred to decals. Type, size and location of product safety plaques or decals shall be in accordance with current ANSIZ 535.4, or latest revision thereto.

Color

Each unit shall be thoroughly cleaned and prime coated with a rust preventative paint with a final coat that is either painted or powder coated meeting Federal Standard 595C Color Chip ID #12473 with a minimum paint thickness of 2.5 mils. Paint and primers used shall be leadfree. All data data plaques and safety decals / plaques shall be protected from being painted over.

CCTV Camera

Furnish and install CCTV assemblies described in these Project Special Provisions. All new CCTV cameras shall be fully compatible with the video management software (Protronix Video Pro) currently in use by NCDOT at the STOC.

Materials

Furnish and install a new CCTV camera assembly per portable trailer. Each assembly consists of the following:

- One dome CCTV color digital signal processing camera unit with zoom lens, filter, control circuit, and accessories in a single enclosed unit
- A NEMA-rated enclosure constructed of aluminum with a clear acrylic dome or approved equal Camera Unit housing
- Motorized pan, tilt, and zoom
- Built-in video encoder capable of H.264/MPEG-4 compression for video-over IP transmission
- Pole-mount camera attachment assembly
- A lightning arrestor installed in-line between the CCTV camera and the equipment cabinet components
- All necessary cable, connectors and incidental hardware to make a complete and operable system

Camera

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

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

Lens

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

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

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

Communications Standards

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

Networking Standards

- Network Connection: 10/100 Mbps auto-negotiate
- Frame Rate: 30 to 60 fps
- Data Rate: scalable
- Built-in Web Server
- Unicast & multicast support
- Two simultaneous video streams (Dual H.264 and MJPEG):
  - Video 1: H.264 (Main Profile, at minimum)
  - Video 2: H.264 or MJPEG
- Supported Protocols: DNS, IGMPv2, NTP, RTSP, RTP, TCP, UDP, DHCP, HTTP, IPv4

The video camera shall allow for the simultaneous encoding and transmission of the two digital video streams, one in H.264 format (high-resolution) and one in H.264 or MJPEG format (low- resolution).

Initially use UDP/IP for video transport and TCP/IP for camera control transport unless otherwise approved by the Engineer.

The 10/100 BaseTX port shall support half-duplex or full-duplex and provide auto negotiation and shall be initially configured for full-duplex.

The camera unit shall be remotely manageable using standard network applications via web browser interface administration. Telnet or SNMP monitors shall be provided.

Camera Housing

Furnish new dome style enclosure for the CCTV assemblies. Equip each housing with mounting assembly for attachment to the CCTV camera telescoping pole. The enclosures shall be equipped with a sunshield and be fabricated from corrosion resistant aluminum and finished in a neutral color of weather resistant enamel. The enclosure shall meet or exceed NEMA 4X ratings. The viewing area of the enclosure shall be tempered glass.

Pan and Tilt Unit

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

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

Video Ethernet Encoder

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

Encoders shall have the following minimum features:

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

Central Receiver / Driver

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

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

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

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

Surge Protection

Protect all equipment with metal oxide varistors connecting each power conductor to ground.

Protect the electrical and Ethernet cables from the CCTV unit entering the equipment cabinet with surge protection. Provide an integrated unit that accepts unprotected electrical and Ethernet connections and outputs protected electrical and Ethernet connections. Ethernet connections shall be RJ45 with full gigabit Ethernet transmission speeds and electrical connections shall be #22 - #14 AWG screw terminals. The surge protection unit shall comply with EIA/TIA568A and EIA/TIA568B standards for data transmission and automatically reset.

Wiring Diagrams

Provide a wiring diagram for each Portable CCTV assembly detailing the power system, including but not limited to, Solar charge controller, photovoltaic panels, batteries, stand-by generator / land power hook up, trickle charger circuitry and cellular modem. Ensure the wiring diagram references connections for CCTV Camera and controller and all other supporting devices and systems that comprise the whole system.

Routine Operations

Describe the operational routine, from necessary preparations for placing the equipment into operation to securing the equipment after operation. Show appropriate illustrations with the sequence of operations presented in tabular form wherever applicable. Include in this section a total list of the test instruments, aids and tools required to perform necessary measurements and measurement techniques for each component, as well as set-up, test, and calibration procedures.

TRAINING

A minimum one day of on-site training shall be conducted at the time of delivery or at a time as approved by the Engineer by representatives of the manufacturer's technical service personnel or factory trained authorized representative.

Training Materials

In conjunction with the delivery of each unit, the Design-Build Team shall supply one complete set of video operator training materials (DVD format preferred). This material shall adequately cover the safe and correct operation of the equipment.

CONSTRUCTION METHODS

Description

This article establishes practices and procedures and gives minimum standards and requirements for the installation of Portable CCTV camera and trailers and auxiliary equipment. Provide electrical equipment described in this specification that conforms to the standards of NEMA, UL, or Electronic Industries Association (EIA), wherever applicable.

Provide stainless steel screws, nuts, and locking washers in all external locations. Do not use self-tapping screws unless specifically approved by the Engineer. Use parts made of corrosion-resistant materials, such as plastic, stainless steel, brass, or aluminum. Use construction materials that resist fungus growth and moisture deterioration. Separate dissimilar metals by an inert dielectric material.

Mount the camera to the pole mount camera attachment assembly and secure to the assembly to the camera mast. Ensure camera wiring spirals around the mast to allow mast to raise and lower. A two-inch diameter minimum (or acceptable equivalent) grommeted entrance way shall be provided to feed wiring through mount into camera.

Deployment

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

Construction Submittal

When the work is complete, submit As-Built Plans, inventory sheets, and any other data required by the Engineer to show the details of actual location and any modifications made during installation.

The As-Built Plans shall show each Portable CCTV camera trailer assembly location on a map with GPS coordinates, and dimensioned from fixed objects or intersecting roadways.

WARRANTY

Units shall be warranted against defects in materials and workmanship for a period of not less than twelve (12) months. The warranty period start date shall begin on the date of deployment and acceptance by the Engineer.

The unit shall be furnished with a copy of the warranty statement and any necessary cards, booklets, or certificates needed to receive warranty repairs at a dealership. Provide a list of approved factory-authorized part, service and warranty facilities.

PORTABLE CHANGEABLE MESSAGE SIGN FOR INCIDENT MANAGEMENT

Description

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

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

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

Each unit shall be new, and of the latest design of a model in current production or an update of an existing model. Prototype equipment shall not be acceptable. Each unit shall be furnished with identical and interchangeable equipment, options and features. It shall be furnished completely assembled, fully serviced, and ready for immediate operation.

The Department will provide a cellular modem to establish the communications link between the PCMS(IM) and the Statewide Traffic Operations Center (STOC).

TRAILER

The trailer shall be specifically designed to support and secure the PCMS(IM) assembly, photovoltaic power source and other systems both in a deployed and travel position. It shall be

capable of being towed at 65 miles per hour over extensive distances. Provide trailers that comply with Federal Motor Safety Regulations 393.

Trailer Construction

The frame including the tongue shall be designed, constructed, and rated for the full capacity of the trailer. The frame shall be constructed of 3” x 3” and 3” x 5” square steel tubing (ASTM A36) with a minimum of 3/16 inch wall thickness and welded in accordance with the applicable American Welding Society (AWS) standards. If counterweights are required, they shall be incorporated as an integral part of the frame. Provide four (4) tie down rings with one (1) located near each corner. Provide the trailer with heavy-duty fenders capable of supporting a minimum of 200 lbs. Ensure the fenders are designed to minimize road surface water and debris from being thrown up on to the trailer equipment when being transported.

The towing tongue or drawbar shall be removable and incorporate a hydraulic surge braking system and shall include a two-inch ball hitch. The trailer shall tow level when attached to a two-inch ball mounted 18" high. Ensure the trailer tongue is removable and that no tools are required to remove or re-install the tongue. Furnish a hydraulic surge braking system built into the tongue with a manual lockout leaver or pin that shall allow the trailer to be backed up. Ensure the lockout leaver, if it is designed to fall out when the vehicle is in a forward motion shall be kept secure to the trailer by a lanyard. Ensure that during removal and reinstallation of the trailer tongue that the hydraulic brake lines can be connected / disconnected using hydraulic connectors and that upon reinstalling the tongue that the braking system does not have to be bled to provide normal braking operations. Additionally, provide an electrical connector for separation of the trailer safety lighting system where the trailer tongue connects to the trailer. Ensure the trailer tongue is rated for 6,000 lbs.

Provide a tongue jack stand that is of a heavy-duty design with a swivel mount castor wheel designed to support a 1,200 lb. capacity (minimum). Ensure the tongue jack stand can be swiveled up and out of the way and held in place by a locking mechanism for transporting the trailer.

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

The trailer, springs and axels shall be rated for 3,500 lbs. and supplied with 15” (minimum) radial tires. Total combined load rating of the tires and wheels shall exceed the GVWR of the unit. Load ratings shall be determined by reference to the current yearbook of the Tire and Rim Association, Inc., or the manufacturer’s published load rating. Tire ratings shall be calculated at 65 mph.

The trailer shall include a leveling system to allow for the trailer to be in a stable and level position when the sign’s jack legs, and auxiliary support legs are deployed. The trailer shall be equipped with (4) four crank style leveling jacks, one at each corner of the trailer that extend straight down with adequate lifting capacity and a large steel footpad to level and stabilize the

trailer. Ensure the leveling jacks can be swiveled up and out of the way and held in place by a locking mechanism for transporting the trailer.

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

Lights / Reflectors and Safety Markings

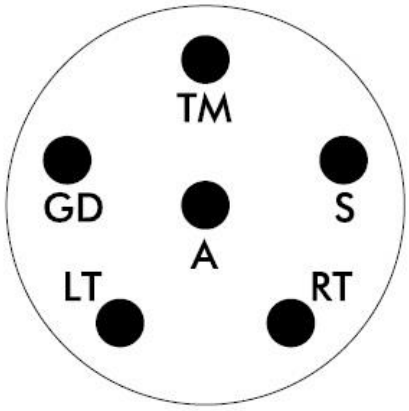
The trailer shall be equipped with lights and reflectors in compliance with applicable North Carolina motor vehicle laws and the Federal Motor Safety Carrier Regulations, including turn signals, dual taillights, and brake lights.

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

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

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

6–Way Trailer Connection



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Solar Power System

The PCMS(IM) shall be powered by a photovoltaic system consisting of photovoltaic panels, deep-cycle batteries, solar charge controller and ancillary equipment and wiring. Under normal conditions, the power system should automatically recharge the battery system with no manual intervention. A motorized power supply requiring fossil fuels (i.e. gas, diesel generators, etc.) is not acceptable, however the system shall be designed and supplied with a NEMA L6-20 locking receptacle in an outdoor rated enclosure to allow for use of a stand-by generator or land-power (120V, single Phase) when necessary. Land-Power can be used to charge the batteries when the units are in storage.

The unit shall satisfactorily operate in all weather conditions between -40 degrees F and +165 degrees F.

A bank of batteries forming a 12 VDC system shall power the unit during standard operations. The battery bank shall consist of 6 VDC deep cycle heavy duty lead / acid batteries wired in series / parallel as to form a 12 VDC system. Warranty service for the power source batteries shall be locally available on a nationwide basis.

The charging system for a trailer mounted device shall be solar, consisting of a photovoltaic array supplying electrical energy to the batteries through a solar regulator. The system shall provide “on demand” charging consistent with battery condition and with the ambient solar luminance at the photovoltaic array. The trailer shall also be equipped with a standard 120 VAC receptacle as well as a temperature-stable 120 VAC battery trickle charger and ammeter. The 120 VAC charging system shall initiate charging automatically when 120 VAC service is connected and shall be capable of completely charging the battery pack within a 24 to 48 - hour time period. The actual charging time will vary depending upon conditions and state of charge / discharge of the batteries.

A Maximum Power Point Tracking (MPPT) solar charge controller shall be provided and solar charging circuitry shall include voltage regulators and automatic battery temperature compensation control circuitry components to prevent battery overcharging. Batteries shall be of

the, deep-cycle golf cart type / acid batteries (BCI Group GC-2) type. Ensure the battery capacity is adequate to operate the PCMS(IM) continuously for at least 20 days with no external charging (no sunlight). Additionally, provide a trickle charger circuitry to allow for standby generator or Land-Power operation when necessary. The system shall have the ability to remotely disconnect the power to the PCMS(IM) load when the available operating power falls below a specified threshold voltage.

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

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

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

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

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

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

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

Equipment Variables (Typical) for Power Usage Calculations

1) Sierra Wireless Modem (Typical) - Provided by NCDOT
   Transmit / Receive (Typical / Max) - 230 mA/440mA @12 VDC
   Idle - 180 mA @ 12VDC

Sign Mast

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

The unit shall satisfactorily operate in all weather conditions including up to a 100 mph wind load with the vertical post fully extended per the ASHTO Wind Load Standard. Provide a mast lowering and raising system that uses 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 ANSIZ 535.4, or latest revision thereto.

Color

Each unit shall be thoroughly cleaned and prime coated with a rust preventative paint with a final coat that is either painted or powder coated meeting Federal Standard 595C Color Chip ID #12473 with a minimum paint thickness of 2.5 mils. Paint and primers used shall be leadfree. All data plaques and safety decals / plaques shall be protected from being painted over.

CHANGEABLE MESSAGE SIGN

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

General

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

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

Sign

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

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

A. Discrete LED's

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

B. Pixel Compilation

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

C. Display Modules

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

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

Message Sign Panel Matrix

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

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

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

Sign Case

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

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

Furnish polycarbonate panels with the following characteristics:

- Tensile Strength, Ultimate: 10,000 PSI
- Tensile Strength, Yield: 9,300 PSI
- Tensile Strain at Break: 125%
- Tensile Modulus: 330,000 PSI
- Flexural Modulus: 330,000 PSI
- Impact Strength, Izod (1/8", notched): 17 ft-lbs./inch of notch
- Rockwell Hardness: M75, R118
- Heat Deflection Temperature Under Load: 264 PSI at 270F and 66 PSI at 288F
- Coefficient of Thermal Expansion: 3.9X10-5 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 ½” thick.

Sign Control System

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

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

NTCIP Compliance / Compatibility

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

(1) 1201 - NTCIP Global Object Definitions
(2) 1203 - NTCIP Object Definitions for Dynamic Message Signs
(3) 2101 - NTCIP Subnet Profile for PMPP over RS-232
(4) 2104 - NTCIP Subnet Profile for Ethernet
(5) 2201 - NTCIP Transport Profile
(6) 2202 - NTCIP Internet Transport Profile
(7) 2301 - Simple Transportation Management Framework

- All mandatory objects applicable to portable PCMS(IM) operations including battery status shall be implemented with Full Standardized Object Range Support (FSORS).
- A complete list of all objects to be implemented shall be submitted for review and approval to NCDOT prior to any PCMS(IM) delivery.

Functions

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

Sign Controller Address

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

Wiring Diagrams

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

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

Routine Operation

Describe the operational routine, from necessary preparations for placing the equipment into operation to securing the equipment after operation. Show appropriate illustrations with the sequence of operations presented in tabular form wherever applicable. Include in this section a total list of the test instruments, aids and tools required to perform necessary measurements and measurement techniques for each component, as well as set-up, test, and calibration procedures.

TRAINING

A minimum one day of on-site training shall be conducted at the time of delivery or at a time as approved by the Engineer. Trainers shall be representatives of the manufacturer’s technical service personnel or a factory trained authorized representative.

Training Materials

In conjunction with the delivery of each unit, Design-Build Team shall supply one complete set of video operator training materials (DVD format preferred). This material shall adequately cover the safe and correct operation of the equipment.

CONSTRUCTION METHODS

Description

This article establishes practices and procedures and gives minimum standards and requirements for the installation of Portable Changeable Message Signs for incident Management activities along with auxiliary equipment requirements. Provide electrical equipment described in this specification that conforms to the standards of NEMA, UL, or Electronic Industries Association (EIA), wherever applicable.

Provide stainless steel screws, nuts, and locking washers in all external locations. Do not use self-tapping screws unless specifically approved by the Engineer. Use parts made of corrosion-resistant materials, such as plastic, stainless steel, brass, or aluminum. Use construction materials that resist fungus growth and moisture deterioration. Separate dissimilar metals by an inert dielectric material.

Deployment

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

Construction Submittal

When the work is complete, submit As-Built Plans, inventory sheets, and any other data required by the Engineer to show the details of actual location and any modifications made during installation.

The As-Built Plans shall show the PCMS(IM) location on a map with GPS coordinates, and dimensioned from fixed objects or intersecting roadways.

WARRANTY

Units shall be warranted against defects in materials and workmanship for a period of not less than twelve (12) months. The warranty period start date shall begin on the date of delivery and acceptance by the Engineer.

The unit shall be furnished with a copy of the warranty statement and any necessary cards, booklets, or certificates needed to receive warranty repairs at a dealership. Provide a list of approved factory-authorized part, service and warranty facilities.

FAA NOTIFICATION OF CONSTRUCTION

The Design-Build Team shall adhere to the requirements of the Title 14 of the Code of Federal Regulations (14 CFR) Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace,* Advisory Circular 70/7460-1L Change 2, *Obstruction Marking and Lighting* and Chapter 34 of the Municipal Development Ordinances for Airport Height Zoning for the City of Lumberton and the Lumberton Regional Airport (LBT). A minimum of sixty days prior to any planned construction activity, the Design-Build Team shall submit a Notice of Proposed Construction or Alteration (Form 7460-1) through the Federal Aviation Administration (FAA) Obstruction Evaluation / Airport Airspace Analysis (OE/AAA) portal found here:

https://oeaaa.faa.gov/oeaaa/external/portal.jsp

The Design-Build Team shall be responsible for all work and costs associated with the FAA forms and approvals required for construction of the project. This shall include, but is not limited to, preparation and submittal of forms 7460-1 and 7460-2. The electronic submittal portal, forms and instructions can be found at the website noted above.

The Design-Build Team shall be responsible for all work and costs associated with the compliance to the City of Lumberton Municipal Development ordinances for Airport Zoning and approvals required for construction of the project. The Height Zoning Ordinance, permit application, and variance application forms can be found at the website noted below:

http://www.lumbertonnc.gov/197/Planning-Neighborhood-Services

Copies of all FAA and LBT forms shall be concurrently submitted to the following:

NCDOT Division of Aviation
Caleb Whitby, P.E., Airport Project Manager
NCDOT Division of Aviation
cwhitby@ncdot.gov
https://www.ncdot.gov/aviation
Telephone: 919-814-0583

City of Lumberton
Bob Snuck, Airport Manager
Lumberton Regional Airport
bsnuck@ci.lumberton.nc.us
http://www.lumbertonmunicipalairport.com/
Telephone: 910-739-6480

Throughout the project, the Design-Build Team shall include both parties listed above in project status meetings, including agendas, meeting minutes, and other stakeholder related communications.

GEOTEXTILE FOR PAVEMENT STABILIZATION

(5-7-14) (Rev. 3-9-18) DB 08-05

Description

Supply and install geotextile for pavement stabilization in accordance with the Geotechnical Engineering Scope of Work found elsewhere in this RFP. Geotextile for pavement stabilization shall be required below the pavement structure.

Materials

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

Item	Section
Geotextiles	1056

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

GEOTEXTILE FOR PAVEMENT STABILIZATION REQUIREMENTS		
Tensile Strength	**Requirement (MARV[A])**	**Test Method**
Tensile Strength @ 5% Strain (MD & CD[A])	1,900 lb/ft	ASTM D4595
Ultimate Tensile Strength (MD & CD[A])	4,800 lb/ft	ASTM D4595

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

Construction Methods

Place geotextile for pavement stabilization below the pavement structure as shown in the plans developed by the Design-Build Team. Pull geotextiles taut so they are in tension and free of kinks, folds, wrinkles or creases. Install geotextile for pavement stabilization either perpendicular or parallel to the survey or lane line as shown in the plans developed by the Design-Build Team. All geotextile joints shall overlap a minimum of 18 inches. Completely cover subgrades with geotextile for pavement stabilization. If installed parallel to the survey line or lane line, the outer edge of a full roll of geotextile shall be installed on the outer edge of the area requiring pavement stabilization. Hold geotextiles in place with wire staples or anchor pins as needed.

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

AUTOMATED MACHINE GUIDANCE

(1-2-11) 801 DB8 R01

General

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

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

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

Submittals

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

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

Inspection

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

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

Subgrade and Base Controls

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

- Provide control points at intervals along the project not to exceed 1,000 feet. The horizontal position of these points shall be determined by static GPS sessions or by traverse connection from the original base line control points. The elevation of these control points shall be established using differential leveling from project benchmarks, forming closed loops where practical. A copy of all new control point information shall be provided to the Engineer prior to construction activities.

- Provide control points and conventional survey grade stakes at 500-foot intervals and at critical points such as, but not limited to, PCs, PTs, superelevation transition points, and other critical points as requested by the Engineer.

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

HORIZONTAL DRAINS

(11-7-19) DB8 R17

Description

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

Materials

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

Item	Section
PVC Pipe	1044-6

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

Construction Methods

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

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

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

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

FOUNDATIONS AND ANCHOR ROD ASSEMBLIES FOR METAL POLES

(1-17-12) (Rev. 11-22-17) 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 2018 *Standard Specifications for Roads and Structures* and 2018 Roadway Standard Drawing No. 1743.01.

Materials

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

Item	Section / Article
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 2018 *Standard Specifications for Roads and Structures* 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 and / or defective materials shall 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:

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 ¼-inch. Galvanize anchor rods and exposed nuts and washers in accordance with Article 1076-4 of the 2018 *Standard Specifications for Roads and Structures*. 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 the 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 2018 *Standard Specifications for Roads and Structures* 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 shall 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 2018 *Standard Specifications for Roads and Structures*. 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 shall 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 the Department approves a casing installation method.

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 2018 *Standard Specifications for Roads and Structures*, 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 the Department approves a concrete placement procedure. 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 the Department approves a procedure for placing anchor rod assemblies and conduit or constructing grade beams or wings.

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 2018 *Standard Specifications for Roads and Structures*. A drilled pier shall be considered defective in accordance with Subarticle 411-5(D) of the 2018 *Standard Specifications for Roads and Structures* and drilled pier acceptance shall be based in part on the criteria in Article 411-6 of the 2018 *Standard Specifications for Roads and Structures* except for the top of pier tolerances in Subarticle 411-6(C) of the 2018 *Standard Specifications for Roads and Structures*.

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 shall be required in accordance with Article 411-6 of the 2018 *Standard Specifications for Roads and Structures*. No additional compensation or 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 2018 *Standard Specifications for Roads and Structures*. 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 by the Engineer.

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 2018 *Standard Specifications for Roads and Structures*. Use forms to construct portions of pedestals and grade beams protruding above finished grade. Provide a chamfer with a ¾-inch 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 2018 *Standard Specifications for Roads and Structures*. 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 three to five 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-inch 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:

NUT ROTATION REQUIREMENTS (Turn-of-Nut Pretensioning Method)	
Anchor Rod Diameter, inch	**Requirement**
≤ 1 1/2	1/3 turn (2 flats)
> 1 1/2	1/6 turn (1 flat)

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

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

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

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

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

(13) Do not grout under base plate.

OVERHEAD AND DYNAMIC MESSAGE SIGN FOUNDATIONS

(9-11-17) 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 2013 AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals,* 6th 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 (γ) = 120 pcf,

B. Friction angle (ϕ) = 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*, 6th 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*, 6th 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 2018 *Standard Specifications for Roads and Structures*. 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 2018 NCDOT *Standard Specifications for Roads and Structures*. 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

(9-12-17) DB9 R09

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, 2018 Roadway Standard Drawings and accepted submittals. Define “high mount foundation” as a drilled pier including the conduit and anchor rod assembly that meets 2018 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 2018 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 2018 *Standard Specifications for Roads and Structures*.

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 (γ) $\geq$ 120 pcf and friction angle (ϕ) $\geq$ 30°,

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 2018 *Standard Specifications for Roads and Structures*. 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*, 6th 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 2018 *Standard Specifications for Roads and Structures*. 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 2018 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

(10-13-20) DB14 R02-2

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 North Carolina Department of Transportation "Standard Specifications for Roads and Structures" (*2018 Standard Specifications*).

Perform all work in conformance with Division 14 of the 2018 *Standard Specifications for Roads and Structures* except as modified or added to by these Special Provisions. 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 2018 *Standard Specifications for Roads and Structures* 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

LIGHT STANDARD LIGHT EMITTING DIODE (LED) LUMINAIRES

DESCRIPTION

Furnish, install and place into satisfactory operation 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 feet in height.

Type	HPS Replacement Equivalent	Color Temp	Min. % of initial output at 70k hours	Min. Maintained Delivered Lumens
185W LED	250W	3500K ±500K	83%	15,500
285W LED	400W	3500K ±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. The Design-Build Team shall provide and install a shorting cap on all luminaires.
- 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 Final Lighting Plans provided by the Department. 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.

B. 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 ± 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.

C. 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).

D. 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.

E. Electrical safety testing

- Luminaires shall be listed for wet locations.
- Luminaires shall be UL listed and labeled.

F. 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.
- Exterior surfaces shall be smooth and free of burrs.

G. 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.

H. Color Quality

- Minimum Color Rendering Index (CRI) of 70 with a Correlated Color Temperature (CCT) of 3000K to 4000K

I. Optics

- Transmissive optical components shall be applied in accordance with OEM design guidelines to ensure suitability for the thermal / mechanical / chemical environment.

J. 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.

K. 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.

L. Manufacturer or local sales representative shall provide installation and troubleshooting support via telephone and / or e-mail.

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 constitutes 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.

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.

The Design-Build Team shall supply Holophane or Cooper LED high mount luminaires as specified below or approved equal.

Mounting Height	Nos. of Fixtures	Holophane Part Number	Cooper Part Number
120’	8	HMLED3-PK3-40K-HVOLT-G-AW-P7	GAN-AF-10-LED-8-5WQ-AP-MA-4N7
100’	6	HMLED3-PK3-40K-HVOLT-G-AW-P7	GAN-AF-10-LED-8-5WQ-AP-MA-4N7
80’	8	HMLED3-PK1-40K-HVOLT-G-AW-P7	GAN-AF-06-LED-8-5WQ-AP-MA-4N7
60’	4	HMLED3-PK1-40K-HVOLT-G-AW-P7	GAN-AF-06-LED-8-5WQ-AP-MA-4N7

Any alternate 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 ±500K	87%	54,000
100’	560W	6 x 750W	3500K ±500K	87%	54,000
80’	335W	8 x 400W	3500K ±500K	87%	27,000
60’	335W	4 x 400W	3500K ±500K	87%	27,000

The Design-Build Team shall supply the Department with current catalog cuts and 3rd party certified photometric data files in Illuminating Engineering Society (IES) format for any alternate high mount luminaire submitted for approval. The Department will thoroughly evaluate alternate luminaires to determine if proposed alternate high mount luminaire meets or exceeds design criteria.

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

High mount luminaire retrofit LED kits are not an acceptable alternative.

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 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. The Design-Build Team shall provide and install a shorting cap for all luminaires.
- 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.

B. 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 ± 10%.
- Shall have a minimum Power Factor (PF) of 0.90 at full input power and across specified voltage range.

C. 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).

D. 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.

E. Electrical safety testing

- Luminaires shall be listed for wet locations.
- Luminaires shall be UL listed and labeled.

F. 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.

G. Thermal management

- Mechanical design of protruding external surfaces (heat sink fins) shall facilitate hose-down cleaning and discourage debris accumulation.

H. Color Quality

- Minimum Color Rendering Index (CRI) of 70 with a Correlated Color Temperature (CCT) of 3000K to 4000K

I. Optics

- Transmissive optical components shall be applied in accordance with OEM design guidelines to ensure suitability for the thermal / mechanical / chemical environment.

J. 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

K. Manufacturer or local sales representative shall provide installation and troubleshooting support via telephone and / or e-mail.

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 constitutes 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.

REMOVE EXISTING LIGHT STANDARDS

DESCRIPTION

The work covered by this section consists of providing all equipment, labor and materials necessary to remove and dispose of existing high mast, single arm and twin arm light standards at the locations shown on the Final Lighting Plans provided by the Department. The single arm and twin arm standards are 45’ in height. The high mast light standards are 100’ in height. Single arm and high mast standards are attached to in ground concrete foundations with anchor bolts. Twin arm standards are attached to median barrier concrete foundations with anchor bolts.

Single arm light standard concrete foundations to be removed or abandoned may be located in areas where, due to knockdowns, there are no light standards to be removed.

Any salvage value for removed light standards and conductor shall be reflected as a reduction in the lump-sum price.

MATERIALS

No materials are required for this work except such miscellaneous items as tape and terminal devices to dead-end circuits serving the light standards.

CONSTRUCTION METHODS

Maintain operation of the existing lighting system until such time that it becomes in conflict with the actual construction work, or it becomes a hazard to traffic as determined by the Engineer.

Coordinate work with the NCDOT Division Construction Engineer and the City of Lumberton Director of Electric Utilities to assure that circuits can be de-energized where and when necessary.

Existing cobrahead luminaires are LED. Remove cobrahead luminaires from single arm and twin arm standards. Dispose of the luminaires in a manner acceptable to the Engineer.

Existing high mast luminaires are metal halide high intensity discharge (HID). Remove high mast luminaires from high mast carrier ring. Due to the presence of mercury in the metal halide bulb, all high mast luminaires must be disposed of in accordance with North Carolina Department of Environmental Quality (NCDEQ) guidelines for hazardous waste disposal.

Remove light standard and arms, couplings, anchor nuts, washers, transformer bases with doors and connecting bolts and fuse holders. Removed items shall be salvaged or disposed of in a manner acceptable to the Engineer.

Remove or abandon existing concrete light standard foundations as defined in 2018 *Standard Specifications for Roads and Structures* Section 1400-10. Dispose of the removed concrete,

reinforcing steel and anchor bolts in a manner acceptable to the Engineer. Backfill the holes with suitable material and compact backfill as required.

Abandon or remove the conductors and the conduit for the removed light standards as shown on the Final Lighting Plans provided by the Department. Refer to the 2018 *Standard Specifications for Roads and Structures,* Section 1400-10.

Remove all existing conductor in the median barrier conduit. Removed conductor shall be salvaged or disposed of in a manner acceptable to the Engineer.

REMOVE EXISTING LIGHTING CONTROL SYSTEM

DESCRIPTION

The work covered by this section consists of providing all equipment, labor and materials necessary to remove and dispose of existing lighting control systems at the locations shown on the Final Lighting Plans provided by the Department.

The existing lighting control systems consists of a stainless-steel enclosure containing circuit breakers, contactors, relays and other miscellaneous electrical equipment. The enclosure is mounted to a 4" galvanized steel conduit using steel slotted channel. The 4" galvanized steel conduit, as well as all feeder circuit conduits, are embedded in a concrete foundation.

MATERIALS

No materials are required for this work except such miscellaneous items as tape and terminal devices to dead-end circuits.

CONSTRUCTION METHODS

Each existing light system shall be left in operation until such time that it becomes in conflict with the actual construction work or it becomes a hazard to traffic as determined by the Engineer.

Coordinate work with the NCDOT Division Construction Engineer and the City of Lumberton Director of Electric Utilities to assure that circuits can be de-energized where and when necessary.

Disconnect circuitry and remove control system enclosure from conduit and support structure. Abandon or remove conduit, underground circuitry, concrete foundation and support structure.

Dispose of the removed lighting control system, components, concrete, reinforcing steel, support structure and conduit in a manner acceptable to the Engineer.

Abandon or remove the conductors and conduit as required by construction. Refer to 2018 *Standard Specifications for Roads and Structures* Section 1400-10.

ELECTRICAL CONDUIT SYSTEM - CARTHAGE ROAD STRUCTURE

DESCRIPTION

The work covered by this section consists of furnishing and installing an electrical conduit system embedded in the barrier rail of the bridge on Carthage Road for connection to future light poles, to be installed by others, on outriggers. Perform all work in accordance with these project special provisions, the Final Lighting Plans provided by the Department, the National Electrical Code (NEC) and Division 14 of the 2018 *Standard Specifications for Roads and Structures*.

MATERIALS

Conduit shall be liquid-tight flexible metallic or non-metallic PVC and sized as noted in the Final Lighting Plans provided by the Department.

Liquid-tight flexible metallic conduit (LFMC) and associated transition bushings shall be marked as suitable for direct burial.

Non-metallic conduit shall be rigid PVC (Polyvinyl chloride) heavy wall approved for underground use with concrete encasement per UL 651 “Rigid Non-Metallic Conduit”. Use terminations designed for PVC conduit to seal and stub out each PVC conduit, and to provide watertight protection.

Provide Type BR junction boxes that meet the requirements of Section 1411 - Electrical Junction Boxes of the 2018 *Standard Specifications for Roads and Structures*.

Provide conductor sized as shown in the Final Lighting Plans provided by the Department.

Provide pull lines for all empty conduits. Use pull lines made of 2-ply line, with a minimum tensile strength of 240 pounds. Use rot and mildew resistant pull lines that are resistant to tangling when being dispensed.

Use mastic that is a permanent, non-hardening, water sealing compound that adheres to metal, plastic and concrete.

CONSTRUCTION METHODS

Prior to placing any concrete, all conduit and boxes installed in the barrier rail shall be securely fastened with ties. After the conduit is encased in concrete, the Design-Build Team shall clean each conduit by snaking with a steel band with an approved tube cleaner equipped with a mandrel of diameter not less than 85% of the nominal inside diameter of the conduit. To ensure against corrosion in the areas where hot dipped galvanizing of the junction box has been damaged, cover all raw metal surfaces with a cold galvanized, zinc rich paint.

Prior to encasement, all junction boxes shall be bonded to rebar in accordance with NEC.

As directed by the Engineer, coordinate electrical conduit system work with work by others.

Install junction boxes in accordance with Section 1411 - Electrical Junction Boxes of the 2018 *Standard Specifications for Roads and Structures*.

Prior to concealment, all work shall be inspected and approved by the Engineer.

HIGH VISIBILITY DEVICES

(2/10/2021)

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.

The purpose of high visibility devices is to enhance the conspicuity of the devices in order to improve both safety and mobility through the interstate and freeway work zones. In addition, using new devices help to ensure they remain in compliance with required retroreflective properties for the full life of the project and to improve the overall appearance of significant work zones throughout the State.

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

All stationary work zone signs shall be new and meet the existing requirements of Section 1089-1 of the 2018 NCDOT *Standard Specifications for Roads and Structures*. Legend overlays shall be prohibited and shall not be accepted on 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 six inches in length on sign supports with one sign mounted at a minimum of 4.5 feet in length for sign supports with two or more signs mounted vertically.

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

B) Material Qualifications / Certifications

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

(C) Performance

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

Construction Methods

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

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

**** NOTE **** Deleted *Work Zone Traffic Pattern Masking* Project Special Provision

**** NOTE **** Deleted *Black Epoxy Pavement Marking Material* Project Special Provision

**** NOTE **** Deleted *Polyurea Pavement Marking Media and Thickness* Project Special Provision

WORK ZONE PRESENCE LIGHTING

(10/14/19) (Rev. 12/20/20)

DESCRIPTION

The Design-Build Team shall furnish and install Work Zone Presence Lighting during nightly work activities on high speed (55 mph or greater) facilities.

MATERIALS

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

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

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

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

Provide Work Zone Presence Lighting listed on the NCDOT APL.

CONSTRUCTION METHODS

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

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

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

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

Lighting Unit Installation Requirements

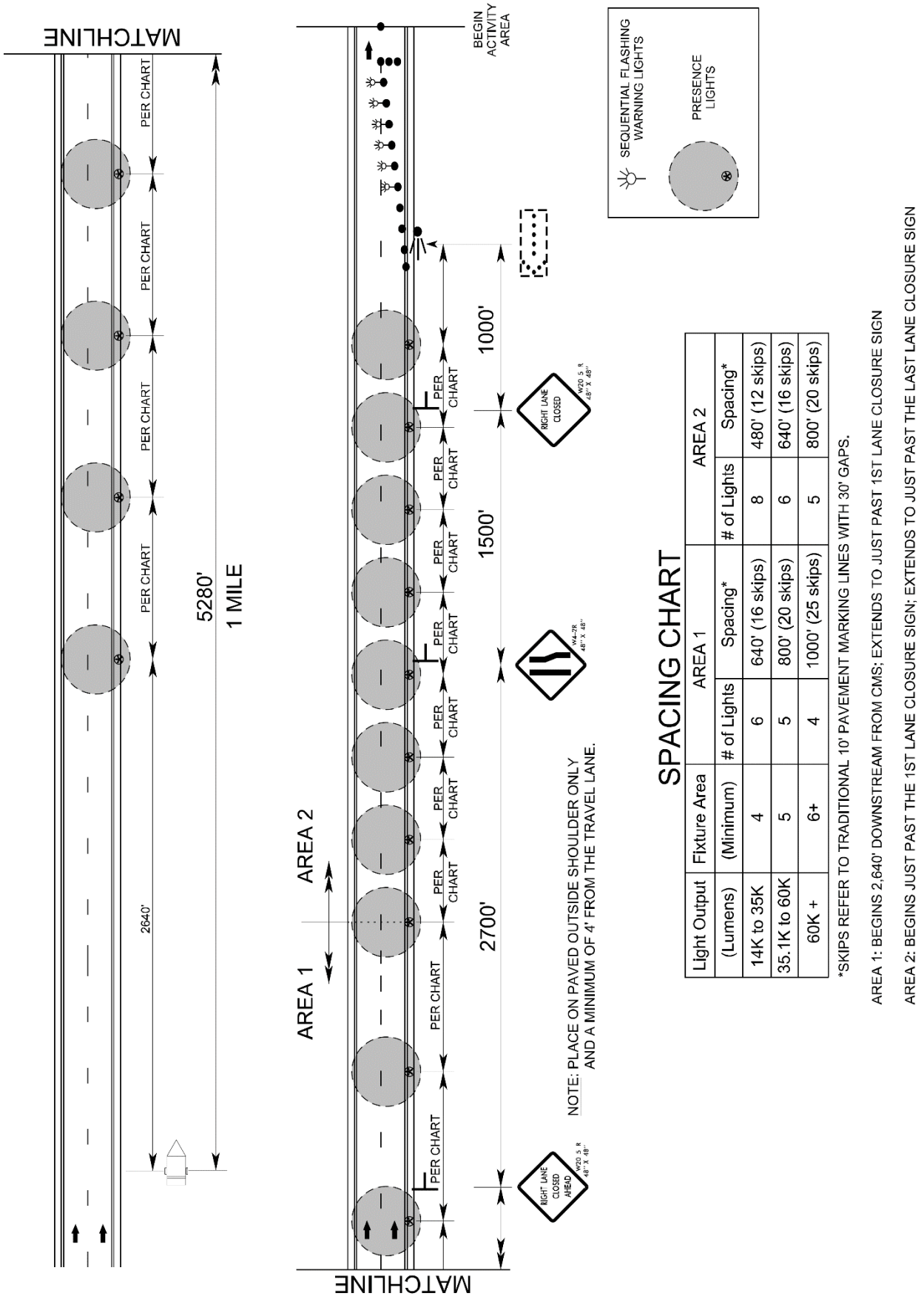
The lighting units shall be installed in advance of the lane closure as shown on the detail below and spaced according to the chart below:

		AREA 1 *		**AREA 2 ****	
Light Output (Lumens)	**Illuminated Fixture Area (Sq. Ft.)**	**Nos. of Lights**	**Spacing *****	**Nos. of Lights**	**Spacing *****
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 1st Lane Closure Sign

** Area 2: Begins just past the 1st Lane Closure Sign; Extends to just past the last Lane Closure Sign

*** Skips refer to traditional ten-foot pavement marking lines with 30' gaps.



SPACING CHART

Light Output	Fixture Area	AREA 1		AREA 2	
(Lumens)	(Minimum)	# of Lights	Spacing*	# of Lights	Spacing*
14K to 35K	4	6	640' (16 skips)	8	480' (12 skips)
35.1K to 60K	5	5	800' (20 skips)	6	640' (16 skips)
60K +	6+	4	1000' (25 skips)	5	800' (20 skips)

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

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

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

SEQUENTIAL FLASHING WARNING LIGHTS

(10/08/2016)

Description

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

The purpose of these lights is to assist the motorist in determining which direction to merge when approaching a lane closure. It is also designed to reduce the number of late merges resulting in devices being struck and having to be reset to maintain positive guidance at the merge point. The successive flashing of the lights shall occur from the upstream end of the merging taper to the downstream end of the merging taper in order to identify the desired vehicle path.

Materials

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

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

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

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

All Sequential Flashing Warning Lights shall be on the NCDOT Work Zone Traffic Control Approved Products List.

Construction Methods

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

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

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

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

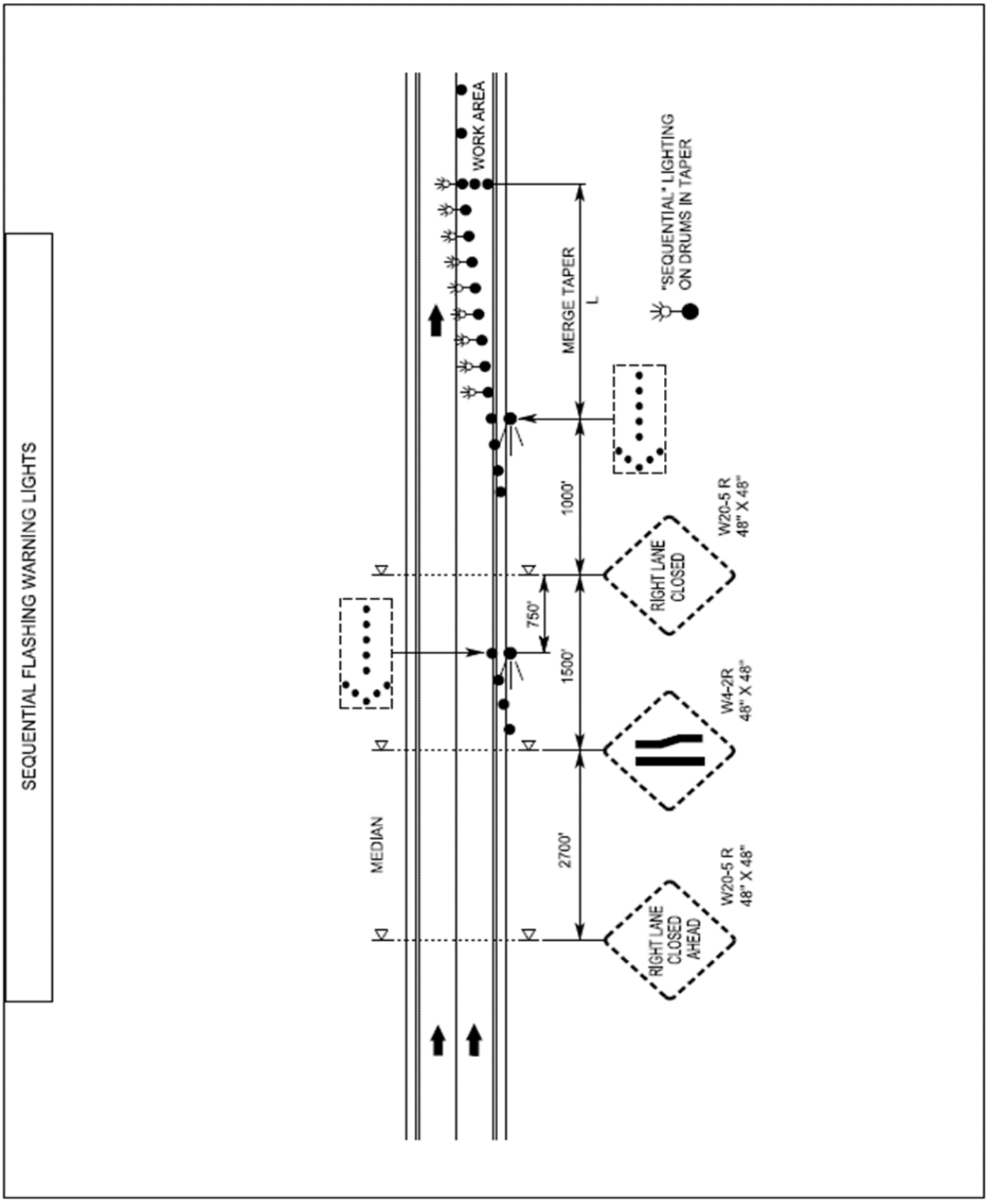
Sequential Flashing Warning Lights shall only be mounted on drums.

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

The Sequential Flashing Warning Lights shall automatically sequence when placed in line in an open area with a distance between lights of ten to 100 feet. A ten-foot stagger in the line of lights shall have no adverse effect on the operation of the lights.

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

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


SEQUENTIAL FLASHING WARNING LIGHTS
WORK AREA
MERGE TAPER
L
"SEQUENTIAL" LIGHTING ON DRUMS IN TAPER
MEDIAN
1000'
750'
1500'
2700'
RIGHT LANE CLOSED
W20-5 R 48" X 48"
W4-2R 48" X 48"
RIGHT LANE CLOSED AHEAD
W20-5 R 48" X 48"

WORK ZONE DIGITAL SPEED LIMIT SIGNS

(2/4/2021)

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. The purpose of Work Zone Digital Speed Limit signs is to easily change work zone speed limits between activities that necessitate the need for a lower speed limit and the ones that do not.

Materials

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

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

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

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

The LED panel shall have auto brightness / dimming capability.

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

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

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

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

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

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

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

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

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

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

Digital Speed Limit Displays

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

Reduced Speed Limit Displays

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

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

Existing Speed Limit Displays

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

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

Construction Methods

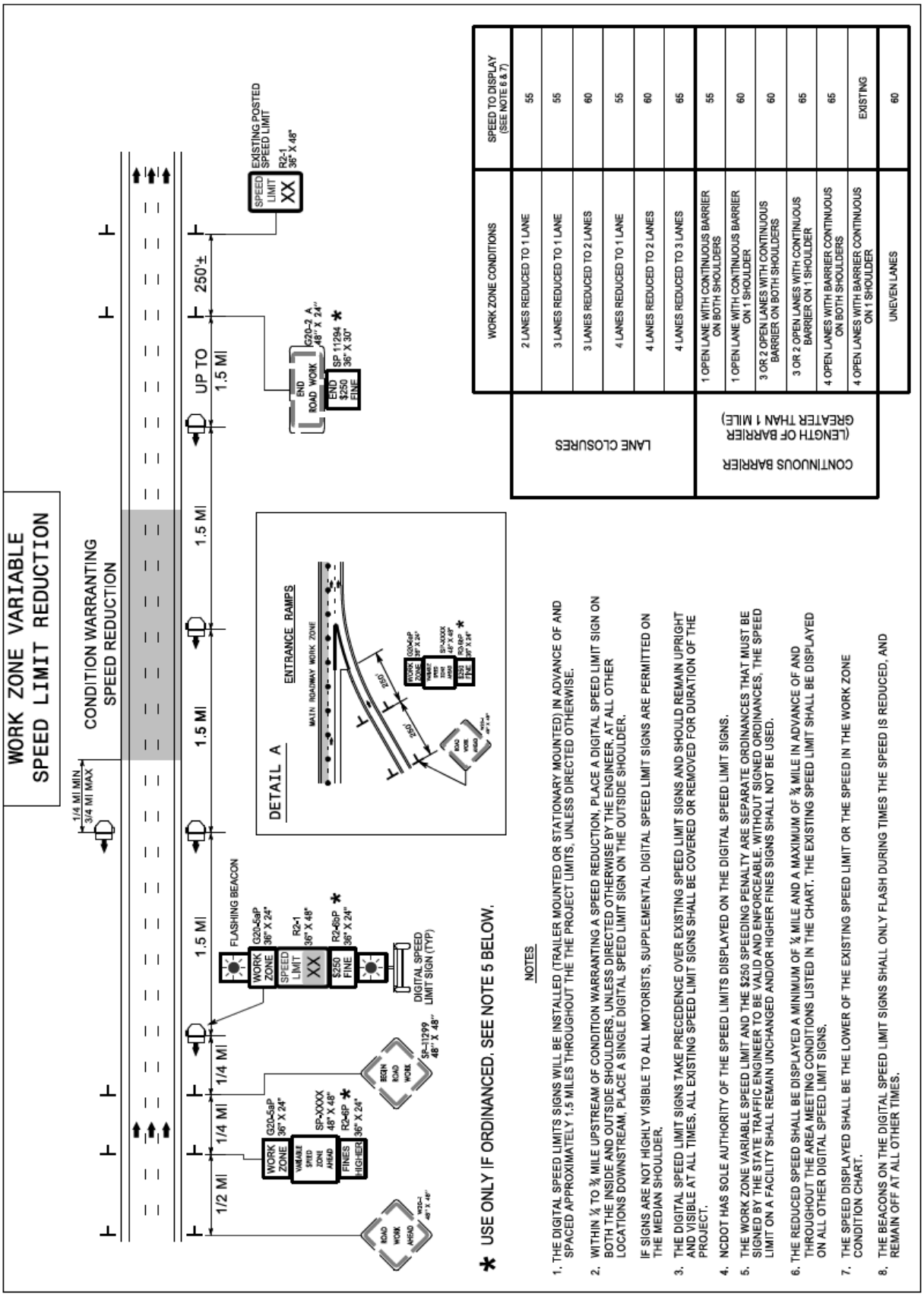
The speed limits shall be the sole authority of the NCDOT. An ordinance by the State Traffic Engineer is required for all speed limits in order to have a lawfully enforceable speed limit.

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

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

**** NOTE **** Relocated paragraph on radar equipment and flashing beacons

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



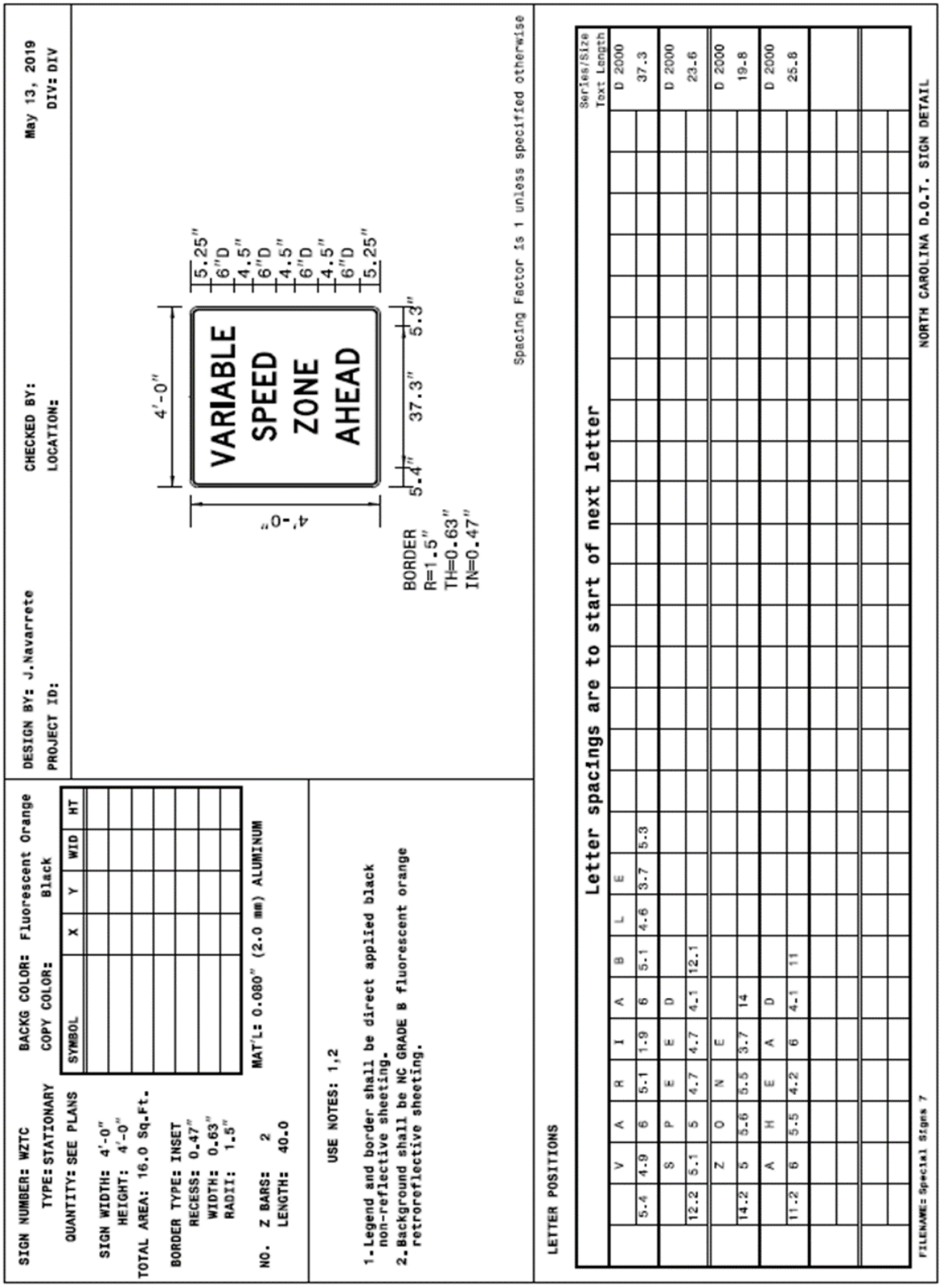
	WORK ZONE CONDITIONS	SPEED TO DISPLAY (SEE NOTE 6 & 7)
LANE CLOSURES	2 LANES REDUCED TO 1 LANE	55
	3 LANES REDUCED TO 1 LANE	55
	3 LANES REDUCED TO 2 LANES	60
	4 LANES REDUCED TO 1 LANE	55
	4 LANES REDUCED TO 2 LANES	60
	4 LANES REDUCED TO 3 LANES	65
CONTINUOUS BARRIER (LENGTH OF BARRIER GREATER THAN 1 MILE)	1 OPEN LANE WITH CONTINUOUS BARRIER ON BOTH SHOULDERS	55
	1 OPEN LANE WITH CONTINUOUS BARRIER ON 1 SHOULDER	60
	3 OR 2 OPEN LANES WITH CONTINUOUS BARRIER ON BOTH SHOULDERS	60
	3 OR 2 OPEN LANES WITH CONTINUOUS BARRIER ON 1 SHOULDER	65
	4 OPEN LANES WITH BARRIER CONTINUOUS ON BOTH SHOULDERS	65
	4 OPEN LANES WITH BARRIER CONTINUOUS ON 1 SHOULDER	EXISTING
	UNEVEN LANES	60

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 ¼ TO ¾ 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 ¼ MILE AND A MAXIMUM OF ¾ 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.

**** NOTE **** Deleted Activity Area Detail



WORK ZONE PERFORMANCE PAVEMENT MARKINGS

(06/04/2015)

Description

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

Materials

a) General

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

**** NOTE **** Deleted paragraph on black contrast Performance pavement markings

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

- Thermoplastic (Extruded and Sprayed)
- Epoxy
- Polymer (Single System)
- Cold Applied Plastic (Type 4)

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

b) Material Qualifications / Certifications

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

c) Performance

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

Construction Methods

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

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

a) Testing Procedures.

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

b) Application Equipment

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

c) Material Application

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

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

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

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

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

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

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

Reflectometer Requirements for Work Zone "Performance" Pavement Markings

Color	Initial	6 Months	12 Months
White	375 mcd/lux/m2	275 mcd/lux/m2	150 mcd/lux/m2
Yellow	250 mcd/lux/m2	150 mcd/lux/m2	100 mcd/lux/m2

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

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

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

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

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

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

Color	MINIMUM
White	150 mcd/lux/m2
Yellow	100 mcd/lux/m2

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

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

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

d) Surface Preparation

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

e) Temperature and Weather Limitations

Work Zone Performance pavement markings shall only be applied when the ambient air temperature and the pavement temperature are 50° F or higher for thermoplastic and are 40° F or higher for all other materials. The Design-Build Team shall not install Work Zone Performance pavement markings unless the pavement surface is completely dry. The Design-Build Team shall not install Work Zone Performance pavement markings within four hours of a heavy rain event, (rainfall intensities equal to or greater than 1 inch / per hour).

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

White:	225 mcd / lux / m2
Yellow:	200 mcd / lux / m2

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

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

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

GREENWAYS AND MULTI-USE PATHS

(2-18-14) BP-1

Description

This project special provision provides for revisions to the 2018 *Standard Specifications for Roads and Structures* for work on a greenway or multi-use path not designed or intended to carry highway traffic.

Materials

Refer to the 2018 *Standard Specifications for Roads and Structures* except as noted in this project special provision. Use materials on the NCDOT Approved Products List (APL) where applicable.

Construction Methods

Construct Greenway in accordance with the plans developed by the Design-Build Team and the 2018 *Standard Specifications for Roads and Structures* except as noted below:

SECTION	ARTICLE	PAGE	REVISION
235: Embankments	235-3(C): Embankment Compaction	2-24	**Delete first sentence and replace with the following:** 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: Fine Grading Subgrade	500-2(C): Compaction of Subgrade	5-1	**Delete first sentence and replace with the following:** Compact all material to a depth of up to eight 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: Fine Grading Subgrade	500-3: Tolerances	5-2	**Delete Article 500-3 and replace with the following:** A tolerance of plus or minus one inch from the established greenway grade will be permitted after the subgrade has been graded to a uniform surface.
505: Aggregate Subgrade	505-3: Construction Methods	5-8	**Delete first paragraph and replace with the following:** 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.

SECTION	ARTICLE	PAGE	REVISION
520: Aggregate Base Course	520-7: Shaping and Compaction	5-11	**Delete first sentence in second paragraph and replace with the following:** 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. **Delete the third paragraph**
610: Asphalt Concrete Plant Mix Pavements	610-10: Density Requirements	6-23	**Delete Article 610-10 and replace with the following:** Compact the asphalt plant mix to at least 85% of the maximum specific gravity.
610: Asphalt Concrete Plant Mix Pavements	610-13: Final Surface Testing and Acceptance	6-24	**Delete Article 610-13**
848: Concrete Sidewalks	848-3: Construction Methods	8-31	**Delete second paragraph and replace with the following:** Construct concrete greenway based on the typical sections in the plans developed by the Design-Build Team. Place groove joints at a spacing equal to the width of the greenway. Transverse Expansion Joints shall be required every 40 feet.

TYPICAL MEDIAN ACCESS AREAS

(12/18/18)

Description

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

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

Materials

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

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

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

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

Flashing Beacon and Detection System

(A) General

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

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

- Provide a totally mobile complete unit capable of being located as traffic conditions demand.

- The warning sign height shall comply with Roadway Standard Drawing No. 1110.01, Sheet 1 of 3, when raised in the upright position.

- The flashing beacon housing assembly shall be of weather resistant construction.

(B) Power System

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

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

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

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

(C) Controller

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

The controller shall provide a battery-charge status indicator.

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

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

(D) Trailer

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

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

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

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

(E) Reliability

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

Construction Methods

See Typical Median Access Detail below.

Temporary Acceleration Lane

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

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

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

Flashing Beacons and Detection System

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

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

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

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

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

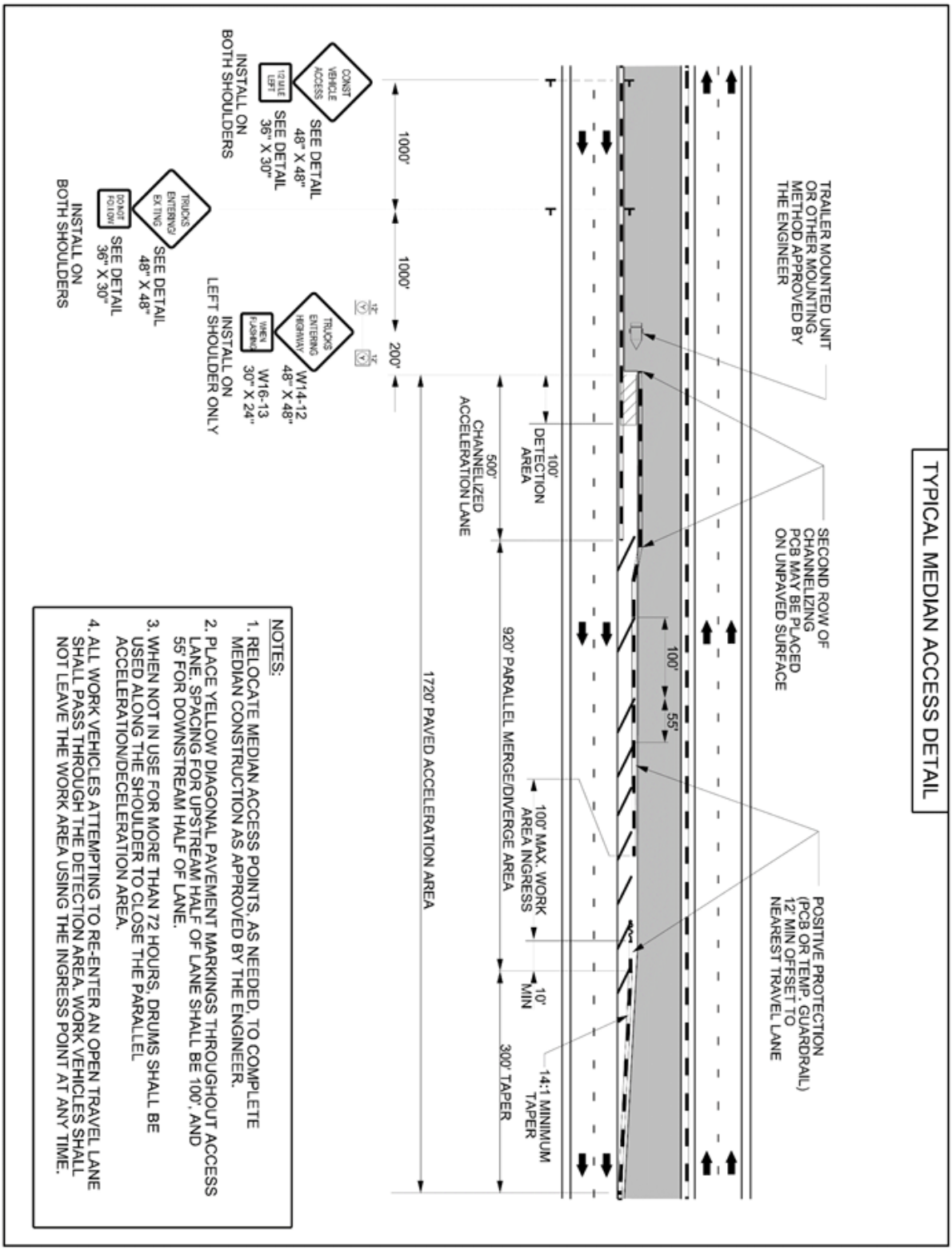
Location, Placement, and Use

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

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

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

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


TYPICAL MEDIAN ACCESS DETAIL
TRAILER MOUNTED UNIT OR OTHER MOUNTING METHOD APPROVED BY THE ENGINEER
SECOND ROW OF CHANNELIZING PCB MAY BE PLACED ON UNPAVED SURFACE
POSITIVE PROTECTION (PCB OR TEMP. GUARDRAIL) 12' MIN OFFSET TO NEAREST TRAVEL LANE
100'
55'
100' DETECTION AREA
500' CHANNELIZED ACCELERATION LANE
100' MAX. WORK AREA INGRESS
10' MIN
14:1 MINIMUM TAPER
300' TAPER
920' PARALLEL MERGE/DIVERGE AREA
1720' PAVED ACCELERATION AREA
1000'
1000'
200'
CONST VEHICLE ACCESS
12'-0" LEFT
SEE DETAIL 48" X 48"
SEE DETAIL 36" X 30"
INSTALL ON BOTH SHOULDERS
TRUCKS ENTERING HIGHWAY
WHEN FLASHING
W14-12 48" X 48"
W16-13 30" X 24"
INSTALL ON LEFT SHOULDER ONLY
TRUCKS ENTERING/ EXITING
DO NOT FOLLOW
SEE DETAIL 48" X 48"
SEE DETAIL 36" X 30"
INSTALL ON BOTH SHOULDERS
NOTES:
1. RELOCATE MEDIAN ACCESS POINTS, AS NEEDED, TO COMPLETE MEDIAN CONSTRUCTION AS APPROVED BY THE ENGINEER.
2. PLACE YELLOW DIAGONAL PAVEMENT MARKINGS THROUGHOUT ACCESS LANE. SPACING FOR UPSTREAM HALF OF LANE SHALL BE 100', AND 55' FOR DOWNSTREAM HALF OF LANE.
3. WHEN NOT IN USE FOR MORE THAN 72 HOURS, DRUMS SHALL BE USED ALONG THE SHOULDER TO CLOSE THE PARALLEL ACCELERATION/DECELERATION AREA.
4. ALL WORK VEHICLES ATTEMPTING TO RE-ENTER AN OPEN TRAVEL LANE SHALL PASS THROUGH THE DETECTION AREA. WORK VEHICLES SHALL NOT LEAVE THE WORK AREA USING THE INGRESS POINT AT ANY TIME.

SIGN NUMBER: WZTC
TYPE: STATIONARY
QUANTITY: SEE PLANS
SIGN WIDTH: 3'-0"
HEIGHT: 2'-6"
TOTAL AREA: 7.5 Sq.Ft.
BORDER TYPE: INSET
RECESS: 0.47"
WIDTH: 0.63"
RADII: 1.5"
NO. Z BARS:
LENGTH:

BACKG COLOR: Fluorescent Orange
COPY COLOR: Black

SYMBOL	X	Y	WID	HT

MAT'L: 0.080" (2.0 mm) ALUMINUM

USE NOTES: 1,2

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

DESIGN BY: J.Navarrete
PROJECT ID: I5922

CHECKED BY:
LOCATION:

Mar 14, 2018
DIV:WZTC

Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter spacings are to start of next letter

	1/2	M	I	L	E	Series/Size Text Length
	6.6	5.9	5	4.4	1.8	3.3	2.6	6.6			C 2000
											22.9
		L	E	F	T						C 2000
	12	3.3	3.4	2.8	2.8	12					12.1

FILENAME: I5922 Sign Designs

NORTH CAROLINA D.O.T. SIGN DETAIL

SIGN NUMBER: WZTC
TYPE: STATIONARY
QUANTITY: SEE PLANS

SIGN WIDTH: 5'-6"
HEIGHT: 5'-6"
TOTAL AREA: 30.3 Sq.Ft.

BORDER TYPE: INSET
RECESS: 0"
WIDTH: 0"
RADII: 0"

NO. Z BARS: 2
LENGTH: 58.0

BACKG COLOR: Fluorescent Orange
COPY COLOR: Black

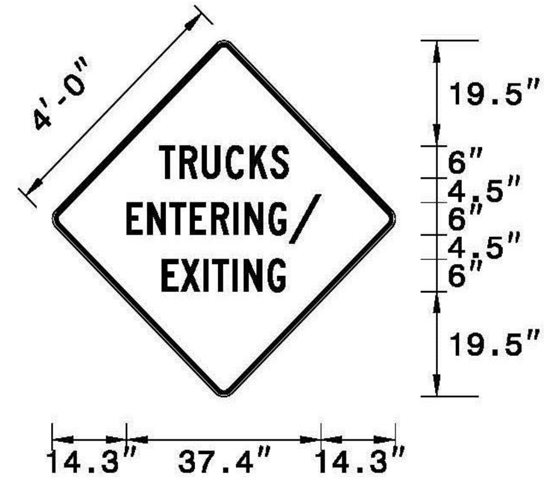
SYMBOL	X	Y	WID	HT

MAT'L: 0.080" (2.0 mm) ALUMINUM

DESIGN BY: J.Navarrete
PROJECT ID: I5922
CHECKED BY:
LOCATION:
Mar 14, 2018
DIV: DIV

USE NOTES: 1,2

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



Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter spacings are to start of next letter

											Series/Size Text Length
	T	R	U	C	K	S					C 2000
20.6	3.9	4.4	4.6	4.6	4.1	3.4	20.6				24.8
	E	N	T	E	R	I	N	G	/		C 2000
14.3	4.1	4.2	3.9	4.1	4.4	2.2	4.6	3.9	6.1	14.3	37.4
	E	X	I	T	I	N	G				C 2000
21.2	3.6	4.4	1.7	3.9	2.2	4.6	3.4	21.2			23.6

FILENAME: I5922 Sign Designs

NORTH CAROLINA D.O.T. SIGN DETAIL

SIGN NUMBER: WZTC
TYPE: STATIONARY
QUANTITY: SEE PLANS

SIGN WIDTH: 3'-0"
HEIGHT: 2'-6"
TOTAL AREA: 7.5 Sq.Ft.

BORDER TYPE: INSET
RECESS: 0.47"
WIDTH: 0.63"
RADII: 1.5"

NO. Z BARS:
LENGTH:

BACKG COLOR: Fluorescent Orange
COPY COLOR: Black

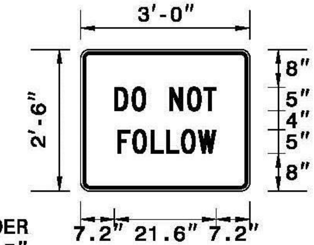
SYMBOL	X	Y	WID	HT

MAT'L: 0.080" (2.0 mm) ALUMINUM

DESIGN BY: J.Navarrete
PROJECT ID: I5922
CHECKED BY:
LOCATION:
Mar 14, 2018
DIV:WZTC

USE NOTES: 1,2

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



BORDER
R=1.5"
TH=0.63"
IN=0.47"

Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter spacings are to start of next letter

								Series/Size Text Length
	D	O		N	O	T		C 2000
7.2	3.7	3	5	3.8	3.6	2.6	7.2	21.6
	F	O	L	L	O	W		C 2000
7.9	3.1	3.9	3.3	3.2	3.6	3.8	7.2	20.9

FILENAME: I5922 Sign Designs

NORTH CAROLINA D.O.T. SIGN DETAIL

CONNECTED LANE CLOSURE DEVICES

(10/29/18)

Description

The Design-Build Team shall furnish, install, operate, maintain, relocate, and remove connected lane closure devices for use on interstate and freeway lane closures. The connected lane closure devices shall transmit the location of the lane closure to navigational companies such as WAZE, Google Maps, Inrix, Here, TrafficCast, TomTom, Apple Maps, Panasonic, the Statewide Traffic Operations Center, (STOC), and any other navigational companies that requests it. A connected lane closure device shall be installed on the flashing arrow board identifying the beginning of a lane closure, and another connected lane closure device shall be installed on a crashworthy traffic control device (such as a drum) at the end of the same lane closure.

Materials

The connected lane closure devices shall be designed and built to transmit the location of the lane closure to the navigational companies as well as the STOC. The format of the information received by each of these shall be approved by each entity, and at minimum, consist of an XML file. The connected lane closure devices shall be capable of obtaining wireless communication by either cellular or satellite technology.

The initial connected device 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 turned off or changed to caution mode, the connected device shall automatically turn off simultaneously.

The second connected device in a lane closure shall be installed on a crashworthy 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 that device has established communication and is transmitting. The light may be either steady burn or flashing and shall not exceed one inch in diameter.

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.

Construction Methods

Connected lane closure devices shall be used on all lane closures on freeways and interstates throughout the project.

Two connected lane closure devices shall be installed 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, and the other at the last traffic control device at the end of the lane closure(s). 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 have 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 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 Design-Build Team 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 as long as the device is in use.

Technical Requirements

The connected devices shall run continuously during any active lane closures for the construction duration.

The GPS within the connected devices shall have a horizontal accuracy of 50 feet, 95% of the time.

The connected device information, including the location, transmission status, and battery status shall be transmitted within five (5) minutes of initiation and updated every fifteen (15) minutes. In addition to transmitting information to the Department, the Design-Build Team shall keep the retained device information for one (1) year after Final Acceptance of the project. Information shall include timestamps, device name, and GPS location. This information shall be made available to the Department upon request.

The battery voltage shall be collected at least once an hour. The information shall be stored and available for troubleshooting. The system shall transmit an alert if the battery voltage of a device is under a specified threshold.

The connected devices shall emit an audible an alert if a device is not transmitting its position for a period of one hour.

The outputs from the connected device on the arrow board and the downstream connected device at the end of the lane closure shall be easily identifiable as a single pair, 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 pair.

SOUND BARRIER WALL

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

1.0 DESCRIPTION

This work consists of furnishing precast panels, structural steel, concrete columns, and all other materials; handling, transporting, fabricating, galvanizing, and storing materials;

furnishing erection drawings, pile excavation, backfilling, erecting and installing the sound barrier wall members and all other materials as required by the plans developed by the Design-Build Team, the 2018 *Standard Specifications for Roads and Structures* and this Project Special Provision.

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

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

(B) **ALTERNATE PILE SPACING**

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

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

(D) **ALTERNATE WALL TYPE**

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

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

requirements herein, including details necessary to fabricate and construct the proposed alternate.

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

MATERIALS AND FABRICATION

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

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

CONSTRUCTION METHODS

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

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

1. Pile Excavation

   Use equipment of adequate capacity and capable of drilling through soil and non-soil including rock, boulders, debris, man-made objects and any other materials encountered. Blasting shall not be permitted to advance the excavation. Blasting for core removal shall only be permitted when approved by the Engineer. Dispose of drilling spoils in accordance with Section 802 of the 2018 *Standard Specifications for Roads and Structures* and as directed by the Engineer. Drilling spoils shall consist of all excavated material, including but not limited to water removed from the excavation either by pumping or drilling tools.

   If unstable, caving or sloughing soils are anticipated or encountered, stabilize excavations with either slurry or steel casing. When using slurry, submit slurry details including product information, manufacturer’s recommendations for use, slurry

equipment information and written approval from the slurry supplier that the mixing water is acceptable before beginning drilling. When using steel casing, use either the sectional type or one continuous corrugated or non-corrugated piece. Steel casings shall consist of clean watertight steel of ample strength to withstand handling and driving stresses and the pressures imposed by concrete, earth or backfill. Use steel casings with an outside diameter equal to the hole size and a minimum wall thickness of ¼-inch.

2. Concrete Placement

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

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

WORKING DRAWINGS

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

ANCHORED SHEET PILE RETAINING WALLS

SP

1.0 GENERAL

Construct anchored sheet pile retaining walls (anchored walls) consisting of ground anchors drilled and grouted into place or steel tie rods connected to deadmen piles (H-piles or sheet piles), and / or cast in place (CIP) or precast concrete deadmen. A ground anchor shall consist of a steel bar or multi-strand tendons grouted in a drilled hole inclined at an angle below horizontal. Steel tie rods shall consist of deformed steel bars connected to deadmen piles or CIP / precast concrete deadmen.

Design and construct anchored walls based on actual elevations and wall dimensions in accordance with 1) the contract, and 2) the plans and special provisions developed by the Design-Build Team and accepted by the Department.

The Design-Build Team shall utilize personnel and / or a subcontractor that is prequalified for Retaining Wall (Anchored) to construct anchored sheet pile retaining walls with ground anchors.

2.0 MATERIALS

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

Item	Section
Joint Materials	1028
Grout	1003
Portland Cement	1024-1
Portland Cement Concrete	1000
Reinforcing Steel	1070
Select Material	1016
Shoulder Drain Materials	816-2
Piles	1084
Steel Plates	1072-2
Precast Concrete Units	1077
Prestressed Concrete Members	1078

In accordance with Article 106-3 of the 2018 *Standard Specifications for Roads and Structures*, provide Type 3 material certifications for materials. Store steel materials on blocking at least 12" above the ground. Load, transport, unload, and store wall materials so materials are kept clean and free of damage. When installing materials ensure the materials are free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Damaged and / or bent and / or defective materials shall be rejected.

A. Ground Anchors

For ground anchors, 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 psi and 4,000 psi, respectively.

Provide ground anchors consisting of grouted steel bars or multi-strand tendons and anchorages. Use high-strength deformed steel bars that meet AASHTO M 275 or seven-wire strands that meet ASTM A886 or Article 1070-5 of the 2018 *Standard Specifications for Roads and Structures*. Splice bars in accordance with Article 1070-9 of the 2018 *Standard Specifications for Roads and Structures*. Do not splice strands.

Provide Class I corrosion protection (encapsulated tendon) for ground anchors in accordance with *FHWA Geotechnical Engineering Circular No. 4 "Ground Anchors and Anchored Systems"* (Publication No. FHWA-IF-99-015). Use grease and grout filled sheaths for unbonded lengths of ground anchors and encapsulation for bond lengths of ground anchors that meet Article 6.3.4 of the *AASHTO LRFD Bridge Construction Specifications*. Provide trumpets with seals that meet Articles 6.3.3 and 6.4.3 of the AASHTO LRFD specifications. Use bondbreakers, spacers and centralizers that meet

Article 6.3.5 of the AASHTO LRFD specifications.

B. Steel Tie Rods

Steel tie rods shall be deformed steel bars meeting the requirements of ASTM A722. Splicing of steel tie rods shall be not allowed. Steel tie rods shall be epoxy coated as specified in Section 1070-7 of the 2018 *Standard Specifications for Roads and Structures*. Provide Class I corrosion protection as described for the unbonded lengths of ground anchors.

C. Piles

Unless required otherwise elsewhere in this RFP, H-piles and / or sheet piles shall meet the requirements of Section 1084 of the 2018 *Standard Specifications for Roads and Structures*.

D. Shapes, Plates, Bolts, Nuts, Washers, and Wedges

All shapes, plates, bolts, nuts, washers, and wedges shall meet the requirements of Section 1072 of the 2018 *Standard Specifications for Roads and Structures*. Use Type 1 or Type 3 high strength bolts, nuts, and washers. All shapes, plates, bolts, nuts, washers, and wedges shall be galvanized, metalized, or made of marine grade steel (ASTM A690). Galvanization or metallization coatings damaged and / or removed during handling and installation shall be repaired with the same coating as used for the subject item.

E. Concrete for Wall Coping and Deadmen

Concrete coping and concrete deadmen shall be Class AA concrete.

3.0 PRECONSTRUCTION REQUIREMENTS

A. Anchored Wall Surveys

The anchored wall plans developed by the Design-Build Team shall show a plan view, typical sections, details, notes and an elevation / profile view (wall envelope) for each anchored wall. Before beginning anchored wall design, survey existing ground elevations shown in the plans developed by the Design-Build Team and other elevations in the vicinity of the anchored wall locations as needed. For proposed slopes above or below anchored walls, survey existing ground elevations to at least ten feet beyond slope stake points. Based on these elevations, set finished grades and actual anchored wall dimensions and details. Submit revised wall envelopes to the Department for review and acceptance. Use accepted wall envelopes for design.

B. Anchored Wall Designs

For anchored wall designs, submit PDF files of working drawings and design calculations to the Department at least 30 days before the preconstruction meeting. Do not begin anchored wall construction until the anchored wall design submittal is accepted by the

Department.

Use a NCDOT prequalified Anchored Wall Design geotechnical firm to design anchored walls. Designs shall be sealed by a Design Engineer approved as a Geotechnical Engineer (key person) for the prequalified Anchored Wall Design geotechnical firm.

Design anchored walls in accordance with *AASHTO LRFD Bridge Design Specifications* unless otherwise required. Design anchored walls for a maximum lateral movement for the service limit state at the top of the wall of 1.5 inches or 0.5% of H, whichever is less, with H defined as the distance from the ground line at the front face of the wall to the top of wall coping.

When utilizing ground anchors, the ground anchors shall meet the following unless otherwise approved by the Department, in writing.

1. Bond length of at least 15 feet in soil
2. Unbonded length of at least ten feet and unbonded length behind critical failure surface of at least five feet or H/5, whichever is longer
3. Inclination of at least 12° below horizontal
4. Clearance between ends of tendons and drill holes of at least six inches
5. Grout cover between encapsulation and drill hole walls of at least 1/2"
6. Diameter of six to ten inches

Do not extend ground anchors or place deadmen beyond right of way or permanent easement limits. If existing or future obstructions such as foundations, guardrail, fence or handrail posts, pavements, pipes, inlets or utilities will interfere with ground anchors, maintain a clearance of at least six inches between obstructions and ground anchors and steel tie rod assemblies.

Provide wall drainage systems utilizing weep holes installed slightly above final grade and / or normal high water on the front face of the wall. Weep holes shall be installed after the wall is constructed utilizing a two-part filter system to allow maintenance and replacement during the life of the wall.

When vehicular traffic will exist on the backside of the wall, design anchored walls for a live load (traffic) surcharge of 250 psf in accordance with Article 11.5.6 of the AASHTO LRFD specifications. When steel beam guardrail with eight-foot posts will exist above anchored walls, analyze walls for a nominal horizontal load (P_{H1}) of 300 lb/ft of wall in accordance with Figure 3.11.6.3-2(a) of the AASHTO LRFD specifications. When concrete barrier rail will exist above anchored walls, analyze walls for a nominal P_{H1} of 500 lb/ft of wall in accordance with Figure 3.11.6.3-2(a) of the AASHTO LRFD specifications.

Submit working drawings and design calculations including unit grout / ground bond strengths and lock-off loads for acceptance in accordance with Article 105-2 of the 2018 *Standard Specifications for Roads and Structures*. Submit working drawings showing plan

views, wall profiles with deadmen and steel tie rod and / or ground anchor locations, including known performance test ground anchor locations, typical sections and details of piles. If necessary, include details on working drawings for concrete barrier rail with moment slab and obstructions extending through walls or interfering with piles, ground anchors, barriers or moment slabs. Submit design calculations including lateral movement calculations for each wall section with surcharge loads, geometry or material parameters. Include analysis of temporary conditions in design calculations. At least one analysis shall be required for each wall section with different steel tie rod or ground anchor lengths.

C. Anchored Wall Construction Plan

Submit a PDF file of an anchored wall construction plan to the Department at least 30 days before the preconstruction meeting. Do not begin anchored wall construction until the construction plan submittal is accepted by the Department. Provide detailed project specific information in the anchored wall construction plan that includes the following:

1. Overall description and sequence of anchored wall construction

2. Proposed pile driving methods and equipment in accordance with Subarticle 450-3(D)(2) of the 2018 *Standard Specifications for Roads and Structures* when proposing / using impact hammers to drive deadmen pile and / or steel sheet pile

3. List and sizes of excavation equipment, drill rigs and tools, tremies and grouting equipment, as applicable for the anchoring method used

4. When using ground anchors, the plan and methods for ground anchor testing with calibration certificates dated within 90 days of the submittal date

5. Examples of construction records to be provided that meet Section 4.0(G) of this project special provision

6. Grout mix design for ground anchors or steel tie rods with acceptable ranges for grout flow and density

7. Other information shown in the plans developed by the Design-Build Team or requested by the Engineer

If alternate construction procedures are proposed or necessary, a revised anchored wall construction plan submittal shall be required and must be accepted by the Department prior to performing alternate construction procedures. If the work deviates from the accepted submittal without prior approval, the Engineer may suspend anchored wall construction until a revised plan is submitted and accepted.

D. Preconstruction Meeting

Before starting anchored wall construction, hold a preconstruction meeting to discuss the construction, inspection and testing of the anchored walls. If this meeting occurs before all

anchored wall submittals have been accepted, additional preconstruction meetings may be required before beginning construction of anchored walls without accepted submittals. The Resident or Bridge Maintenance Engineer, Area Construction Engineer, Geotechnical Operations Engineer, Design-Build Team, Anchored Wall Contractor and Anchored Wall Contractor Superintendent shall attend preconstruction meetings.

4.0 CONSTRUCTION METHODS

Control drainage during construction in the vicinity of anchored walls. Direct runoff away from anchored walls and areas above and behind walls.

A. Installation of Steel Sheet Piles

Install steel sheet piles in accordance with Sections 450 and 452 of the 2018 *Standard Specifications for Roads and Structures*. Impact driving, spudding, pre-drilling, and / or excavation and backfilling shall be used when stiff / strong material is encountered when installing steel sheet piles. To maintain alignment and location tolerances, a steel template shall be required unless otherwise approved by the Engineer, in writing, and / or the Design-Build Team demonstrates other proposed methods which meet the tolerance requirements, in the Department's sole discretion. Do not splice steel sheet piles. Damaged steel sheet piles or steel sheet piles installed out of tolerance shall be removed and reinstalled. Galvanization or metallization coatings damaged and / or removed during handling and installation shall be repaired with the same coating as used for the sheet pile. Tolerances for piles shall be in accordance with Section 450-3(B) of the 2018 *Standard Specifications for Roads and Structures*, except sheet piles shall be installed vertically within a tolerance of 1/8 inch per foot and no higher than one inch above the top elevation shown in the plans developed by the Design-Build Team.

B. Wall Backfill

For partial fill sections, backfill behind sheet piles in accordance with Article 410-8 of the 2018 *Standard Specifications for Roads and Structures*. Do not damage portions of ground anchors or steel tie rods exposed behind sheet piles when placing and compacting backfill material in fill areas. When backfilling in water, use select granular material, Class III to three feet above the water.

C. Deadman (piles or cast in place / precast concrete)

Excavate the existing ground as necessary to install the steel tie rods and assemblies. When deadmen are piles, drive the piles to the tip elevations shown in the plans developed by the Design-Build Team. The top elevation of the piles shall be as shown in the plans developed by the Design-Build Team. When using cast in place / precast concrete as deadmen, excavate and build / place in accordance with Sections 410 and 420 of the 2018 *Standard Specifications for Roads and Structures.*

D. Ground Anchors

Fabricate and install ground anchors in accordance with the accepted submittals and Articles 6.4 and 6.5 of the *AASHTO LRFD Bridge Construction Specifications* with the following exceptions.

- Ground anchor materials that meet Section 2.0 this project special provision
- Heat-shrink sheaths for unbonded lengths of ground anchors shall not be allowed

Mix and place neat cement grout in accordance with Sub-articles 1003-5, 1003-6 and 1003-7 of the 2018 *Standard Specifications for Roads and Structures*. Measure grout temperature, density and flow during grouting with at least the same frequency grout cubes are made for compressive strength. Perform density and flow field tests in the presence of the Engineer in accordance with American National Standards Institute / American Petroleum Institute Recommended Practice 13B-1 (Section 4, Mud Balance) and ASTM C939 (Flow Cone), respectively.

Test ground anchors in accordance with the contract and as directed by the Engineer. Performance and proof tests shall be required in accordance with the accepted submittals, Article 6.5.5 of the AASHTO LRFD specifications and the following additional requirements.

1. In place of the performance test requirements in Article 6.5.5.2 of the AASHTO LRFD Specifications, performance tests shall be required for at least two ground anchors or five percent of total ground anchors, whichever is greater, for each anchored wall

2. Electrical resistance load cells shall be required for performance tests

3. An additional load increment equal to the alignment load (AL) shall be required between the maximum test and lock-off loads in Table 6.5.5.2-1 of the AASHTO LRFD specifications

4. The lock-off load shall be as shown in the accepted submittals

The Engineer will determine the number and locations of performance tests required. The approximate known performance test ground anchor locations shall be shown in the plans developed by the Design-Build Team. Submit identification numbers and calibration records for load cells, jacks and pressure gauges with the anchored wall construction plan. Calibrate each jack and pressure gauge as a unit.

E. Steel Tie Rods

When using deadmen, steel tie rods shall be installed at the locations and specified time period shown in the plans developed by the Design-Build Team. Place and compact the embankment up to the bottom of the steel tie rods before laying the steel tie rods. Apply the required lock off load. Steel tie rods shall maintain the linear alignment between the sheet

piling and the deadmen without a sag. Extreme care shall be taken not to damage the proposed steel tie rods or their corrosion protection during installation and backfilling. The Design-Build Team shall replace all steel tie rods that are damaged, including but not limited to damage to the corrosion protection, at no additional cost.

F. Concrete Coping

Construct copping as shown in the accepted submittals and Subarticle 452-4(B) of the 2018 *Standard Specifications for Roads and Structures*.

G. Construction Records

Within 24 hours of completing each row of ground anchors, provide two copies of anchored wall construction records. Include at least the following construction records.

1. Names of Anchored Wall Contractor, Superintendent, Drill Rig Operator, Project Manager and Design Engineer

2. Wall description, county, Department's contract, TIP and WBS element number

3. Wall station and number, and lift location, dimensions, elevations and description

4. Ground anchor locations, dimensions and inclinations, tendon types, sizes and grades, corrosion protection and temporary casing information

5. Date and time drilling begins and ends, tendons are inserted into drill holes, neat cement grout is mixed and arrives on-site and grout placement begins and ends

6. Grout volume, temperature, flow and density records

7. Ground and surface water conditions and elevations, if applicable

8. Weather conditions including air temperature at time of grout placement

9. Ground anchor testing records including load versus movement and time versus creep movement plots

10. Any other pertinent details related to anchored wall construction and / or requested by the Engineer

The Engineer will review the construction records to determine if ground anchors are acceptable. If the Engineer determines a ground anchor is unacceptable, revise the ground anchor design or installation methods. Submit a revised anchored wall design or construction plan for acceptance and provide an acceptable ground anchor with the revised design or installation methods. If necessary, provide additional ground anchors with the revised design or installation methods for the unacceptable ground anchors.

CONTINUOUS FLIGHT AUGER PILES FOR SOUND BARRIER WALLS

SP

GENERAL

Continuous flight auger (CFA) piles are constructed by drilling a borehole with a continuous flight hollow stem auger and filling the borehole by pumping grout through the auger as it is withdrawn. After completing grout placement, reinforcement is inserted into the column of fluid grout. At the Design-Build Team's option, construct CFA piles for sound barrier walls instead of pile excavation. Install CFA piles with the required depth in accordance with the contract and accepted submittals. Use a prequalified CFA Pile Subcontractor for CFA pile work. Define "pile" as a CFA pile and "reinforcement" as pile extending out of CFA pile.

INSTALLATION PLAN SUBMITTAL

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

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

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

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

MATERIALS

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

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

PRECONSTRUCTION MEETING

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

CONSTRUCTION METHODS

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

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

Drilling

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

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

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

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

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

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

Grouting

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

Place a screen between the ready mix truck and the grout pump to remove large particles or cement balls using a mesh that has openings no larger than ¾".

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

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

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

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

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

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

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

Top of Pile Finishing and Protection

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

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

Reinforcement

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

CONSTRUCTION RECORDS

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

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

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

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

CFA PILE ACCEPTANCE

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

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

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

ARCHITECTURAL CONCRETE SURFACE TREATMENT

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

1.0 GENERAL

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

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

relief) of natural stone to resemble an ashlar stone pattern with panel staining **on both sides** of pre-cast concrete panels used in sound barrier walls, and exposed faces of retaining walls to match the Gray Palette Color # FS 36270 found in the *Federal Standard 595B – Colors Used in Government Procurement*. All texture shall be in addition to the nominal thickness of the pre-cast sound barrier wall panel thickness and retaining wall face thickness, ± ¼ inch. Maximum relief of the textured surface shall be 1¼ inch or less. The top 1'-0" of the top panel within each sound barrier wall segment shall have a smooth, non-textured and non-stained finish to resemble faux coping. Concrete columns shall remain unstained in their natural concrete color. There shall be an appreciable contrast between the colors of the unstained concrete columns and the stained panels. For information purposes only, sources of form liners in the ashlar stone pattern include, but are not limited to:

Scott System, Inc.
10777 E. 45th Avenue
Denver, Colorado 80239
http://www.scottsystem.com/
Pattern: Ashlar Stone # 167B

Architectural Polymers, Inc.
1220 Little Gap Road
Palmerton, Pennsylvania 18071
http://www.architecturalpolymers.com/
Pattern: Ashlar Stone # 904A

Fitzgerald Form Liners
1500 East Chestnut Avenue
Santa Ana, California 92701
http://formliners.com/
Pattern: Georgia Ashlar # 16999

The Design-Build Team has the option of supplying an alternative pattern of simulated stone form liner, as long as the pattern selected is approved, in writing, as an equal or approved alternative by the Engineer.

2.0 SUBMITTALS

Shop Drawings - The Design-Build Team shall submit for review and acceptance, plan and elevation views and details showing overall simulated stone pattern, joint locations, form tie locations, and end, edge or other special conditions. The drawings shall include typical cross sections of applicable surfaces, joints, corners, stone relief, stone size, pitch / working line, mortar joint and bed depths. If necessary, the Design-Build Team shall revise the shop drawings until the proposed form liner patterns and arrangement have been accepted by the Engineer. Shop drawings shall be of sufficient scale to show the detail of all stone and joint patterns. The size of the sheets used for the shop drawings shall be 22" x 34".

The form liner shall be patterned such that long continuous horizontal or vertical lines do not occur on the finished exposed surface. The line pattern shall be random in nature and shall conceal construction joint lines. Special attention shall be given to details for wrapping form liners around corners.

Shop drawings shall be reviewed and accepted prior to fabrication of any form liners.

Sample Wall Panels - After shop drawings have been reviewed and accepted by the Engineer, the Design-Build Team shall construct three 24" x 24" transportable sample panel(s) at the project site. The materials used in construction of the sample panel(s) shall comply with Section 420 of the 2018 *Standard Specifications for Roads and Structures*. The sample panel(s) shall be constructed using form liners approved by the Engineer. Any sample panel that is not approved by the Engineer shall be removed from the project site and a new sample panel produced at no additional expense to the Department.

After the color, texture and uniformity of the furnished samples are approved by the Engineer, produce a full-scale unit meeting the design requirements. This mock-up and the furnished samples shall establish the standard quality for determining the panel approval.

Architectural surface treatments and patterns of the finished work shall achieve the same final effect as demonstrated on the approved sample panel(s). Upon approval by the Engineer, the sample panel(s) shall be used as the quality standard for the project. After the approval of the completed structure, the Design-Build Team shall dispose of the sample panels, as directed by the Engineer.

3.0 MATERIAL REQUIREMENTS

Form Liner - The form liner shall be a high quality, reusable product manufactured of high strength urethane rubber or other approved material which attaches easily to the form work system and shall not compress more than ¼-inch when concrete is poured at a rate of ten vertical feet per hour. The form liners shall be removable without causing deterioration of the surface or underlying concrete.

Form Release Agent - Form release agent shall be a non-staining petroleum distillate free from water, asphaltic, and other insoluble residue, or an equivalent product. Form release agents shall be compatible with the color system applied and any special surface finish.

Form Ties - Form ties shall be set back a minimum of two inches from the finished concrete surface. The ties shall be designed so that all material in the device to a depth of at least two inches back of the concrete face (bottom of simulated mortar groove) can be disengaged and removed without spalling or damaging the concrete. The Design-Build Team shall submit the type of form ties to the Engineer for approval.

Concrete Color System / Stain - Special surface color system shall be performed using approved coloring systems / stains suitable for the purpose intended and applied in a manner consistent with the design intent of the project. The approved sample panel shall be the basis for determining the appropriate color / stain application.

Color stains shall be a special penetrating stain mix as provided by the manufacturer and shall be medium to dark gray to achieve a full, natural color in the finished surface. The stain shall create a surface finish that is breathable (allowing water vapor transmission), and that resists deterioration from water, acid, alkali, fungi, sunlight, and / or weathering. Stain mix shall meet the requirements for mildew resistance of Federal Test Method Standard 144, Method 6271, and requirements for weathering resistance of 1,000 hours accelerated exposure measures by Weatherometer, in accordance with ASTM G 26. Color samples shall be submitted for approval by the Engineer. Final coloring system and the Gray Palette Color # FS 36270 shall be subject to approval by the Engineer.

Anti-Graffiti Coating - The Design-Build Team shall apply anti-graffiti coating that is compatible with the concrete color system / stain. After application, the anti-graffiti coating shall be dry to the touch within one hour and shall achieve a final cure within three hours. The color of the anti-graffiti shall be clear after full cure. The Design-Build Team shall provide one gallon of graffiti remover, thinners, dryers and all necessary components recommended by the manufacturer to the North Carolina Department of Transportation Materials and Tests Unit, Chemical Testing Engineer.

Quality Standards - Manufacturer of simulated stone masonry form liners and custom coloring system shall have at least five years' experience making stone masonry molds and color stains to create formed concrete surfaces to match the natural stone shapes, surface textures and colors.

The Design-Build Team shall schedule a pre-installation conference with a manufacturer representative and the Engineer to assure understanding of simulated stone masonry form liner use, color application, requirements for construction of sample panel(s), and to coordinate the work. The Design-Build Team shall disclose their source of simulated stone masonry manufacturer and final coloration contractor at the Preconstruction Conference.

4.0 CONSTRUCTION

Form Liner Preparation - Prior to each concrete pour, the form liners shall be clean and free of build-up. Each liner shall be visually inspected for blemishes and tears. Repairs shall be made in accordance with the manufacturer's recommendations. Repairs shall be approved by the Engineer before being used. Form liner panels that do not perform as intended or are no longer repairable shall be replaced.

Form Liner Attachment - Form liners shall be securely attached to forms in accordance with the manufacturer's recommendations, with less than a ¼-inch seam. Blend form liner butt joints into the stone pattern and finish off the final concrete surface. Create no

visible vertical or horizontal seams or conspicuous form liner butt joint marks. At locations where the form liners are joined, carefully blend to match the balance of the stone pattern. Form liners shall be installed to withstand anticipated concrete placement pressures without leakage and without causing physical or visual defects. Wall ties shall be coordinated with the form liner system. The Design-Build Team shall have a technical representative from the form liner manufacturer on site for technical supervision during the installation and removal of form liners. Unless allowed by the Engineer, installation and removal of form liners shall not be permitted if the aforementioned technical representative is not present.

Form Release Agent - Form release agent shall be applied in accordance with the manufacturer's recommendations. The material shall be compatible with the form liner material and the concrete coloring system and in accordance with this Project Special Provision. Form release agent shall be worked into all areas, especially pattern recesses.

Patching - Using patching materials and procedures in accordance with the manufacturer's recommendations, all form tie holes and other defects in finished uncolored surface shall be filled or repaired within 48 hours of form removal.

Surface Finish - All surfaces that are to receive coloring agent application shall be free of all laitance, dirt, dust, grease, efflorescence, paint or any other foreign material prior to the application of coloring agent. Cleaning of surfaces shall be accomplished by pressure washing with water set at 3000 psi to remove laitance. The fan nozzle shall be held perpendicular to the surface at a distance of one to two feet. Sandblasting shall not be permitted.

Final surface shall be free of blemishes, discolorations, surface voids, and other irregularities. All patterns shall be continuous without visual disruption.

Reinforced concrete shall be finished in accordance with the 2018 *Standard Specifications for Roads and Structures*, except that curing of concrete shall be done to accommodate the application of coloring and surface finish treatment.

Grout Pattern Joints - Grout pattern joints shall be constructed to simulate the appearance of mortared joints produced in laid up masonry work. Grout pattern joints shall be produced in accordance with the form liner / concrete color system manufacturer.

Color / Stain Application - Finished concrete and patches shall stand in place 30 days after form liners are removed prior to application of coloring / staining agent. Maintain the concrete temperature between 40° F and 85° F during color / stain application and for 48 hours after color / stain application. Consult the manufacturer's recommendations for preparation, application, curing and storage of coloring agents / stains. Treated surfaces located adjacent to exposed soil or pavement shall be temporarily covered to prevent dirt or soil splatter from rain.

Anti-Graffiti Coating Application - The Design-Build Team shall apply anti-graffiti coating after full cure of the color coating. The anti-graffiti coating shall be applied by

brush, roller or airless spray when the ambient temperature is between 45° F and 90° F, and the surface temperature is between 50° F and 100° F. Ensure the surface is clean and dry before applying the anti-graffiti coating. The minimum dry film thickness of the anti-graffiti coating shall be 2.0 mils.

Following the completion of all work, repairs of any damage made by other construction operations shall be made to the form lined and colored surfaces, as directed by the Engineer.

Experience and Qualifications - The Design-Build Team shall have a minimum of three consecutive years' experience in architectural concrete surface treatment construction on similar types of projects. The Design-Build Team shall furnish to the Engineer five references who were responsible for supervision of similar projects and will testify to the successful completion of these projects. Include name, address, telephone number, and specific type of application.

ROLLER COMPACTED CONCRETE

(05-17-16) 1000 DBI 7-18

Description

Construct Roller Compacted Concrete (RCC) pavement on a prepared base, in accordance with these provisions and with lines, grades, thicknesses, and typical sections as shown on the plans developed by the Design-Build Team. This work includes, but is not limited to, the designing of the mix; producing, furnishing and placing of the concrete; compaction; finishing; constructing joints; curing the pavement; coring for test specimens and associated patching of the pavement; and quality control testing.

Submit the following for approval a minimum of 30 days prior to the start of any production of RCC:

(A) Submit RCC mix design in accordance with Section 1000-3(A) of the 2018 *Standard Specifications for Roads and Structures* except as noted herein. The submitted design shall minimally include aggregate gradation, cementitious materials, admixtures (if used), compressive strength (minimum 4,500 psi at 28 days), required moisture and density to be achieved and quantities of individual materials per cubic yard for the mix design. Minimum cement content per cubic yard shall be 450 pounds. Measurement and reporting of flexural strength is not required.

(B) Submit a Process Control Plan detailing the personnel, equipment, production, placement, compaction, sampling, testing and repair operations.

Schedule a pre-pave meeting prior to installing the RCC including representatives from the Engineer, Design-Build Team, Subcontractor, Area Construction Engineer, the State Pavement Construction Engineer, Design-Build Unit, and a representative from the Materials and Tests Unit.

Materials

(A) General

All materials shall meet the requirements of the 2018 *Standard Specifications for Roads and Structures.*

Item	Section
Portland Cement Concrete	1000
Curing Agents	1026
Joint Filler	1028-1
Low Modulus Silicone Sealant	1028-3
Water	1024-4

(B) Aggregates

Furnish aggregates conforming to Section 1014 of the 2018 *Standard Specifications for Roads and Structures.* The plasticity index of the aggregate shall not exceed five. Provide a well-graded aggregate blend conforming to the following gradation:

GRADATION FOR ROLLER COMPACTED CONCRETE AGGREGATE	
Sieve Size	**% Passing by Weight**
1"	100
3/4"	95 - 100
1/2"	70 - 90
3/8"	60 - 85
No. 4	40 - 60
No. 8	30 - 50
No. 16	20 - 40
No. 100	0 - 18
No. 200	0 - 8

Other aggregate blends may be considered provided demonstration of past performance and mix approval prior to production.

Equipment

(A) General

Provide maintained equipment and tools that will produce a completed RCC pavement meeting the requirements of this Project Special Provision. All equipment shall be on site, inspected and in good operating condition before work may proceed.

(B) Concrete Mixing Plant

A pugmill plant shall be a central plant with a twin shaft pugmill mixer, capable of batch and continuous mixing, equipped with synchronized metering devices and feeders to maintain the correct proportions of aggregate, cement, mineral admixtures, and water. Other pugmill plant requirements are as follows:

- Ensure that all aggregate stockpiles have adequate separation to prevent cross contamination and are handled in a manner that prevents segregation.

- Control feed rate by a variable speed belt or an operable gate calibrated to accurately deliver any specified quantity of material. If two or more aggregate stockpiles are used, the feed rate from each bin shall be readily adjustable to change aggregate proportions, when required. Feed rate controls must maintain the established proportions of aggregate from each stockpile bin when the combined aggregate delivery is increased or decreased.

- Operate plant scales in accordance with Sub-article 1000-9(C) of the 2018 *Standard Specifications for Roads and Structures.*

Minimize segregation during loading of delivery trucks. Loading directly from a belt or auger will not be permitted.

(C) Paver

Utilize a high-density paver, which provides a minimum of 90% of the maximum wet density in accordance with ASTM Dl557 or equivalent test method at placement.

Provide a paver of suitable weight and stability to spread and finish the RCC material, without segregation, to the required thickness, smoothness, surface texture, cross-section and grade.

(D) Compactors

Provide self-propelled steel drum vibratory rollers having a minimum static weight of ten tons for primary compaction. Provide rollers equipped with controls that automatically disengage the vibration mechanism before the roller stops. For final compaction, use a combination of self-propelled steel drum roller, in static mode, and a

rubber tire roller weighing between four and ten tons, as necessary, to achieve an acceptable surface.

Use walk-behind vibratory rollers or plate tampers for compacting areas inaccessible to the large rollers. Ensure that areas compacted with walk-behind equipment meet all requirements for compaction and surface quality. If sufficient compaction and texture cannot be achieved with walk-behind equipment, use conventional concrete in the inaccessible areas.

(E) Water Trucks

Provide at least one water truck or other similar equipment on-site capable of evenly applying a fine spray of water to dampen the base or subgrade surface ahead of RCC placement and to keep the surface of the RCC moist without damaging the final surface.

(F) Hauling Equipment

Use non-agitating hauling equipment having bodies which are smooth, watertight, metal containers equipped with vibrators and gates to discharge the concrete without segregation or damage. Provide fitted covers to protect the material from rain and excessive evaporation.

Prevent the accumulation of hardened concrete in the delivery vehicles, providing a washout station, if necessary, to prevent the accumulation of material. Discharge all flushing water before charging with the next RCC load.

(G) Concrete Saws

Use early-entry concrete saws that are capable of sawing the concrete the same day as placement and as soon as the concrete can be cut for crack control without raveling and to the depth required. Once hardened, use standard wet saw-cutting equipment if additional saw cuts are necessary. Equip all saws with blade guards and guides or devices to control alignment and depth.

Preparation of Subgrade and Base

Prior to the placement of RCC pavement, verify the subgrade and base has proper density and grade tolerances in accordance with Section 500-3 of the 2018 *Standard Specifications for Roads and Structures* and repair any soft or yielding areas. Correct all damaged areas in the subgrade or base prior to placing concrete. Keep the base clean and free of foreign material.

Dampen the surface of the base uniformly at the time the RCC pavement mixture is placed. Ensure that no free water or ponding is present at the time of concrete placement.

Weather Limitations

(A) Cold Weather

Do not place RCC when any of the following conditions exist:

(1) When base contains frost or frozen material.

(2) When the air temperature is 35°F and descending.

Maintain a sufficient supply of insulating blankets, plastic sheeting or other suitable material. Apply insulating materials to maintain a minimum temperature of 40°F at the pavement surface for a minimum of five days.

(B) Hot Weather Precautions

Do not place RCC when the air temperature is 90°F and rising and RCC temperature is greater than 95°F.

(C) Rain

Do not place RCC pavement during rain conditions sufficient to be detrimental to the finished product. Placement may continue during drizzle or mist conditions provided the surface of the RCC pavement is not eroded or damaged in any way. The Engineer will be the sole judge as to when placement must be stopped due to rain.

Construction Methods

(A) Delivery

Provide a sufficient number of trucks to ensure an adequate and continuous supply of RCC material to the paver. Deliver the concrete to the work site in a thoroughly mixed and uniform mass. Minimize the elapsed time to be 45 minutes or less, unless longer times can be demonstrated to provide acceptable performance to the sole satisfaction of the Engineer. The Engineer may rescind approval for longer elapsed times if the performance becomes unsatisfactory due to changes in weather, materials, or any other pertinent reason. The elapsed time shall be defined as the period from first contact between mixing water and cement until the entire operation of placing and compacting, including corrective measures if necessary, has been completed.

(B) Placement

Deposit the RCC material into a material transfer vehicle prior to placing into the hopper of the paver.

If at discharge, the concrete is not thoroughly mixed and homogeneous, the charging sequence, size of load, mixing time or any combination thereof should be altered to meet these requirements; otherwise, utilize other equipment capable of delivering a thoroughly mixed and uniform concrete mass.

Maintain an adequate quantity of RCC in the paver and do not allow the paver to become empty between loads. Maintain the material above the auger shaft at all times during paving.

Operate the paver in a manner that will prevent segregation and produce a smooth continuous surface without excessive tearing, pulling or shoving. Limit the placement of RCC to a length that can be compacted and finished within the appropriate time limit under the prevailing air temperature and wind conditions.

Advance the paver in a steady, continuous operation with minimal starts and stops. Limit the paver speed during placement operations to ensure that density requirements are met and surface distress is minimized.

Broadcasting or fanning the RCC material across areas being compacted will not be permitted. Such additions of material shall only be done immediately behind the paver and before any compaction has taken place. Any segregated coarse aggregate shall be removed from the surface before rolling.

If segregation occurs in the RCC during paving operations, the placement shall cease and the segregated materials shall be removed and replaced with fresh RCC before rolling.

(C) Compaction

Immediately after the concrete has been placed, thoroughly and uniformly compact the pavement.

Determine the sequence and number of roller passes by vibratory and non-vibratory rolling to obtain the specified density and surface finish. Avoid displacement of the RCC pavement. Immediately correct any displacement of the surface resulting from reversing or turning action of the roller. Smooth any uneven marks left during the vibrating rolling with a steel drum or rubber tire roller(s) operated in static mode. Provide a final surface meeting the smoothness and finish grade requirements of this section, and free of excessive surface tears and cracks.

Areas inaccessible to either the paver or rollers may be placed by hand and compacted with equipment specified within this provision. Compaction of these areas must satisfy the same minimum density requirements as specified below. An alternate and preferred method for paving inaccessible areas is to use cast-in-place, air-entrained concrete with a minimum compressive strength of 4,000 psi.

Provide additional rolling to longitudinal joints as necessary to produce the specified density for the full depth of the lift and produce a tight smooth joint.

(D) Density Testing

The RCC pavement shall be evaluated for density on a lot by lot basis. A lot shall consist of 2,000 SY of newly placed RCC. In-place field density tests shall be performed in accordance with ASTM C 1040, direct transmission, as soon as possible, but no later than 30 minutes after completion of rolling at three randomly selected locations within the lot that are no closer than 12 inches from a free edge or six inches from a confined edge. Only wet density shall be used for evaluation. Based on these three tests, an average density not less than 98% of the maximum wet density obtained by ASTM D 1557 or equivalent test method shall be required, with no individual test less than 96%.

In addition to determining the density within the mat, determine the in-place wet joint density on joints at three random locations at a of distance 12 inches from a free edge or six inches from a confined edge, as appropriate. The average of three wet joint density tests shall be not less than 96% and none of the density tests shall be less than 94% of the maximum wet density obtained by ASTM D 1557 or equivalent test method.

If the Engineer determines that a given lot does not meet the minimum specification density requirements, but the work is reasonably acceptable, the lot will be accepted at a reduced pay factor in accordance with the following formula. The reduced pay factor will apply only to the RCC unit price.

Reduced Pay Factor = 100 + [*{(Actual Density-Specified Density)/2}*25]*

Where:

Actual Density = the lot average density, not to exceed 4.0% of the specified density

Specified Density = the wet density or joint density specified in the contract

Any density lot not meeting minimum density requirements will be evaluated for acceptance in accordance with Article 105-3.

(E) Strength Testing

(1) Mix Design

The proposed RCC mix design shall have a minimum compressive strength of at least 4,500 psi in accordance with ASTM C39 based on test results of 6" x 12" cylinders prepared in accordance with ASTM C1435. Cure and

transport specimens to the laboratory in accordance with ASTM C 31.

(2) Production Quality Control Strength Testing

The RCC pavement will be evaluated for compressive strength on a lot by lot basis. A lot will consist of 2,000 SY of newly placed RCC or a fraction thereof. Obtain one sample of fresh RCC during the placement of each lot and make at least three 6" X 12" cylinders in accordance with ASTM C1435. The average of two cylinders tested at 28 days shall be the compressive strength for that lot.

(F) Curing

After final finish and immediately after the free surface moisture has disappeared, apply curing compound at a rate of 0.0067 gallons per square foot. Provide an inline flow metering device to ensure the proper application rate is provided. Apply the curing compound such that puddling or ponding does not occur on the fresh concrete surface.

(G) Finishing

The finished surface of the RCC pavement, when tested with a ten-foot straight edge or crown surface template, shall not vary from the straight edge or template by more than 3/8 inch at any one point. When the surface smoothness is outside the specified surface tolerance, the surface shall be grinded to within the tolerance by use of a self-propelled diamond grinder. Milling of the final surface will not be acceptable.

(H) Joint Construction

Construct joints to assure continuous bond between new and previously placed lanes. A vertical joint shall be considered a fresh joint when an adjacent RCC lane is placed no later than 60 minutes of placing the previous lane. This time may be reduced by the Engineer when conditions such as hot, dry, and / or windy weather are encountered. The Engineer may further require measures to keep the fresh joint moist, including but not limited to wetting or moist burlap. Cold vertical joints shall be defined as any planned or unplanned construction joints that do not qualify as fresh joints.

Cold vertical joints may be formed through the use of an edging shoe after successful demonstration that the procedure meets the minimum joint density requirements of this section and the edging shoe produces a face with no more than an angle of ten degrees from vertical. If the edging shoe is not used or cannot meet the specification requirements, remove a minimum of six inches along the entire edge by saw cutting the full depth of the RCC pavement. Saw cutting operations must not produce excessive raveling along the surface of the cut.

Prior to placing fresh RCC mixture against a compacted cold vertical joint, the joint shall be thoroughly cleaned of any loose or foreign material and in a moist condition immediately prior to placement. The joints between RCC pavement and concrete structures shall be treated as cold vertical joints.

Construct all contraction joints within RCC pavement in accordance with the plans developed by the Design-Build Team and Article 700-11 of the 2018 *Standard Specifications for Roads and Structures.* Seal contraction joints in accordance with Article 700-12 (excluding 700-12 (B) Age of Pavement) of the 2018 *Standard Specifications for Roads and Structures.*

(I) Opening to Traffic

Heavy truck traffic and other heavy equipment will not be allowed on the RCC pavement until representative concrete test cylinders achieve 3,000 psi and at least three days old. All compressive strength concrete test cylinders shall be made and tested in accordance with ASTM 1435 and AASHTO T22. However, limited automobile and light truck traffic may be allowed on the RCC as soon as the concrete is sufficiently cured to prevent significant marring.

No permanent traffic will be allowed on the pavement until construction of the joints, including all sawing, sealing, and curing that is required, has been completed.

Thickness Acceptance

The thickness of the pavement shall be determined by measurement of cores. One core shall be taken from each lot at a random location selected by the Engineer.

The thickness of the RCC pavement shall not deviate from that shown on the plans developed by the Design-Build Team by more than minus 0.5 inches. When the measurement of any core is less than the plan thickness by more than 0.5 inches, the actual thickness of the pavement in this area will be determined by taking additional cores at not less than ten-foot intervals parallel to the center line in each direction from the affected location until a core is found in each direction which is not deficient by more than inches. Areas found deficient in thickness by more than 0.5 inches will be removed full shoulder width and replaced with concrete of the thickness shown on the plans developed by the Design-Build Team. No overlays shall be accepted.

Strength Acceptance

The minimum compressive strength of RCC field cylinder specimens shall be at least 4,500 psi. The RCC pay factor for pavement achieving a compressive strength in 28 days of 4,500 psi or greater is 100%. The pay factor for pavement achieving a compressive strength in 28 days between 3,500 psi and 4,500 psi shall be determined by the following formula:

Pay Factor(%) = 100.0- [0.05(4500- Compressive Strength)]
(pay factor rounded to nearest 0.1%)

If the average compressive strength of the three cores per Lot is less than 4500 psi, then the area shall be evaluated in accordance with Article 105-3 of the 2018 *Standard Specifications for Roads and Structures.*

Test Section

At least seven days before the start of paving operations, construct a test section using the approved concrete mix design. Provide a minimum test section of 300 feet in length. Use the same equipment, materials, techniques, and personnel in the test section that will be used to construct the production RCC pavement. If approved by the Engineer, the test section may be incorporated into the production section.

The Engineer shall evaluate the following criteria from the test section:

- Adequacy of mixing plant to meet productivity requirements and produce consistent material
- Maximum density directly behind the paver prior to roller compaction
- Sequence of primary / secondary roller passes (with and without vibration)
- Maximum density following roller compaction
- Texture and surface finish acceptability
- Integrity of proposed edging shoes, edge compaction, and jointing methods
- RCC compressive strength based on cylinders and extracted cores tested at seven and 28 days

Verify the correlation between the compressive strength of extracted cores and compressive strength of field cylinder specimens. A representative area of the test section shall be identified and samples of the material used to construct this area collected for the fabrication of cylinders. The final density of the subject area shall be determined and recorded.

NONWOVEN GEOTEXTILE INTERLAYER

(1-13-14) DBI 10-07

Description

Furnish and install a nonwoven geotextile interlayer at locations shown in the plans developed 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 2018 NCDOT *Standard Specifications for Roads and Structures* certifying that the paving mat is a non-woven needle-punched geotextile with no thermal treatment (calendaring or IR) meeting the requirements shown:

Physical Properties of Non-Woven Geotextile Interlayer			
Property	**Test Method**	**Units**	**Value**
Minimum Mass per unit area	ASTM D 5261	oz/yd^2	15.0
Minimum thickness under load (a) at 2 kPa (0.29 psi) (b) at 20 kPa (2.9 psi) (c) at 200 kPa (29 psi)	ASTM D 5199	in	(a) 0.12 (b) 0.10 (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	3.3×10^{-4}
Minimum in-plane water permeability (transmissivity) under load (pressure) (a) at 20kPa (2.9 psi) (b) at 200kPa (29 psi)	Mod. ASTM D 6574 or ASTM D 4716	ft/s	(a) 1.6×10^{-3} (b) 6.6×10^{-4}
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.

FIBER OPTIC CONDUIT SYSTEM (RGC - HANGING)

A. GENERAL

The work covered by this provision consists of furnishing and installing a conduit system suspended beneath structures and buried. This conduit system is for the installation of a future fiber optic cable. Perform all work in accordance with this special provision, the plans developed by the Design-Build Team, and the National Electrical Code (NEC). Install the conduit system in accordance with NEC requirements as an approved raceway for electrical circuits.

The Contractor performing the work described in this special provision shall have a license of the proper classification from the North Carolina State Board of Examiners of Electrical Contractors.

The licensed Electrical Contractor shall be available on the job site when the work is being performed or when requested by the Engineer. The licensed Electrical Contractor shall have a set of plans and special provisions in his possession on the job site, and shall maintain accurate As-Built Plans.

B. MATERIALS

Submit catalog cuts and / or drawings electronically for all proposed materials for the Engineer's review and approval. Include the brand name, stock number, description, size, rating, manufacturing specification, and applicable contract item number(s) on each submittal. Allow forty (40) days for submittal review. The Engineer will advise the Design-Build Team of reasons for rejected submittals and will return approved submittals to the Design-Build Team. Do not deliver material to the project prior to submittal approval.

Use terminations to seal the open ends of each conduit to provide watertight protection.

Use rigid galvanized conduit (RGC) in accordance with UL 6 “Rigid Metallic Conduit” with rigid full weight galvanized threaded fittings. Provide factory installed reverse-spin couplings with three set screws, to allow assembly without turning the outer duct, and prevent the coupling from backing off before and after installation. Provide an O-ring gasket in the coupling body to resist pullout and to create a watertight seal. Do not use materials provided by more than one manufacturer.

When deflection couplers are detailed on the plans developed by the Design-Build Team, use deflection couplers that are designed for use with RGC raceways, and meet all the requirements for RGC conduit stated above. Provide deflection couplers that allow a 30-degree bend in any direction and ¾-inch mis-alignment in all axis. Provide factory installed reverse-spin couplings with three set screws, to allow assembly without turning the conduit, and prevent the coupling from backing off before and after installation. Provide deflection couplers with a middle section consisting of a rubber boot attached by spin couplings and galvanized straps.

Use expansion joints that are designed for use with RGC raceways, and meet the requirements for RGC stated above. Provide expansion joints that allow eight inches of longitudinal movement. Use expansion joints consisting of a female end with a lead-in coupling body and spin coupling, and an exterior sliding joint. Provide expansion joints that have factory installed reverse-spin couplings with three set screws, to allow assembly without turning the conduit and prevent the coupling from backing off before and after installation.

Use transition adapters that allow RGC raceway and PVC raceway to be coupled together. Provide adapters consisting of a threaded female adapter, an outer duct adapter, and a modified coupling body with a sleeve, thin wall couplings and an end spacer.

Provide concrete inserts made of galvanized malleable iron, with internal threads for suspending loads from a fixed point beneath a concrete ceiling or deck where no lateral adjustment is required. Use inserts that can be secured to the concrete forms, preventing movement during concrete placement.

For stabilizers and hangers, use galvanized rods that conform to ASTM-A36 or A-575. Galvanized rods shall be threaded on both ends or threaded continuously. Use steel stabilizer clamps and attachment brackets, sized as noted in the plans developed by the Design-Build Team and hot dipped galvanized per ASTM-A123. Provide high strength bolts, nuts and washers that are galvanized in accordance with Article 1072-5 of the 2018 *Standard Specifications for Roads and Structures*.

Use adjustable clevis-type pipe hangers that allow for vertical adjustment and limited movement of the pipe. Use galvanized pipe hangers that are listed with Underwriters Laboratories, or are Factory Mutual approved for the size conduit shown in the plans developed by the Design-Build Team. Use hangers that comply with Federal Specification WW-H-171E Type 1 and Manufacturers Standardization Society SP-69 Type 1. Plastic-coat the saddle area of the hanger.

Provide pull lines specifically designed for pulling rope through conduit. Use pull lines made of two-ply line, with a tensile strength of 240 pounds minimum. Use rot and mildew resistant pull lines that are resistant to tangling when being dispensed.

Use mastic that is a permanent, non-hardening, water sealing compound that adheres to metal, plastic, and concrete.

Provide jute that is a burlap-like material used for filling voids and protecting components from waterproofing and adhesive compounds.

Provide zinc rich paint conforming to Section 1080-9 of the 2018 *Standard Specifications for Roads and Structures*.

C. **INSTALLATION**

To ensure against corrosion in the area where hot dipped galvanizing has been damaged, cover all raw metal surfaces with a cold galvanized, zinc rich paint.

Stub the raceway out at an accessible location and seal with termination kits designed specifically for that purpose. Use termination kits of the same material as the raceway.

Install Stabilizers as shown on the plans developed by the Design-Build Team to assure proper movement of the conduit expansion joints. Securely fasten the clamps with attachment brackets and stabilizer rods to the conduit at the indicated locations to assure these locations remain stationary. Install the stabilizer rods parallel to the alignment of the conduit, and tilt rod upward at an orientation of 45 degrees to the bottom of the bridge deck.

Insert a pull line in each inner duct with sufficient slack for future use.

Securely fasten all components to prevent movement during concrete placement.

Smooth all sleeve ends and make them flush with surrounding concrete surfaces. Remove burrs and rough edges by filing or grinding. A torch shall be used to cut the ends of metal sleeves. Use shields to protect all surfaces during torch-cutting operations.

Place backfill in accordance with Section 300-7 of the 2018 *Standard Specifications for Roads and Structure*s.

Fill the space between the raceway and the sleeve with mastic and jute. Install the mastic with a minimum distance of 2 inches at each end of the sleeve and the remaining interior space filled with jute. Finish the mastic by making it smooth and flush with the concrete.

Coordinate electrical conduit system work with work by others and allow installation of circuitry or fiber optic cables during the construction process as directed by the Engineer.

Ensure that the concrete inserts are in the proper position and installed correctly, including when they are located in prestressed concrete deck panels.

Keep the raceway system clean of all debris during construction, with the completed system clean and ready for installation of circuitry or fiber optic cables.

The Engineer shall inspect and approve all work before concealment.

AIR TERMINAL & LIGHTNING PROTECTION SYSTEM

DESCRIPTION

Furnish an air terminal and lightning protection system that is comprised of items meeting UL 96 and UL 467 product standards for lightning protection and installed to be compliant with the National Fire Protection Association 780 Standards for Lightning Protection Systems. The lightning protection system shall consist of, as a minimum, an Air Terminal, vertical Air Terminal Base (wood pole) or Air Terminal Rod Clamps (metal pole), 28-Strand bare-copper lightning conductor, 4-point grounding systems (grounding electrodes), #4 AWG copper bonding conductors, marker tape and other miscellaneous hardware.

Materials

General

Reference the following Typical Details where applicable:

CCTV Camera Installation for Metal Pole with Aerial Electrical Service

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

The above details can be found at the following website:

https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

A. Wood Pole

Furnish a UL Listed Class II, copper clad minimum 48” long by ½” diameter air terminal. Ensure the air terminal has a tapered tip with a rounded point on one end and is threaded on the connection end with standard Unified Coarse (UNC) 13 threads per inch.

Furnish a copper vertical air terminal base that has internal threading to accept a ½” diameter air terminal with UNC 13 threads per inch. Provide a base that allows for a minimum ¼” mounting hole to secure the base to the vertical side of a wood pole. Ensure the air terminal base includes (2) 5/16” cap screws to secure the bare copper lightning conductor. Additionally, provide (2) ½” copper tube straps (conduit clamps) to secure the air terminal and bare copper lightning conductor to the pole.

B. Metal Pole

Furnish a UL Listed Class II, stainless steel minimum 48” long by ½” diameter air terminal with a tapered tip with a rounded point on one end. No threading is required on the opposing end.

Furnish an air terminal rod clamp manufactured out of 304 stainless steel. Ensure the air terminal rod clamp has two horizontal support arms that are 2" wide by 3/16" thick and design to offset the air terminal approximately 8" away from the metal pole. Ensure the support arms at the point where the air terminal is to be installed has an internal crease to secure the air terminal along with four (4) bolts to provide the clamping action between the two support arms. Provide two (2) stainless steel banding clamps to secure the air terminal rod clamp's base plate to the metal pole.

C. Copper Lightning Conductor and Ground Rods

Furnish a Class II rated copper lightning conductor which consists of 28 strands (minimum) of 15 AWG copper wires to form a rope-lay bare copper lightning conductor. Furnish 5/8" diameter, 10-foot long copper-clad steel ground rods with a 10-mil thick copper cladding to serve as an integral part of the 4-point grounding system. Furnish irreversible mechanical clamps to secure the 28-strand lightning conductor, #4 AWG bare copper ground wires and grounding electrodes together to complete the grounding system.

Construction Methods

A. Wood Pole

Install the vertical air terminal base approximately 12" below the top of the wood pole and install the air terminal to the threaded connection on the base. Install a ½" copper tube strap (conduit clamp) over the air terminal, 6" from the top of the pole. Additionally, secure the copper lightning conductor under both 5/16" diameter cap screws located on the base. Install an additional ½" copper tube strap (conduit clamp) over the bare copper lightning conductor, 6" below the air terminal base. Locate the ¼" mounting hole on the vertical air terminal base and install a ¼" by 3" (minimum) long lag bolt through the base and into the wood pole to support the air terminal assembly.

Route the bare copper lightning conductor to maintain maximum horizontal separation from any risers that traverse up the pole. Secure the bare copper lightning conductor to the pole on 24" centers using copper cable clips. From the bottom of the pole (ground level) install a 2" by 10' long PVC U-Guard over the bare copper lightning conductor to protect the cable from vandalism.

B. Metal Pole

Install two (2) stainless steel air terminal rod clamps to the side of the metal pole structure starting at 6" below the top of the pole with the second air terminal clamp 12" from the top of the pole (approximately 6" of separation between the 2 clamps). Secure each air terminal rod clamp to the pole structure with two (2) stainless steel banding clamps. Install the air terminal between the horizontal support arms on each air terminal rod clamp and tighten the bolts to provide a secure connection.

C. Copper Lightning Conductor and Ground Rods

Install the 4-point grounding system by installing a central grounding electrode that is surrounded by a minimum of three (3) additional grounding electrodes spaced approximately 20 feet away from the central grounding electrode and approximately 120 degrees apart.

Interconnect each grounding electrode using a #4 AWG bare copper conductor back to the central grounding electrode using irreversible mechanical crimps. Additionally, using an irreversible mechanical crimp, connect the bare copper lightning conductor to the central grounding electrode. Install each grounding electrode and its corresponding #4 AWG bare copper grounding wire and 28 strand copper lightning conductor such that the wires are 24" below grade. Install marker tape 12" below grade and above all grounding conductors.

In instances where right of way does not allow for ground rod spacing as required above, reference the 2018 Roadway Standard Drawings - Section 1700.02 "Electrical Service Grounding" for "Limited Shoulder" or "Restricted Space" installation alternatives.

Prior to connecting the lightning protection system to an electrical service, perform a grounding electrode test on the lightning protection system to obtain a maximum of 20 ohms or less. Install additional grounding electrodes as need to obtain the 20 ohms or less requirement. The grounding electrode resistance test shall be verified or witnessed by the Engineer or the Engineer's designated representative.

Follow test equipment's procedures for measuring grounding electrode resistance. When using clamp-type ground resistance meters, readings of less than one ohm typically indicate a ground loop. Rework bonding and grounding circuits as necessary to remove ground loop circuits and retest. If a ground loop cannot be identified and removed to allow the proper use of a clamp-type ground resistance meter, use the three-point test method. Submit a completed inductive Loop & Grounding Test Form available on the Department's website.

GENERAL

The State will not be bound by oral explanations or instructions given at any time during the bidding process or after award. Only information that is received in response to this RFP will be evaluated; reference to information previously submitted will not suffice as a response to this solicitation.

NO CONTACT CLAUSE

To ensure that information is distributed equitably to all short-listed Design-Build Teams, all questions and requests for information shall be directed to the State Contract Officer through the Design-Build e-mail address. This precludes any Design-Build team member, or representative, from contacting representatives of the Department, other State Agencies or Federal Agencies either by phone, e-mail or in person concerning the Design-Build Project.

USE OF TERMS

Throughout this RFP and all manuals, documents and standards referred to in the RFP the terms Contractor, Bidder, Design-Builder, Design-Build Team, Team, Firm, Company and Proposer are synonymous.

Throughout this RFP and all manuals, documents and standards referred to in the RFP, the terms NCDOT, Department, Engineer and State are synonymous.

Throughout this RFP and all documents referred to in the RFP, references to the Technical Proposal include all Technical Proposal supplemental information that may be submitted in response to a Best and Final Offer RFP.

DESIGN REFERENCES

Design references developed and published by NCDOT and those developed and published by other agencies and adopted for use by NCDOT which are to be used in the design of this project may be obtained by contacting the Contract Standards and Development Unit within the Field Support Division. Standard prices for materials, which the Department normally sells for a fee, will be in effect. The Design-Build Team shall be responsible for designing in accordance with the applicable documents and current revisions and supplements thereto.

REVIEW OF SUBMITTALS

Major design milestones and required design submittals shall be identified as activities on a CPM, bar chart or other scheduling tool. This schedule shall be submitted to the Design-Build Unit and Resident Engineer concurrently with the first design submittal, or within 30 days of the contract award, whichever is earlier. The schedule shall be revised and resubmitted as design milestones change or as directed by the Design-Build Unit. 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) from the date of receipt by NCDOT, whichever is greater, unless otherwise stipulated in the Scope of Work. All

submittals shall be prepared and submitted in accordance with the *Design-Build Submittal Guidelines*, which by reference are incorporated and made a part of this contract. All submittals shall be made simultaneously to the Design-Build Unit and the Resident Engineer. The Department will not accept subsequent submittals until prior submittal reviews have been completed for that item. For all design disciplines, the Design-Build Team shall inform the Design-Build Unit, in writing, of all proposed changes / revisions to the NCDOT preliminary designs, the Design-Build Team's Technical Proposal and / or previously reviewed / accepted submittals, including but not limited to changes / revisions to RFC Plans, and obtain approval prior to incorporation. Failure to provide the aforementioned written notification of changes / revisions with the appropriate design submittal could result in the Department 1) suspending the design submittal review 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. The Design-Build Team shall prioritize submittals in the event that multiple submittals are made based on the current schedule. All submittals shall include pertinent Special Provisions. No work shall be performed prior to Department review and acceptance of the design submittals.

OVERVIEW

The I-6064A, B & C / I-5879 Design-Build Project rehabilitates the existing I-95 pavement, widens I-95 to eight lanes and modifies interchanges from I-74 (Exit 13) to Station 67+00 -L- on the I-5987A Project in Robeson County. The project is approximately 8.0 miles long.

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
- **Right of Way** - acquisition of right of way necessary to construct project
- **As-Constructed Drawings**
- **As-Built Plans**

Construction Engineering Inspection will be provided by the NCDOT Division personnel or will be performed under a separate contract.

The following project planning documents have been completed:

- The I-5879 Type III Categorical Exclusion (CE) was approved on November 15, 2018.
- The I-6064 Type III CE was approved on December 29, 2020.

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 8.0 miles of I-95 to an eight-lane divided facility, including pavement rehabilitation and interchange modifications. Unless allowed otherwise elsewhere in this RFP, the designs shall meet all appropriate latest versions of AASHTO *Policy on Geometric Design of Highways and Streets*, AASHTO *LRFD Bridge Design Specifications, Manual of Uniform Traffic Control Devices* and all NCDOT design policies that are current as of the Technical Proposal submittal date or the Best and Final Offer submittal date, whichever is later.

Unless noted otherwise elsewhere in this RFP, all documents referenced herein shall be the edition / version, including all interim revisions, effective on the Technical Proposal submittal date or the Best and Final Offer submittal date, whichever is later.

Construction shall include, but not be limited to, all necessary clearing, grading, roadway, drainage, structures, utility coordination and relocation, and erosion and sediment control work items for the proposed eight-lane facility and installation of the control of access fence. Construction engineering and management shall be the responsibility of the Design-Build Team. Construction shall comply with 2018 NCDOT *Standard Specifications for Roads and Structures* and any special provisions.

Areas of work required for this project shall include, but are not limited to the following items:

Roadway Design
Structure Design
Permit Application
Hydraulic Design
Geotechnical Engineering
GeoEnvironmental
Railroad Coordination
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).

DESIGN AND CONSTRUCTION PERFORMED BY DESIGN-BUILD TEAM

The design work consists of the preparation of all construction documents to widen approximately 8.0 miles I-95 to an eight-lane divided facility, including pavement rehabilitation and interchange modifications as outlined in the Scope of Work section of this RFP. The Design-Build Team shall prepare final designs, construction drawings and special provisions.

Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall acknowledge that project documents furnished by the Department are preliminary and provided solely to assist the Design-Build Team in the development of the project design. The Design-Build Team shall be fully and totally responsible for the accuracy and completeness of all work performed under this contract and shall save the State harmless and shall be fully liable for any additional costs and all claims against the State which may arise due to errors, omissions and negligence of the Design-Build Team in performing the work required by this contract.

There shall be no assignment, subletting or transfer of the interest of the Design-Build Team in any of the work covered by the Contract without the written consent of the State, except that the Design-Build Team may, with prior written notification of such action to the State, sublet property searches and related services without further approval of the State.

The Design-Build Team shall certify all plans, specifications, estimates and engineering data furnished by the Design-Build Team.

All work by the Design-Build Team shall be performed in a manner satisfactory to the State and in accordance with the established customs, practices, and procedures of the North Carolina Department of Transportation, and in conformity with the standards adopted by the American Association of State Highway Transportation Officials, and approved by the U.S. Secretary of Transportation as provided in Title 23, U.S. Code, Section 109 (b). The decision of the Engineer / State / Department shall control in all questions regarding location, type of design, dimension of design, and similar questions.

Alternate designs, details and / or construction practices (such as those employed by other states, but not standard practice in NC) are subject to Department review and approval, and will be evaluated on a case by case basis.

The Design-Build Team shall not change team members, subconsultants or subcontractors identified in the Statement of Qualifications (SOQ) or Technical Proposal without written consent of the Engineer or the State Contract Officer. In addition, subconsultants and subcontractors not identified in the SOQ or Technical Proposal shall not perform any work without written consent by the Engineer. Individual offices of the Design-Build Team not identified in the Statement of Qualifications or the Technical Proposal submitted shall not perform any work without written consent by the Engineer. Failure to comply with this

requirement may be justification for removing the Team from further consideration for this project and disqualification from submitting on future Design-Build Projects.

All firms shall be prequalified by the Department for the work they are to perform. Joint Ventures, LLCs or any legal structure that are different than the existing prequalification status must be prequalified prior to the Price Proposal submittal deadline. Subcontractors need only be prequalified prior to performing the work. Design firms should be prequalified prior to the Technical Proposal submittal deadline. If not prequalified at the time of the Technical Proposal submittal deadline, the prime contractor shall be solely responsible for either (1) ensuring that the design firm is prequalified prior to its first design submittal or (2) replacing that firm with a prequalified firm.

ACCESS TO PROVIDED MATERIALS

To facilitate distribution of documents that may be helpful to the Design-Build Teams in their development of a Technical and Price Proposal and subsequent designs, project material will be made accessible through a secure web portal. Access to the web portal will be given to each short-listed prime contractor and lead design firm. No distribution of Provided Materials will be possible prior to the Department announcing the short-listed Design-Build Teams and establishing the access privileges.

Access privileges will only be given to the individuals listed in the prime contractor's and lead design firm's Active Directory Group. It shall be solely the prime contractor's and lead design firm's responsibility to maintain their Active Directory Group. Once access has been established, individuals may enter the "Connect" site and login with their NCID account. Once logged in, the Teamsite "I-6064A, B & C / I-5879" 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/projects/roadway/pages/private-engineering-firm-resources.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:

Drafting the contract or contract Scopes of Work
Design-Build Team selection
Negotiation of the contract cost (including calculating manhours or fees)
Contract administration

An exception to these terms may be granted when recommended by the Secretary and approved by the Board of Transportation.

The Design-Build Team and their subconsultants / subcontractors shall restrict all personnel embedded within the Department, including but not limited to Design Units and Divisions, from working on any Design-Build procurement / project. Except as allowed otherwise below, the Design-Build Team shall provide a list of all embedded personnel to the Department and a signed Confidentiality Agreement for each embedded employee, as well as their employer and NCDOT Unit Manager. If the Design-Build Team has previously provided a signed Confidentiality Agreement for an embedded employee who's employer and / or NCDOT Unit Manager have not changed, the Design-Build Team shall 1) indicate on the aforementioned list when the original Confidentiality Agreement was provided to the Design-Build Unit (date and TIP Project), 2) provide a copy of the original signed Confidentiality Agreement, or 3) provide a new signed Confidentiality Agreement. The Design-Build Team shall submit the aforementioned list and Confidentiality Agreements to Mr. Ronald E. Davenport, Jr., P.E., State Contract Officer, within ten business days of the issuance of the Industry Draft RFP, and provide updated lists and Confidentiality Agreements, as appropriate, throughout the project procurement / duration.

Failure to comply with the terms stated above in this section may be grounds for termination of this contract and / or not being considered for selection of work on future contracts for a period of one year.

SUBMITTAL OF TECHNICAL AND PRICE PROPOSALS

Technical and / or Price Proposals that do not adhere to all the requirements noted below may be considered non-responsive and may result in the Department not considering the Design-Build Team for award of the contract or reading their Price Proposal publicly.

TECHNICAL PROPOSAL

Technical Proposals will be accepted until **4:00 p.m. Local Time on Tuesday, August 31, 2021,** at the office of the State Contract Officer:

Mr. Ronald E. Davenport, Jr., PE
Contract Standards and Development
1020 Birch Ridge Drive
Century Center Complex - Building B
Raleigh, NC 27610

No Technical Proposals will be accepted after the time specified.

TECHNICAL PROPOSAL - Hard Copies

Hard copies of the Technical Proposal shall be submitted in a sealed package. The outer wrapping shall clearly indicate the following information:

Technical Proposal - Hard Copies
Submitted By: (Design-Build Team's Name)
Design-Build Team Address
Contract Number C204596
TIP Number I-6064A, B & C / I-5879
Robeson County
I-95 widening and pavement rehabilitation from I-74 (Exit 13) to south of US 301 (Exit 22) and I-95 / SR 1536 (Carthage Road) interchange improvements

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. C204596". (Reference the *Submittal of Quantities, Fuel Base Index Price and Opt-Out Option* Project Special Provision found elsewhere in this RFP for additional requirements that are concurrent with the Technical Proposal submittal.)

Technical Proposal Requirements

12 Copies

8 ½-inch by 11-inch pages
No fold out sheets allowed - 24-inch by 36-inch fold out sheets shall only be allowed to present interchange plans in the 11-inch by 17-inch plan sheets

Printed on one side only

Double-spaced

Font size 12 - Within embedded tables, charts, and graphics only, minimal font size 10 is permissible

Excluding the introductory letter to Mr. Ronald E. Davenport, Jr., P.E. (two-page maximum length), a copy of the Department's approval letter for each incorporated Formal ATC, and the 11-inch by 17-inch appropriate plan sheets, the maximum number of allowable pages shall be 50 pages.

The aforementioned introductory letter to Mr. Ronald E. Davenport, Jr., PE shall include a statement acknowledging that the NCDOT may destroy all Technical Proposals not retained by the Department, **or** a statement that the NCDOT should return all Technical Proposals not retained by the Department.

Project team members, identified in the Statement of Qualifications, shall not be modified in the Technical Proposal without written approval of the Department. Any such request should be sent to the attention of Mr. Ronald E. Davenport, Jr., PE, at the address below:

NCDOT- Contract Standards and Development
Century Center Complex - Building B
1020 Birch Ridge Drive
Raleigh, NC 27610

TECHNICAL PROPOSAL - Electronic Copy

An electronic copy of the Technical Proposal shall be submitted in a sealed package. The electronic copy 1) shall be in a searchable .pdf format, 2) shall not contain any hyperlinks, 3) shall be scaled to reproduce to the appropriate page format, as defined above, and 4) shall be created by converting the original MicroStation / GeoPak files. The outer wrapping shall clearly indicate the following information:

Technical Proposal - Electronic Copy
Submitted By: (Design-Build Team's Name)
Design-Build Team Address
Contract Number C204596
TIP Number I-6064A, B & C / I-5879
Robeson County
I-95 widening and pavement rehabilitation from I-74 (Exit 13) to south of US 301 (Exit 22) and I-95 / SR 1536 (Carthage Road) interchange improvements

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. C204596".

PRICE PROPOSAL

Price Proposals will be accepted until **4:00 p.m. Local Time on Tuesday, September 14, 2021**, 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 C204596
TIP Number I-6064A, B & C / I-5879
Robeson County
I-95 widening and pavement rehabilitation from I-74 (Exit 13) to south of US 301 (Exit 22) and I-95 / SR 1536 (Carthage Road) interchange improvements

The Price Proposal shall be submitted by returning the Request for Proposals with the item sheets completed, and all required signatures and bonds. Failure to execute the required documents may render the Price Proposal non-responsive.

Price Proposals delivered in person shall be delivered to Door B3 of the Century Center Complex - Building B. The delivery person shall call Ms. Marsha Sample at (919) 707-6915 or Mr. Ken Kennedy, PE at (919) 707-6919 to accept delivery. If delivered by mail, the sealed

package shall be placed in another sealed package that is addressed to the Contract Officer as stated in the Request for Proposals. The outer package shall also bear the statement "Price Proposal for the Design-Build of State Highway Contract No. C204596".

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:

	EVALUATION FACTORS	POINTS
1.	Management	6
2.	Responsiveness to Request for Proposal	30
3.	Long Term Maintenance	4
4.	Schedule and Milestones	25
5.	Innovation	5
6.	Maintenance of Traffic and Safety Plan	25
7.	Oral Interview	5

TECHNICAL PROPOSAL EVALUATION CRITERIA

1. Management - 6 points

Provide a comprehensive Organizational Chart that identifies the design, quality and construction management, 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.

Design-Build Team Management

- Describe the Design-Build Team's concept of design management, and identify key positions and subordinate organizational units.
- Describe how the various design disciplines will be coordinated, including how designs developed by different firms and offices will be integrated / consistent.
- Describe how design personnel will interface with the construction personnel.
- List projects, including description and similarity to the subject project that the Design-Build Team's designer(s) have developed Pavement Marking Plans; Traffic Signal, Electrical Detail and Signal Communications Plans; and Signing Plans.
- List projects, including description and similarity to the subject project, that the Design-Build Team's right of way firm has performed right of way acquisition services.
- Describe the Design-Build Team's concept of the project construction management organization and how it interrelates with the other elements of the Design-Build Team's organization for the project.
- 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.

Quality Management

- Describe how the Design-Build Team will comply with the design and construction quality control requirements. Specifically, include a narrative that describes the Design-Build Team's understanding of the Department's quality control philosophy and how the Design-Build Team will implement it for this project.
- Describe any significant design and / or construction quality control issues experienced on NCDOT projects in the last ten years and how those issues will be addressed for this project.

2. Responsiveness to RFP - 30 points

Natural Environmental Responsibility

- Describe the Design-Build Team's approach to addressing environmental concerns within the project boundaries.
- 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, and streams.
- 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.
- Describe the Design-Build Team's approach to Sedimentation and Erosion Control for the project.

- Describe efforts to minimize excavation within the contaminated sites and associated disturbance to underlying soil. If applicable, specify the extent of impacts to properties with contaminated soils, indicating the anticipated contamination excavation limits.
- Provide a narrative overview of the Design-Build Team's Vegetation Management Procedure.

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.
- If applicable, identify the personnel and / or subcontractor that will design and construct the RCC pavement, and their associated qualifications, providing examples and quality results of their previous RCC pavement construction.
- 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.
- Include a minimum three-year extension of the 12-month guarantee for all incorporated permanent mainline travel lane, mainline shoulder, ramp and loop ATC pavement designs.
- Indicate how longitudinal joints will be located on a lane line or lane midpoint.
- Identify drainage modifications and designs to be implemented.
- Provide a brief summary of the mainline hydroplaning risk assessment and proposed mitigation.
- Provide a *Box Culverts and Cross Pipes Hydraulic Deficiency Assessment and Proposed Mitigation Table* that contains the box culvert and cross pipe attributes noted in the Hydraulics Scope of Work found elsewhere in this RFP.
- Provide a *Box Culverts and Cross Pipes Hydraulic Assessment Table* that contains the box culvert and cross pipe attributes noted in the Hydraulics Scope of Work found elsewhere in this RFP.
- Identify the months the Department should schedule the interagency hydraulic design review meeting and the interagency permit impacts meeting.
- 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.
- Indicate the type and number of bridge expansion joints.
- Identify types of any retaining walls and / or sound barrier walls, if applicable.
- Describe any geotechnical investigations to be performed by the Design-Build Team and note any deviations to NCDOT requirements for subsurface investigations noted in the Geotechnical Engineering Scope of Work found elsewhere in this RFP.
- Identify the approximate location of new permanent ITS devices and when they will be installed and operational in their permanent location.
- Identify any aesthetic considerations not required herein that will be part of the design.
- Describe how utility conflicts will be addressed and any special utility design considerations. Describe how the Design-Build Team's design and construction methods minimize the Department's utility relocation costs.
- Describe how the design will affect the Department's right of way costs.
- Provide a Preliminary Signing Concept Map that includes, at a minimum, all anticipated DMS locations, all proposed overhead sign structure locations, all overhead signs, and all ground mounted Type A and B guide signs.
- Provide a representative sample of the proposed Type A, B, D, E, and F sign installation details for the various situations along the I-95 elevated sections.

3. Long Term Maintenance - 4 points

- Describe any special materials, not referenced elsewhere in this RFP, incorporated into the project that would result in long term reduction in maintenance.
- Describe any special designs or construction methods that would reduce future maintenance costs to the Department.
- Estimate a minimum ten-year cost saving resulting from incorporation of these special materials, design or construction methods into the project.

4. Schedule and Milestones - 25 points

- Provide a brief narrative description of the Design-Build Team's proposed plan for performing construction on the project. The description shall include at least the following:

  - Indicate if, and how, the Design-Build Team intends to divide the project into work segments to enable optimum construction performance.
  - Describe the Design-Build Team's plans and procedures to ensure timely deliveries of materials to achieve the project schedule.

- Provide a detailed schedule for the project including both design and construction activities. The schedule shall show the sequence and continuity of operations, as well as the month of delivery of usable segments of the project.

- Indicate the specific construction activities that will occur outside jurisdictional resources prior to obtaining the environmental permits and their anticipated start date.
- Indicate how the Design-Build Team will maintain the project schedule if the right of way acquisition process, railroad agreements and / or utility relocations are delayed.
- Identify any self-imposed liquidated damages and associated Intermediate Contract Time(s), if applicable.
- Specify the duration, in hours, for ICT #9, ICT #10, ICT #11, ICT #12, ICT #13, ICT #14, ICT #15, ICT #16, ICT #17, ICT #18, ITC #19, ICT #20, ICT #21, ICT # 22, and ICT #23.
- Specify the duration, in calendar days, for ICT #24, ICT # 25, ICT #26, ICT #27, ICT #28, ICT #29, ICT #30 and ICT #31.
- 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"**.
- The Intermediate Contract Time #1 completion date shall be clearly indicated on the Project Schedule and labeled "Intermediate Contract Time #1 Completion Date".

5. Innovation - 5 points

- Identify any aspects of the design or construction elements that the Design-Build Team considers innovative. Include a description of alternatives that were considered whether implemented or not.

6. Maintenance of Traffic and Safety Plan - 25 points

Maintenance of Traffic

- Provide a Transportation Management Phasing Concept (TMPC).
- Identify the type of positive median cross-over protection proposed and replacement / resetting requirements.
- Describe the traffic control measures that will be used for each construction phase.
- Describe how traffic will be maintained as appropriate and describe the Design-Build Team's understanding of any time restrictions noted in the RFP.
- Describe the Design-Build Team's approach to site access and material staging.
- Specifically describe how business, school and residential access will be maintained, if applicable.
- Address how hauling will be conducted, including but not limited to, hauling of materials to and from the site and hauling of materials within NCDOT right of way.
- Describe the Design-Build Team's approach to providing the public access to project personnel for inquiries on vehicular and pedestrian traffic impacts.
- If a temporary portable barrier system will be utilized, provide the type and why it is needed.
- If temporary shoring will be required, provide the type and why it is required.
- Include all proposed road closures, detour routes, durations and justifications.
- Address where and how law enforcement officers will be used.

- Identify a Traffic Control Supervisor and briefly describe their qualifications for this role.

Safety Plan

- Describe the safety considerations specific to the project.
- Discuss the Design-Build Team's overall approach to safety.
- 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.

7. 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.

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.

Quality Credit Evaluation Factors for Technical Proposals

Management	6
Responsiveness to Request for Proposal	30
Long Term Maintenance	4
Schedule and Milestones	25
Innovation	5
Maintenance of Traffic and Safety Plan	25
Oral Interview	5
Maximum Score	**100**

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 **35%.** 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	35.00	84	16.33
99	33.83	83	15.17
98	32.67	82	14.00
97	31.50	81	12.83
96	30.33	80	11.67
95	29.17	79	10.50
94	28.00	78	9.33
93	26.83	77	8.17
92	25.67	76	7.00
91	24.50	75	5.83
90	23.33	74	4.67
89	22.17	73	3.50
88	21.00	72	2.33
87	19.83	71	1.17
86	18.67	70	0.00
85	17.50		

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	29.17	3,000,000	875,100	2,124,900
B	90	23.33	2,900,000	676,570	2,223,430
C	90	23.33	2,800,000	653,240	2,146,760
D	80	11.67	2,700,000	315,090	2,384,910
E	70	0.00	2,600,000	0	2,600,000
* Successful Design-Build Team - Contract Cost $3,000,000					

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 **$315,000.00** will be awarded to each short-listed Design-Build Team that provides a responsive, but unsuccessful, Design-Build Proposal. If a contract award is not made, all short-listed Design-Build Teams that provide a responsive Design-Build Proposal shall receive the stipulated fee. Once award is made, or a decision is made not to award, unsuccessful Design-Build Teams can apply for the stipulated fee by notifying the State Contract Officer in writing and providing an original invoice within 60 days of Award. If the Design-Build Team accepts the stipulated fee, the Department reserves the right to use any ideas or information contained in the Design-Build Proposal and / or Alternative Technical Concepts, whether incorporated into the Design-Build Proposal or not, in connection with any contract awarded for the project, or in connection with any subsequent procurement, with no obligation to pay additional compensation to the unsuccessful Design-Build Team. The stipulated fee shall be paid to eligible Design-Build Teams within ninety days after the contract award or the decision not to award. Unsuccessful Design-Build Teams may elect to refuse payment of the stipulated fee and retain any rights to its Design-Build Proposal and the ideas and information contained therein.

In the event that the Department suspends or discontinues the procurement process prior to the Technical Proposal or Price Proposal submittal date current at the time of the suspension, no stipulated fee will be paid.

ROADWAY SCOPE OF WORK (7-14-21)

Throughout this RFP, references to the Preliminary Roadway Plans shall denote the December 17, 2020 MicroStation files, the June 9, 2021 -Y5- Shorten MicroStation files and the I6064_COXRD_OPT3_REV.pdf file. From Station 10+00 -Y5- to Station 29+95 -Y5-, the June 9, 2021 -Y5- Shorten MicroStation files shall supersede the December 17, 2020 MicroStation files.

Throughout this RFP, references to the mainline and -L- Line shall denote I-95.

Project Details

- From I-74 (Exit 13) to Station 67+00 -L- on the I-5987A Project, 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 75 mph design speed for a level rural freeway designed to interstate standards. The mainline shall be designed and constructed in accordance with the 2018 AASHTO *A Policy on Geometric Design of Highways and Streets*, Table 3-10 (e_{max} = 8%). The Design-Build Team shall provide all other design criteria in the Technical Proposal.

- Along I-95, 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).

- Excluding the transitions required to tie to the existing median width at the southern project limits, the Design-Build Team shall design and construct a minimum 26-foot full depth paved median along the mainline. The Design-Build Team shall design and construct Type "T" double-faced concrete median barrier on the aforementioned full depth median pavement.

- At the southern end of the project, the Design-Build Team shall transition from the existing I-95 four-lane typical section to the proposed I-95 eight-lane typical section in accordance with the following:

  - The outside / fourth I-95 southbound lane from the median shall become an "Exit Only" lane onto Ramp -Y1RPA- at Exit 13A-B. Ramp -Y1RPA- shall be designed as a single lane, parallel exit. To the maximum extent practicable, the Design-Build Team shall revise the Ramp -Y1RPA- gore to maximize the distance between the I-74 bridge and the back of the Ramp -Y1RPA- gore (12-foot width).

- Excluding the advance lane drop signing installed on an overhead sign assembly and the modifications noted below, the signage and pavement markings for the outside / third I-95 southbound lane drop shall be in accordance with Roadway Standard Drawing No. 1205.13. The lane drop taper shall be 840 feet long and terminate at the northern edge of the I-74 bridge. Ground-mounted Sign W9-1R shall be located 300 feet south of the back of the Ramp -Y1RPA- gore (12-foot width) and ground-mounted Sign W4-2R shall be located half-way between Sign W9-1R and the start of the aformentioned lane drop taper. (Reference the Signing Scope of Work found elsewhere in this RFP) The Design-Build Team will not be required to pave the median between the I-95 southbound lanes and the southbound collector-distributor (CD) road.

- Beginning a minimum of 500 feet south of the southern edge of the US 74 Alt. Bridge, the Design-Build Team shall design and construct the new I-95 northbound median lane (12-foot width). The -Y1RPD- entrance ramp shall become the outside / fourth I-95 northbound lane. To the extent practicable, the Design-Build Team shall maintain the existing Ramp -Y1RPD- alignment and gore location. The Design-Build Team will not be required to pave the I-95 median or install Type "T' concrete median barrier south of the southern edge of the US 74 Alt. Bridge.

- The Design-Build Team shall coordinate with Project I-5987A design and construction to ensure accurate hydrology, capacity, and horizontal and vertical ties that adhere to the design criteria. Using the equality information provided by the Department, the Design-Build Team shall convert the I-5987A horizontal and vertical alignments shown on the I-5987A Roadway Plans, provided by the Department, to the I-6064A, B & C / I-5879 Project datum and confirm horizontal and vertical accuracy between the projects. The Design-Build Team shall not make any design or construction revisions that impact the design or construction of Project I-5987A without prior written approval from the Design-Build Unit. The aforementioned prior written approval shall occur 1) through the Alternative Technical Concept (ATC) Process prior to Award or 2) through coordination and / or submittals to the Design-Build Unit after Award. (Reference the *Alternative Technical Concepts and Confidential Questions* and *Cooperation Between Contractors* Project Special Previsions found elsewhere in this RFP)

- Interchange configurations that do not provide a diamond interchange, with roundabouts at the ramp terminals, at the I-95 / SR 1536 (Carthage Road) interchange (Exit 19), shall require an approved Alternative Technical Concept (ATC).

- Between the ramp terminal roundabouts on SR 1536 (Carthage Road), the Design-Build Team shall design and construct a continuous minimum four-foot wide concrete median island, with nine-inch offsets to each adjacent travel lane. The aforementioned median island shall be a five-inch keyed-in monolithic concrete island.

- The northbound I-95 exit ramp onto SR 1536 (Carthage Road) shall be designed and constructed in accordance with the following requirements:

  - The exit ramp shall be a parallel exit.

- The ramp deceleration length shall extend completely across the bridge on I-95 over the Lumber River.
- The exit ramp shall be designed and constructed with a 50 mph or greater stopping sight distance. All other design criteria for the ramp shall adhere to desirable values.

- Between the ramp terminals at the I-95 / NC 72 / NC 711 (Caton Road) interchange, the Design-Build Team shall design and construct eastbound and westbound dual left turn lanes. The Design-Build Team shall design and construct a continuous minimum four-foot wide five-inch keyed-in monolithic concrete channelization island, with nine-inch offsets to the adjacent lanes, that delineates and separates each set of dual left turn lanes from the opposing through traffic. The Design-Build Team shall design and construct a minimum 100-foot storage length for the westbound dual left turn lanes and a minimum 275-foot storage length for the eastbound dual left turn lanes, with a 75-foot separation taper between each set of dual left turn lanes.

- From Station 21+50.00 -Y2RPC- to Station 30+00.00 -Y2-, the Design-Build Team shall design and construct a retaining wall along the right side of Ramp -Y2RPC- and NC 72 / NC 711 (Caton Road). 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 drainage ditches, shall remain within the existing / proposed right of way; and 3) all existing and proposed slopes shall be 3:1 or flatter, requiring the Design-Build Team to flatten all existing slopes steeper than 3:1. The aforementioned written approval shall occur through 1) the ATC Process prior to Award or 2) coordination and / or submittals to the Design-Build Unit after Award. (Reference the Alternative Technical Concepts and Confidential Questions Project Special Provision found elsewhere in this RFP).

- The Design-Build Team shall design and construct one-lane ramps that provide a minimum 16-foot lane width. The Design-Build Team shall design and construct two-lane ramps that provide minimum 12-foot lanes. All ramps shall have 14-foot outside shoulders, four-foot of which shall be full depth paved shoulders and 12-foot inside shoulders, four-foot of which shall be full depth paved shoulders.

- The Design-Build Team shall design and construct all directional ramps to meet a 60 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 14-foot berm. The minimum loop design shall be 30 mph with a minimum 230-foot radius.

- 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-67; 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-67; 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 -L- Line, 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.

- **** NOTE **** Deleted bullet requiring concrete islands within and approaching an interchange.

- The Ambika of Lumberton, LLC parcel - Parcel ID No. 939266550700 (former hotel site located adjacent to the I-95 / NC 211 (North Roberts Avenue) interchange Quadrant D) is slated for redevelopment. Unless approved by the Department, in writing, the Design-Build Team shall not impact this parcel beyond the limits shown on the Preliminary Roadway Plans provided by the Department.

- Unless noted otherwise elsewhere in this RFP, the maximum allowable cut and fill slope shall be 3:1. (Reference the Geotechnical Engineering Scope of Work found elsewhere in this RFP) The slopes in the interchange area shall follow the requirements set forth in the *Roadway Design Guidelines for Design-Build Projects* located on the Design-Build website.

- Unless required otherwise elsewhere in this RFP, the elimination of any retaining walls along the elevated sections of I-95, including all ramps, that result in additional relocatees beyond those required by the Department's Preliminary Roadway Plans, shall require an approved ATC.

- 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.

- **** NOTE **** Relocated bullet on existing service road requirements

- The Design-Build Team shall design and construct Cox Road to meet a 40 mph design speed. The travel lane widths shall be the greater of 1) the width required for the functional classification and design year traffic or 2) ten feet. Excluding the minimum eight-foot wide paved shoulders from the edge of travel lane to the face of the concrete barrier, all shoulder widths (turf and paved) shall be the width required for the functional classification and design year traffic. The Design-Build Team shall modify the existing SR 1588 (Cox Road) vertical alignment at the CSX Railroad at-grade crossing to eliminate the existing "humped" profile.

- West of the I-95 / NC 72 / NC 711 (Canton Road) Ramp C / D, the Design-Build Team shall design and construct NC 72 / NC 711 (Caton Road) as a shoulder section.

- Post award, the Design-Build Team shall prioritize and pursue an early work package to develop Right of Way Plans for the 1) southbound widening of I-95 in the vicinity of the bridge(s) on I-95 over the CSX Railroad and 2) realignment of SR 1588 (Cox Road), VFW Road and SR 1587 (Hackett Street). (Reference the Right of Way Scope of Work found elsewhere in this RFP)

- From NC 211 (North Roberts Avenue) to the limits of the existing curb and gutter at +/- Station 20+00 -SR5-, the Design-Build Team will not be required to widen SR 1792 (Khan Drive), replace the existing curb and gutter or widen the existing berm.

- From NC 211 (North Roberts Avenue) to the reconstruction limits at +/- Station 17+00 -SR4-, the Design-Build Team will not be required to widen SR 1791 (Dawn Drive), replace the existing curb and gutter or widen the existing berm.

- On the east side of I-95, the Design-Build Team shall connect Crystal Road to VFW Road with a minimum 15 mph design speed curve in accordance with the 2018 AASHTO *A Policy on Geometric Design of Highways and Streets*, Table 3-8 (e_{max} = 4%). (Reference the Pavement Management Scope of Work found elsewhere in this RFP)

- The existing HESCO barriers located near the bridge(s) on I-95 over the CSX Railroad shall remain in place until they are conflict with the I-6064A, B & C / I-5879 project construction. The Design-Build Team shall notify the Engineer and City of Lumberton, in writing, a minimum of 21 calendars days prior to any construction operations that will impact the HESCO barriers. The City of Lumberton will remove the HESCO barriers within the 21 calendar days. In the event of a flood threat during the project construction, the City of Lumberton shall be allowed to reinstall the HESCO barriers with no additional contract compensation or time extension.

- Beneath the I-95 bridge(s) over the CSX Railroad and to the limits of the existing I-95 right of way (approximately 330 foot in length), the Design-Build Team shall **design** minimum 16-foot wide gravel maintenance roads, without graded shoulders, on the south side and north side of the CSX Railroad. The design shall include single face concrete barrier along the maintenance roads at the interior bents, but does not need to include guardrail on the approach to the single face concrete barrier. The maintenance roads will be used to access and maintain the proposed West Lumberton floodgate and shall not be located within 25 feet of the centerline of the existing or future CSX Railroad track. For the **construction** of the maintenance roads, the Design-Build Team shall only grade the maintenance roads to an elevation six inches above the future maintenance road subgrade. (Reference the Structures Scope of Work and Railroad Coordination Scope of Work found elsewhere in this RFP)

- 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 November 17, 2020 *I-6064 Capacity Analysis Memorandum* provided by the Department. At all intersections impacted by the Design-Build Team's design and / or construction, excluding resurfacing and the SR 2499 (West 5th Street) approach to NC 72 / NC 711 (Caton Road), 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 minimum turn lane lengths as defined in the NCDOT *Roadway Design Manual* (Reference Section 9-1, Figure 4).

  - All lengths for the turn lanes required by the November 17, 2020 *I-6064 Capacity Analysis Memorandum* to be provided by the Department shall adhere to the NCDOT Recommended Treatment for Turn Lanes. These lengths shall be determined by adding the storage length defined in the aforementioned Memorandum and the minimum deceleration length, as defined in the NCDOT *Roadway Design Manual* (Reference Section 9-1, Figure F-4A).

- Right turn lanes / tapers shall be provided in accordance with the NCDOT Right Turn Lane Warrants, as defined in the NCDOT *Roadway Design Manual* (Reference Section 9-1, Figure F-4C).

- For all interchange / intersection design modifications, the Design-Build Team shall provide a traffic analysis that adheres to the July 1, 2015 NCDOT *Congestion Management Capacity Analysis Guidelines* for the Department's review and acceptance.

- The Design-Build Team 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 Report 672: *Roundabouts: An Informational Guide* - Second Edition. Prior to incorporating any roundabout not shown on the Preliminary Roadway Plans provided by the Department or any roundabout not required herein, the Design-Build Team shall provide a traffic analysis of the proposed roundabout(s), utilizing the I-6064 *Traffic Forecast Report* - 2040 Future Year - Build traffic volumes and SIDRA Intersection 8.1 or higher analysis software, for NCDOT review and acceptance. In addition to the requirements noted above all roundabouts shall adhere to the following:

  - The Design-Build Team shall design and construct all roundabouts to accommodate a WB-67 design vehicle without the cab of the truck traversing over the center truck apron or the trailer traversing over the exterior 2'-6" curb and gutter.

  - The Department prefers a maximum 25 mph roundabout entry speed. Thus, justification, in the Department's sole discretion, shall be provided for all entry speeds that exceed 25 mph. The Design-Build Team shall perform a fastest path performance check and provide the results to the Department for review and acceptance.

  - The Department prefers that all roadway grades approaching a roundabout are 4.0% or less. Thus, justification, in the Department's sole discretion, shall be provided for all roadway approach grades that are steeper than 4.0%.

  - The Design-Build Team shall design and construct all single-lane circular roundabouts with a minimum Inscribed Circle Diameter (ICD) of 130 feet.

  - The Design-Build Team shall design all roundabouts with an angle of intersection not less than 75 degrees for each leg.

  - The Design-Build Team shall design and construct chicanes along the approach roadway when the approach roadway design speed is greater than 50 mph. The Design-Build Team

will not be required to provide chicanes between roundabouts located at adjacent ramp terminals.

- The Design-Build Team shall design and construct splitter islands along the approach roadway when the approach roadway design speed is 50 mph or less. At a minimum, the splitter islands shall be 100 feet in length and extend beyond the end of the exit curve.

- The Design-Build Team shall design and construct all chicanes and splitters islands with a minimum six-foot width.

- The Design-Build Team shall design and construct five-inch keyed-in monolithic concrete islands for all roundabout approach / departure channelization islands, including the chicane and splitter islands.

- The roundabout center island shall be capped with four inches of concrete. All roundabout approach / departure channelization islands shall be designed and constructed with concrete. The Design-Build Team shall incorporate a red dye into the aforementioned center island and channelization island concrete prior to finishing, and stamp the concrete with a brick pattern. The Design-Build Team shall submit the red dye and brick pattern to the Engineer for review and approval prior to constructing the islands. If the circulating roadway is constructed with concrete, then the center island truck apron shall also be constructed with red dye concrete and stamped with a brick pattern.

- 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 16-foot wide concrete median island, with nine-inch offsets to each adjacent travel lane, between the roundabouts. The aforementioned median island shall be a five-inch keyed-in monolithic concrete island.

- Along the outside edge of the roundabout pavement, the Design-Build Team shall design and construct 2’-6” curb and gutter, with a minimum ten-foot berm. At a minimum, the 2’-6” curb and gutter shall extend along all approach / departing roadways to the approach / departing curve radius point.

- The Design-Build Team shall design and construct minimum 16-foot travel lanes inside the roundabout.

- The Design-Build Team shall design and construct 1’-6” mountable curb and gutter between the roundabout lane and the concrete truck apron. The slope of the 1”-6” curb and gutter shall the match the travel lane pavement slope. The Design-Build Team shall design and construct 9” x 18” concrete curb between the truck apron and the center island.

- At all intersections with restricted movements impacted by the Design-Build Team’s design and / or construction methods, excluding resurfacing, the Design-Build Team shall provide five-inch keyed-in concrete monolithic channelization islands, regardless of the island dimensions. (Reference Roadway Standard Drawing No. 852.01)

- Excluding the following locations, 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:

  - Along SR 1792 (Khan Drive) at NC 211 (North Roberts Avenue)

  - Along NC 72 / NC 711 (Caton Road) at and east of West Drive (full access into and out of West Drive shall remain at the completion of the project)

- In accordance with the NCDOT Right of Way Manual, the Design-Build Team shall develop Service Road Studies for all land-locked parcels and / or as required by variations to the Department's design. If the aforementioned Service Road Studies indicate that service roads are required that are not shown on the Preliminary Roadway Plans provided by the Department, the design and construction costs of the additional service roads shall be as follows:

  - If the Design-Build Team demonstrates, to the Department's sole satisfaction, that the additional service road(s) are required for the Department's preliminary design, the service road(s) design and construction, including all associated NEPA requirements, will be paid for as extra work in accordance with Subarticle 104-8-(A) of the NCDOT *Standard Specifications for Roads and Structures*.

  - If variations to the Department's proposed design and / or construction methods require additional service road(s), the service road(s) design and construction, as well as all associated NEPA requirements, shall be included in the Design-Build Team's lump sum bid for the entire project.

  - The Design-Build Team shall not eliminate any service roads shown on the Preliminary Roadway Plans provided by the Department without the Department's written approval. The aforementioned written approval shall occur 1) through the ATC Process prior to Award or 2) through coordination and / or submittals to the Design-Build Unit after Award. (Reference the *Alternative Technical Concepts and Confidential Questions* Project Special Provision found elsewhere in this RFP).

- 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 MicroStation .dsn file provided by the Department, or 3) the existing width.

  - Provide minimum eight-foot wide paved shoulders from the edge of travel lane to the face of concrete barrier. All other shoulders 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 MicroStation .dsn file provided by the Department.

- The Design-Build Team shall maintain and / or modify the existing service road located right of Station 315+00 -L-, as necessary, to maintain access to The Shafer Company, Inc. property - Parcel ID No. 938179706400. The Design-Build Team shall design and construct the service road to meet a minimum 40 mph design speed using the 0.04 superelevation chart. At a minimum, the Design-Build Team shall design and construct the service road with two nine-foot lanes and two-foot minimum shoulders with a Type "B" ditch, as per the NCDOT *Roadway Design Manual*. Minimum four-foot paved shoulders shall be provided from the edge of travel lane to the face of concrete barrier.

- 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 NCDOT *Roadway Design Manual.*

- 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 I-95 grade point and crown point shall be located on the outside edge of the median lane such that the median lane in each direction of travel slopes towards the median and the remaining lanes slope towards the outside. Except as allowed otherwise below, the I-95 normal crown cross slope shall be 0.020. The normal crown cross slope for the outermost lane in each direction of travel shall be steepened (0.03 maximum), as required, to minimize hydroplaning. Prior to the beginning of the I-95 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 existing. (Reference the Hydraulics Scope of Work found elsewhere in this RFP)

- Excluding the transitions required to tie to the existing median width at the southern project limits, only one vertical alignment shall be used for the proposed I -95 grade. ATCs that utilize independent vertical alignments for the northbound and southbound lanes of I-95 will not be permitted and shall not be evaluated or considered.

- I-95 is a full control of access facility. The Design-Build Team shall bring to the Design-Build Unit's attention any deviations from the proposed control of access and / or right of way shown on the Preliminary Roadway Plans provided by the Department. The proposed control of access and / or right of way limits may deviate in proximity to 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.

- 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:

  - Throughout the construction limits, excluding areas that consist solely of pavement marking obliterations / revisions, the Design-Build Team shall remove and dispose of all existing control of access fence, and install new control of access fence. The Design-Build Team will not be required to install control of access fence along the I-95 elevated sections where retaining walls / elements acting as retaining walls are located along the I-95 outside shoulder.

  - The Design-Build Team shall replace, in kind, all control of access fence damaged during construction.

  - The Design-Build Team shall install all missing control of access fence, matching the adjacent fence type.

  - The Design-Build Team shall install control of access fence on the east side of I-95 within the limits of the bridge(s) on I-95 over the CSX Railroad to limit access under the bridge. A minimum 12-foot wide gate with lock shall be provided on each side of the CSX Railroad track to access the future maintenance roads. The Design-Build Team shall provide a minimum of three keys for each lock to the Engineer. The control of access fence shall not be installed within 25 feet of the centerline of the existing CSX Railroad track.

- The Department will provide an approved I-6064 Interchange Access Report (IAR) based on the Preliminary Roadway Plans provided by the Department. Based on the Preliminary Roadway Plans provided by the Department, an approved Interchange Access Report is only required at the I-95 / NC 211 (North Roberts Avenue) interchange (Exit 20). If the Design-Build Team revises the roadway design such that the approved I-6064 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-6064 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.

- 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, in accordance with the NCDOT Roadway Standard Drawings.

- For all bridges over roadways and railroads, 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.

- Excluding construction areas that consist solely of pavement marking obliterations / revisions that are uniformly overlaid, the Design-Build Team shall design and construct resurfacing grades for all roadways impacted by construction and all roadways shown to be resurfaced on the September 2020 I-6064 Public Meeting Map 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 September 2020 I-6064 Public Meeting Map 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.

  - The Design-Build Team will not be required to resurface the lanes or shoulders between the gap along SR 2499 (West 5th Street) solely to adhere to the requirement to resurface gaps along a 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.

- Excluding the modifications required herein, the Design-Build Team shall inform the Design-Build Unit, in writing, of all proposed design revisions, including but not limited to the following:

  - The Design-Build Team shall note in the Technical Proposal any proposed deviations to the preliminary design shown on the Preliminary Roadway Plans provided by the Department. The Design-Build Team shall be responsible for all activities, as deemed necessary by the Department or the FHWA, resulting from changes to the NCDOT preliminary design, including but not limited to, public involvement, NEPA re-evaluation and / or coordination with other stakeholders. The Department will not honor any requests for additional contract time or compensation for completion of the required activities resulting from changes to the NCDOT preliminary design.

  - After the contract has been Awarded, the Design-Build Team shall inform the Design-Build Unit, in writing, of all proposed changes to the design shown in the Technical Proposal.

  - After the Department has reviewed and accepted the Design-Build Team's design submittals, the Design-Build Team shall inform the Design-Build Unit, in writing, of any changes to previously reviewed submittals, including but not limited to changes to RFC Plans.

  The proposed design revisions noted above shall be subject to the Department's review and acceptance.

- 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 (excluding the median shoulder width at the US 74 Alt. Bridge) 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 Plans developed by the Design-Build Team, the Design-Build Team must obtain prior conceptual approval from the Design-Build Unit. If conceptual approval is obtained, the Design-Build Team shall be responsible for the development and approval of all design exceptions. A design exception will only be approved if the design exception request demonstrates, in the Department's sole

discretion, that a design exception is warranted and that it cannot be reasonably and / or feasibly eliminated.

- Prior to recording the Right of Way Plans, the Design-Build Team shall locate and install iron pins and metal caps with fiberglass right of way markers that delineate the proposed right of way and proposed permanent easements for all parcels within the project limits. The Design-Build Team shall replace all existing and proposed right of way and permanent easement markers / monuments damaged and / or relocated during construction. A Professional Land Surveyor registered in North Carolina shall certify the placement of all right of way and permanent easement markers / monuments. In accordance with NCDOT Policy, the Department will furnish the metal caps with fiberglass markers.

- The Department will provide an accepted I-6064 Traffic Noise Report (TNR) that is based on the Department's preliminary design. The Design-Build Team shall evaluate the **entire** I-6064A, B, & C / I-5879 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. 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 2016 Traffic Noise Policy and the NCDOT 2016 Traffic Noise Manual; and be reviewed and accepted by NCDOT. 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 2018 Standard Specifications for Roads and Structures, if the accepted DNR and balloting process require more than 115,000 square feet (sf) of sound barrier wall, the amount over 115,000 sf will be paid for as extra work at the unit price of $40.00 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 and earthwork shall be considered inclusive in the aforementioned unit price. The amount of 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.

The Design-Build Team shall provide absorptive-faced sound barrier walls at the following locations:

- Where a sound barrier wall is located on the opposite side of the highway from impacted noise sensitive receptors that are not receiving a sound barrier wall and the receptors are located within ten times the proposed sound barrier wall height.

- Where the parallel barrier analysis (PBA), including PBAs for a single wall configuration with a minimum six-foot high retaining wall on the opposite side of the highway, shows that the noise reduction degradation results in noise levels and / or insertion loss values cause the sound barrier wall to not be feasible and reasonable.

- Where the PBA, including PBAs for a single wall configuration with a minimum six-foot high retaining wall on the opposite side of the highway, results in impacted receptors no longer being benefited.

At all sound barrier walls, the Design-Build Team shall provide 1) a four-foot berm between the wall and fill / cut slopes steeper than 6:1 and 2) a parallel concrete ditch at locations where the final grade slopes toward the wall.

The Design-Build Team shall design and construct all sound barrier walls a minimum of ten feet inside the right of way.

For all sound barrier walls, the Design-Build Team shall design and construct maintenance access points, as necessary and / or as directed by the Engineer.

To satisfy the FHWA's Abatement Measure Reporting requirements, the Design-Build Team shall prepare and concurrently submit a summary of the sound barrier walls to be constructed on the project with the final sound barrier wall working drawings submittal. The Design-Build Team shall submit the sound barrier wall summary directly to the NCDOT

Traffic Noise and Air Quality Group and include the information noted in Title 23 Code of Federal Regulations Part 772 Section 772.13(f), including but not limited to overall cost and unit cost per square foot.

General

- Unless noted otherwise elsewhere in this RFP, the design shall be in accordance with the 2018 AASHTO *A Policy on Geometric Design of Highways and Streets*, and 2019 Errata, 2002 NCDOT *Roadway Design Manual*, including all revisions effective on the Technical Proposal submittal date, January 2018 NCDOT *Roadway Standard Drawings*, or as superseded by detail sheets located at **https://connect.ncdot.gov/resources/Specifications/Pages/2018-Roadway-Standard-Drawings.aspx,** *Roadway Design Policy and Procedure Manual, Roadway Design Guidelines for Design-Build Projects*, 2018 NCDOT *Standard Specifications for Roads and Structures*, the Highway Capacity Manual, 6th Edition, and the 2011 AASHTO *Roadside Design Guide*, 4th Edition and 2015 Errata.

- If the NCDOT *Roadway Design Manual*, including all revisions, the 2018 AASHTO *A Policy on Geometric Design of Highways and Streets* and 2019 Errata, the 2018 NCDOT *Roadway Standard Drawings* and / or any other guidelines, standards or policies have desirable and / or minimum values, the Design-Build Team shall use the desirable values unless noted otherwise elsewhere in this RFP. Similarly, in case of conflicting design parameters, and / or ranges, in the various resources, the proposed design shall adhere to the most conservative values, unless noted otherwise elsewhere in this RFP.

- The Design-Build Team shall provide a Drainage Summary Sheet, Earthwork Summary Sheet, Guardrail Summary Sheet, (permanent and temporary) and Pavement Removal Summary Sheet in the Final Roadway Plans and RFC Roadway Plans.

- At all intersections, the Design-Build Team shall not exceed a 0.05 roll-over between the outside edge of travel lane of the primary roadway and the beginning of the proposed grade for the secondary roadway.

- Unless noted otherwise elsewhere in this RFP, all bridge rail offsets shall be the greater of 1) the bridge rail offset as indicated in the NCDOT *Roadway Design Manual*, 2) the approach roadway paved shoulder width, or 3) the offset required to achieve stopping sight distance (maximum 12-foot). Narrower bridge rail offsets based on bridge length will not be allowed. The Design-Build Team will not be required to widen existing bridges solely to provide the aforementioned minimum bridge rail offsets. Where retaining walls are located along the outside shoulder approaching a bridge within the I-95 elevated sections, the minimum outside bridge rail offset shall be 14 feet for bridges on I-95.

- 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 NCDOT *Roadway Standard Drawings* and / or approved details in lieu of standards. Along all 3:1 fill slopes, constructed at fill heights that are equal to or greater than 12 feet, the Design-Build Team shall install guardrail. Along all fill slopes steeper than 3:1, constructed at fill heights that are equal to or greater than six feet, the Design-Build Team shall install guardrail. Excluding construction areas that consist solely of pavement marking obliterations / revisions, the Design-Build Team shall upgrade all existing guardrail in the construction limits in accordance with the aforementioned requirements and the requirements noted below, regardless if the Design-Build Team's design and / or construction impacts the guardrail.

  - For existing guardrail that extends 100 feet or less outside the construction limits, the Design-Build Team shall replace all the existing guardrail.

  - For existing guardrail that extends more than 100 feet outside the construction limits, the Design-Build Team shall tie the proposed guardrail to the existing guardrail outside the construction limits.

  - In areas that are resurfaced solely to adhere to the resurfacing limits shown in the September 2020 I-6064 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 total outside shoulder width for all facilities with defined usable shoulders shall equal the usable shoulder plus two feet.

- The Design-Build Team shall provide continuous single face concrete barrier between two segments of single face concrete barrier when 1) the two segments are less than 300 feet apart, and 2) guardrail would be required between the two segments.

- At all locations where back to back single face concrete barrier is provided, including but not limited to bridge piers and sign supports, the Design-Build Team shall fill the area between the single face concrete barriers with gravel and cap with four inches of concrete when the area is ten feet wide or less.

- The Design-Build Team shall be responsible for the evaluation of the algebraic difference in rates of cross slope (roll-over) between existing shoulders and roadways and the associated suitability for carrying traffic during construction, if necessary. In the event that the roll-over is found to be unacceptable for the proposed temporary traffic patterns, the Design-Build Team shall be responsible for providing cross slopes that meet design standards and eliminate roll-over concerns.

- Unless noted otherwise elsewhere in this RFP, the design speed for all roadways shall be the greater of the minimum design speed for the facility type, as specified in the 2018 AASHTO *A Policy on Geometric Design of Highways and Streets*, or the anticipated / actual posted speed plus five mph. If a speed limit is not physically posted on an existing facility outside the Lumberton City Limits, General Statues 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 Lumberton City Limits, the speed limit is 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.

- In accordance with the March 19, 2019 memo from Ms. Brenda Moore, PE, former State Roadway Design Engineer, and Mr. Brian Hanks, PE, State Structures Engineer, the Design-Build Team will not be required to submit separate Structure Recommendations. Instead, in accordance with the aforementioned Memo, 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 joint material. (Reference Section1028-1 of the 2018 *Standard Specifications for Roads and Structures*)

- The Design-Build Team shall design and construct all depressed grass medians and raised medians in accordance with the following:

  - The minimum width of all depressed grass medians shall be eight feet. At all locations where a depressed grass median becomes narrower than eight feet, the Design-Build Team

shall design and construct a five-inch keyed-in concrete monolithic island in lieu of the depressed grass median.

- The Design-Build Team shall install a four-inch concrete cap on all raised medians that are eight feet wide or narrower, measured face to face from the surrounding mountable concrete curb and gutter.

- All grass covered raised medians shall be designed and constructed with topsoil and appropriate cross slope and median drain with pipe to prevent groundwater and surface water infiltration into the subgrade and / or pavement structure. Prior to construction of the grass covered raised median and / or median drain with pipe, the Design-Build Team shall submit to the Design-Build Unit, for review and acceptance, the proposed number of drains, drain locations within the typical section, topsoil specifications and construction details. Within all proposed grass covered raised median limits, the Design-Build Team shall completely remove and dispose of the existing pavement structure.

- Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall design and construct all lane drops from the outside travel way.

- A sag vertical curve low point will not be allowed on any proposed bridge or approach slab.

- At all -Y- Line / -Y- Line intersection radius points, including service roads, the minimum -Y- Line pavement width shall be 30 feet.

- Excluding grades required to tie to existing, the minimum longitudinal grade shall be 0.30%, unless noted otherwise elsewhere in this RFP. Along -Y- Lines with turf shoulders, a 0.00% grade will be allowed, provided all hydraulic requirements are met. (Reference the Hydraulics Scope of Work found elsewhere in this RFP)

- At all intersections impacted by the Design-Build Team's design and / or construction methods, excluding resurfacing and intersections within diverging diamond interchanges, the following design vehicles shall be required for all turning movements:

  - WB-67 at all ramp / loop intersections with -Y- Lines (For side-by-side turning maneuvers, WB-67 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 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 and chicanes.

  - 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.

- A 4:1 back slope shall extend from the back of the expressway gutter to the clear zone limit. Beyond that, a maximum 3:1 cut slope will be acceptable. The expressway gutter centerline shall be located at the hinge / shoulder point. Expressway gutter shall not be installed in fill sections. Expressway gutter shall only be used to minimize impacts to existing structures, and / or cultural, historical or otherwise protected landmarks or topographic features.

- 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 or topographic features, 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 I-95 shall be designed and constructed in accordance with the desirable Ditch Type "A", as shown in the NCDOT *Roadway Design Manual* Section 1-2A, Figure F-1. 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.), 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)

- Unless noted otherwise elsewhere this RFP, the minimum berm width along 2'-6" curb and gutter sections shall be ten feet.

- Shoulder berm gutter shall be installed in fill sections with guardrail and fill slopes steeper than 4:1. Shoulder berm gutter shall not be installed in cut sections.

- Cut and fill slope transitions shall not exceed one increment (e.g. 3:1 to 4:1) per 50 feet.

- The Design-Build Team shall design and construct horizontal and vertical curves at all Points of Intersections (PIs) on the horizontal and vertical alignments, respectively.

- All paved shoulders shall be tapered at 8:1 to the existing pavement at tie-in points.

NCDOT Information Supplied

- The NCDOT will provide copies of the I-6064 and I-5879 Categorical Exclusions, 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-6064 Public Meeting Map and I-6064 electronic design files. The Design-Build Team is cautioned that the preliminary designs shown on the aforementioned Map 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-5987A electronic design files.

- The NCDOT will provide final pavement designs for I-6064. 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-6064. The Design-Build Team shall be responsible for any additional geotechnical information, all geotechnical recommendations, as well as supplemental structural and roadway investigations. (Reference the Geotechnical Engineering Scope of Work found elsewhere in this RFP)

ENVIRONMENTAL PERMITS SCOPE OF WORK (7-15-21)

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.

The Design-Build Team shall prepare all designs and assist the Department in developing the documents necessary for the Department to obtain the Section 7(a) Determination under the Wild and Scenic Rivers Act.

The Design-Build Team shall not begin ground-disturbing activities, including utility relocations, in jurisdictional areas until the environmental permits have been issued (this does not include investigative borings covered under a Nationwide Permit No. 6).

The Design-Build Team shall coordinate with the Design-Build Unit to determine if a Preconstruction Notification (PCN) is required for the Nationwide Permit No. 6. If a PCN is required, the Design-Build Team shall submit all necessary documents and forms to the Design-Build Unit for submittal to the appropriate agencies; and shall not perform any geotechnical investigative work within the jurisdictional resource(s) requiring a PCN prior to obtaining the required approval. If a PCN is not required, the Design-Build Team may proceed with geotechnical investigations inside and outside jurisdictional resources, provided all of the Nationwide Permit No. 6 General Conditions are followed. The Design-Build Team is cautioned that any geotechnical investigation activity within the Lumber River shall require a PCN.

The Design-Build Team may begin construction activities prior to obtaining the aforementioned environmental permits provided that (1) the Department has reviewed and accepted the appropriate design submittal(s); (2) the Department is notified in writing and provides written approval prior to beginning work; and (3) such activities are outside jurisdictional resources. The Design-Build Team is encouraged to advance as many construction activities as possible outside jurisdictional resources prior to issuance of the environmental permits. The Design-Build Team shall indicate the specific construction activities that will occur outside jurisdictional resources prior to obtaining the environmental permits and their anticipated start date in the Technical Proposal.

The Department will not allow any direct contact between the Design-Build Team and representatives of the environmental agencies. No contact between the Design-Build Team and the environmental agencies shall be allowed either by phone, e-mail or in person, without representatives of the Department's Environmental Analysis Unit (EAU) - Environmental Coordination and Permitting Group (ECAP) or the Division's Environmental Officer (DEO) present. A representative from the Design-Build Unit shall be included on all correspondence.

The I-6064A, B & C / I-5879 Project is not in the Merger Process used by the environmental agencies and the Department to obtain environmental permits. On Non-Merger Projects, the Department has committed to coordination efforts with the environmental agencies. Thus, the Design-Build Team shall participate and present information for an interagency hydraulic design review meeting and an interagency permit impacts meeting. These meetings shall adhere to the Concurrence Point 4B and Concurrence Point 4C requirements of the Merger Process used by the environmental agencies and the Department to obtain environmental permits. Specifically, the Design-Build Team shall follow the appropriate details in the *Section 404 / NEPA Merger Process Information* document on the website noted below:

https://connect.ncdot.gov/resources/Environmental/EPU/Merger/Pages/default.aspx

Unless stipulated otherwise in the Technical Proposal, the Department will schedule the interagency hydraulic design review meeting and the interagency permit impacts meeting for May 2022 and August 2022, respectively. The Design-Build Team shall clearly identify in the Technical Proposal what months they would like the Department to schedule these meetings. Failure on the part of the Design-Build Team to meet the dates shown in the Technical Proposal shall place all responsibility for delays resulting from missing these dates solely in the hands of the Design-Build Team.

Any variations in the Department's proposed design and / or construction methods that nullify any decisions reached between the Department and the environmental agencies; and / or require additional coordination with the environmental agencies shall be the sole responsibility of the Design-Build Team. The Department will not allow any contract time extensions or compensation associated with this additional coordination.

Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall be bound by the terms of all signed planning documents, and approved minutes and commitments of all interagency meetings. The Design-Build Team shall be held accountable for meeting all permit conditions, including but not limited to a specific containment system and demolition process for the Lumber River bridge, if required. 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.

Section 7(a) Determination under the Wild and Scenic Rivers Act Application Process, Permit Application Process and Timeframe for all Permits except the Nationwide Permit No. 6 for Geotechnical Investigations

Prior to submitting the permit application, a Section 7(a) Determination under the Wild and Scenic Rivers Act shall be obtained from the National Parks Service. NCDOT will take the lead role in

obtaining the Section 7(a) Determination under the Wild and Scenic Rivers Act and provide the Wild and Scenic Rivers Section 7(a) Study. The Design-Build Team shall attend and participate in monthly coordination meetings (Section 7(a) coordination meetings) with representatives from NCDOT, National Parks Service (NPS), and North Carolina Division of Parks and Recreation. The Design-Build Team shall compile information, data, and design elements that show how the new structure(s) on I-95 over the Lumber River do not negatively impact the elements on which the Lumber River was designated Wild and Scenic. Further, the Design-Build Team shall prepare all necessary drawings that reflect the design and construction details, as well as impact and minimization efforts resulting from the aforementioned coordination meetings, and from the project as designed by the Design-Build Team.

At a minimum, the Section 7(a) Determination under the Wild and Scenic Rivers Act application shall consist of the following:

- Final signed and sealed Bridge Survey Report for the proposed bridge(s) on I-95 over the Lumber River
- Half-size set of plans developed for the interagency permit impacts meeting
- All necessary drawings that reflect the design and construction details, and impact and minimization efforts
- Documentation of avoidance and minimization measures taken to show how the Wild and Scenic elements of the Lumber River have not been adversely affected
- Wild and Scenic Rivers Section 7(a) Study (To be developed and sealed by the Department with assistance from the Design-Build Team)

It shall be the Design-Build Team's responsibility to acquire information and prepare permit drawings that reflect the impacts and minimization efforts resulting from the aforementioned interagency hydraulic design review meeting and the interagency permit impacts meeting, and from the project as designed by the Design-Build Team. Further, it shall be the Design-Build Team's responsibility to provide permit impact sheets (drawings) depicting the design and construction details to the Department as part of the permit application. The aforementioned permit impact sheets shall be reviewed and accepted by the Department prior to the permit application submittal. The Design-Build Team shall be responsible for developing the permit application for all jurisdictional impacts. The permit application shall include all utility relocations required by the project.

At a minimum, the permit application shall consist of the following:

- Cover Letter
- Completed forms (PCN, Section 404 ENG 4345, etc.) appropriate for impacts
- NCDOT Mitigation Site debit ledger and / or Division of Mitigation Acceptance Letter
- Minutes from the interagency hydraulic design review meeting and the interagency permit impacts meeting
- Section 7(a) Determination
- 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 303d (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 Section 7(a) Determination under the Wild and Scenic Rivers Act application and 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 1) Section 7(a) monthly coordination meetings, as necessary, 2) interagency hydraulic design review meeting, and 3) the interagency permit impacts meeting; and resolved with the environmental agencies during the aforementioned meetings.

The Design-Build Team shall clearly indicate the location and impacts of haul roads and utility relocations in jurisdictional areas. The Design-Build Team shall also identify all proposed borrow and waste sites. Further, the Design-Build Team shall describe the construction methods for all structures that impact jurisdictional resources. The temporary impact descriptions (haul roads, utility relocations, work bridges, etc.) shall include restoration plans, schedules and disposal plans. The aforementioned information, descriptions and details shall be presented during the Section 7(a) monthly coordination meetings, as necessary, interagency hydraulic design review meeting and the interagency permit impacts meeting and be included in the Section 7(a) Determination under the Wild and Scenic Rivers Act application and in the permit application.

The NCDOT hereby commits to ensuring, to the greatest extent practicable, that the footprint of the impacts in areas under the jurisdiction of the Federal Clean Water Act will not be increased during the Design-Build effort. In accordance with the Department of Water Resources' NCG 010000, all fill material shall be stabilized and maintained to prevent sediment from entering adjacent waters or wetlands. The Design-Build Team shall be responsible for ensuring that the design and construction of the project will not impair the movement of aquatic life.

Permit modification requests are strongly discouraged and shall only be allowed if the Engineer determines it to be in the best interest of the Department. The Design-Build Team shall not take

an iterative approach to hydraulic design issues. Prior to submitting the permit application, the hydraulic design shall be complete and accepted by the Department.

Direct coordination between the Design-Build Team, the Design-Build Unit, Resident Engineer, DEO, Hydraulics Unit, and EAU shall be necessary to ensure proper permit application development. Upon completion of the draft permit application, the Design-Build Team shall concurrently forward the permit application to the Design-Build Unit, Resident Engineer, DEO, Hydraulics Unit and EAU for review and approval. After all revisions are complete, the Department will subsequently forward the "complete" permit application to the appropriate environmental agencies.

The Design-Build Team should expect it to take up to ten 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-6064A, B & C / I-5987 project construction from the NC Division of Mitigation Services. The amount of mitigation will be based on impacts as identified in the I-6064 Categorical Exclusion, which includes the impacts for the I-5879 roadway project corridor.

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 (including specifics for the Wild and Scenic elements of the Lumber River), 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 and / or Section 7(a) Determination under the Wild and Scenic Rivers Act 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 impacts to Wild and Scenic Rivers, wetlands and streams; and to provide full compensatory mitigation of all remaining wetland and stream impacts. Avoidance measures were taken during the planning process, NEPA Process and the Department's initial coordination efforts with NPS for the Section 7(a) Determination under the Wild and Scenic Rivers Act; 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 Section 7(a) monthly coordination meetings, interagency hydraulic design review meeting and the interagency permit impacts meeting, into the design and / or construction methods at no additional cost or contract time extension.

All work by the Design-Build Team must be accomplished in strict compliance with the plans submitted with the permit application and in compliance with all conditions of the Section 7(a) Determination under the Wild and Scenic Rivers Act, 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-6064 Categorical Exclusion, the I-5879 Categorical Exclusion, all permits, all interagency meetings, and all site visits.

Cultural Resources

Based on the Department's preliminary design, NCDOT has reached a no adverse effect determination under Section 106 of the National Historic Preservation Act for this Undertaking. (Reference the December 2, 2020 Effects Determination, as well as the archaeological survey and historic architecture survey of the respective Areas of Potential Effects (APE) provided by the Department.) If the Design-Build Team's design or construction activities 1) impact any property that has been determined eligible for the National Register of Historical 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 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 Design-Build 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 Steve Kendall, PE, NCDOT Division 6 Project Development Engineer at (910) 364-0603.

EROSION AND SEDIMENTATION CONTROL SCOPE OF WORK (5-4-21)

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 April 1, 2019 NCG-010000 General Construction Permit, issued by the North Carolina Department of Environmental Quality, Division of Water Resources, the Design-Build Team shall formally submit a project-wide Vegetation Management Procedure for the Department's review and acceptance prior to any land disturbing activities. After this initial review, the Design-Build Team shall concurrently provide the Resident Engineer and Roadside Environmental Field Operations Engineer updated versions of the Vegetation Management Procedure on a monthly basis. These updated versions will not require formal submittal to the Design-Build Unit, but will be subject to review comments by the aforementioned field personnel. All versions of the Vegetation Management Procedure shall include, but not be limited to, 1) provisions for the early establishment of grasses / vegetation, 2) provisions for obtaining the required 80% permanent vegetation stand, as defined in the April 1, 2019 NCG-010000 General Construction Permit and in accordance with the *Permanent Vegetation Establishment* Project Special Provision found elsewhere in this RFP, by the project final completion date, and 3) procedure and schedule details for fertilizer topdressing, supplemental seeding, mowing and repair seeding. The Vegetation Management Procedure shall be closely coordinated with the grading and hauling operations. The Design-Build Team shall provide a narrative overview of the Vegetation Management Procedure in the Technical Proposal.

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. For 1) all streams within the project limits that are located within the Lumber River High Quality Water (HQW) area (within one mile and draining to the identified HQW resource) and 2) the main channel of the Lumber River, delineate Environmentally Sensitive Areas (ESA) on Clearing and Grubbing Plans only. ESA restrictions shall apply for all delineated areas. HQW restrictions shall apply for all delineated areas in the Lumber River HQW area.
6. Utilize skimmer basins and rock measures with sediment control stone (Temporary Rock Sediment Dam Type 'B' (TRSD-B), Temporary Rock Silt Check Type 'A' (TRSC-A), etc.) at drainage outlets.
7. Take into account topography and show existing contour lines on Clearing & Grubbing Plans only.
8. Utilize Temporary Rock Silt Checks Type 'B' (TRSC-B) or wattles to reduce velocity in existing ditches with spacing of 250 feet divided by percentage of ditch grade. Also utilize TRSC-Bs in proposed TSDs and temporary diversions (TD).
9. Protect existing streams; do not place erosion control devices in live streams unless permitted by the Division of Water Resources 401 Certification and the Army Corps of Engineers 404 Permit.
10. Sediment basins shall be sized to provide adequate silt storage for 3,600 cubic feet per disturbed acre with surface area equal to 435 square feet per cubic foot per second (cfs) of the peak inflow rate, Q25, using 25-year peak rainfall data (NCDEQ - *Erosion and Sediment Control Planning and Design Manual* or NOAA's National Weather Service website **https://hdsc.nws.noaa.gov/hdsc/pfds/** for partial duration (ARI) time series type). A Sediment Basin Designer Spreadsheet will be provided by the NCDOT Roadside Environmental Unit upon request.
11. Skimmer Basins shall be sized to provide adequate silt storage for 1,800 cubic feet per disturbed acre with surface area equal to 325 square feet per cubic foot per second (cfs) of the peak inflow rate, Q25, using the 25-year peak rainfall data (NCDEQ - *Erosion and Sediment Control Planning and Design Manual* or NOAA's National Weather Service website **https://hdsc.nws.noaa.gov/hdsc/pfds/** for partial duration (ARI) time series type). Skimmer Basins shall be designed to dewater in two to three days. A Skimmer Basin Designer Spreadsheet will be provided by the NCDOT Roadside Environmental Unit upon request.
12. Design Riser Basins to the following standards:
    a. Surface Area shall be determined by Equation A (sq. feet) = Q25 (cfs) * 435.
    b. Volume requirement shall be 1,800 cubic feet per disturbed acre draining to the riser basin.
    c. Riser Pipe shall have a cross-sectional area 1.5 times that of the barrel pipe.
    d. 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.

e. 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. Utilize Excelsior / Coir Fiber Wattles with Polyacrylamide (PAM) and / or TRSC-As with Matting and PAM in temporary and permanent, existing and proposed ditches per NCDOT *Erosion and Sediment Control Design and Construction Manual* in areas where sediment basins are not feasible at drainage outlets, and in areas where sediment basins at drainage outlets with sediment traps (i.e. PIST-A, RIST-A, etc.) cannot be properly sized to surface area and / or sediment storage requirements due to safety concerns, right of way restrictions, utility conflicts, or other construction limitations approved by the NCDOT Roadside Environmental Unit.
18. Place devices utilizing PAM at all sediment basin inlets.
19. At a maximum spacing of 200 feet, at all sag points and as directed, utilize Special Sediment Control Fence or Coir Fiber Wattles as drainage breaks in silt fence.
20. Do not place erosion control devices that require excavation (i.e. sediment basins, silt ditches, etc.) in wetlands unless permitted by the Division of Water Resources 401 Certification and the Army Corps of Engineers 404 Permit.
21. Within the entire project limits, provide disturbed and undisturbed drainage area delineations in MicroStation Format.
22. For all drainage outlets where the runoff cannot be treated with a sediment basin and / or the sediment basin cannot be constructed to the required sediment storage or surface area requirements, provide a written explanation.
23. Excluding Sediment Basins that will function only during Clearing and Grubbing operations, all perimeter Sediment Basins shall be placed outside of fill slopes.

B. Final Grade Phase

1. Use correct NCDOT symbology.
2. Protect existing and proposed drainage structure inlets with RIST-A, RIST-C, PIST-A, etc.
3. Utilize adequate perimeter controls (TSD, TSF, etc.).
4. Clean Water Diversions (CWD) shall not be used to divert offsite runoff through the project construction limits.
5. Utilize TRSC-Bs or wattles to reduce velocity in existing and proposed ditches with spacing of 250 feet divided by percentage of ditch grade. Also utilize TRSC-Bs in proposed TSDs and TDs.
6. Utilize temporary slope drains and earth berms at top of fill slopes five feet or higher and a fill slope steeper than 4:1, or where there are superelevations above 0.04 and fills are greater than three feet. Maximum slope drain spacing shall be 200 feet.
7. Utilize a rock energy dissipater at the outlet of all slope drains.
8. Devices at all drainage turnouts shall utilize skimmer or sediment control stone (TRSD-B, TRSC-A, etc.) and a spillway with an adequately designed base length to distribute outflow.
9. Sediment basins shall be sized to provide adequate silt storage for 3,600 cubic feet per disturbed acre with surface area equal to 435 square feet per cubic foot per second (cfs) of the peak inflow rate, Q25, using 25-year peak rainfall data (NCDEQ - *Erosion and Sediment Control Planning and Design Manual* or NOAA's National Weather Service website **https://hdsc.nws.noaa.gov/hdsc/pfds/** for partial duration (ARI) time series type). A Sediment Basin Designer Spreadsheet will be provided by NCDOT Roadside Environmental Unit upon request.
10. Skimmer Basins shall be sized to provide adequate silt storage for 1,800 cubic feet per disturbed acre with surface area equal to 325 square feet per cubic foot per second (cfs) of the peak inflow rate, Q25, using the 25-year peak rainfall data (NCDEQ - *Erosion and Sediment Control Planning and Design Manual* or NOAA's National Weather Service website **https://hdsc.nws.noaa.gov/hdsc/pfds/** for partial duration (ARI) time series type). Skimmer Basins shall be designed to dewater in two to three days. A Skimmer Basin Designer Spreadsheet will be provided by the NCDOT Roadside Environmental Unit upon request.
11. Design Riser Basins to the following standards:
    a. Surface Area shall be determined by Equation A (sq. feet) = Q25 (cfs) * 435.
    b. Volume requirement shall be 1,800 cubic feet per disturbed acre draining to the riser basin.
    c. Riser Pipe shall have a cross-sectional area 1.5 times that of the barrel pipe.
    d. 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.
    e. See NCDEQ - *Erosion and Sediment Control Planning and Design Manual* for additional design criteria.
12. In accordance with the requirements below, install erosion control in all ditch lines, including but not limited to temporary ditch lines (TDs) utilized to divert offsite runoff around construction areas:

- Install straw matting in all ditch lines where the velocity is greater than 2.0 feet / sec, and the shear stress is 1.25 psf or less.
- Install excelsior matting in all ditch lines with a shear stress above 1.25 psf, but not greater than 2.55 psf.
- Excluding locations where Rip Rap is not allowed (e.g. clear recovery zone, etc.), install Permanent Soil Reinforcement Mat or Rip Rap in all ditch lines with a sheer stress greater than 2.55 psf.
- At locations where Rip Rap is not allowed, install Permanent Soil Reinforcement Mat in all ditch lines with a sheer stress greater than 2.55 psf.

13. Unless otherwise approved by the Roadside Environmental Field Operations Engineer, provide matting for erosion control on all slopes (cut and fill) that are steeper than 4:1 and a height of five feet or greater.
14. Install matting for erosion control on all disturbed slopes adjacent to jurisdictional areas regardless of height and slope. Rolled erosion control products used within wetlands or riparian areas shall be non-poly mesh nettings.
15. Along all slopes (cut and fill) that are 30 feet or higher, place parallel rows of minimum nine-inch Excelsior Wattles at a spacing height of 20 feet.
16. The minimum and maximum length to width ratio of all Sediment Basins shall be 2:1 and 6:1, respectively.
17. Coir Fiber Baffles shall be installed in all silt basins and sediment dams at drainage outlets. For silt basins with a 20-foot or longer length, three Coir Fiber Baffles shall be installed with a spacing of 1/4 the basin length. For silt basins with a length less than 20 feet, a minimum of two Coir Fiber Baffles shall be installed, with a spacing of 1/3 the basin length. The Design-Build Team will not be required to show the individual baffles on the Erosion Control Plans, but shall be required to incorporate the Coir Fiber Baffle Detail on the Erosion Control Plans.
18. During construction, provide temporary sediment basins that dewater from the surface at all permanent stormwater devices.
19. Utilize Excelsior / Coir Fiber Wattles with Polyacrylamide (PAM) and / or TRSC-As with matting and PAM in temporary and permanent, existing and proposed ditches per NCDOT *Erosion and Sediment Control Design and Construction Manual* in areas where sediment basins are not feasible at drainage outlets, and in areas where sediment basins at drainage outlets with sediment traps (i.e. PIST-A, RIST-A, etc.) cannot be properly sized to surface area and / or sediment storage requirements due to safety concerns, right of way restrictions, utility conflicts, or other construction limitations approved by the NCDOT Roadside Environmental Unit.
20. Place devices utilizing PAM at all sediment basin inlets.
21. At a maximum spacing of 200 feet, at all sag points, and as directed, Utilize Special Sediment Control Fence or Coir Fiber Wattles as drainage breaks in silt fence.
22. Do not place erosion control devices that require excavation (i.e. sediment basins, silt ditches, etc.) in wetlands unless permitted by the Division of Water Resources 401 Certification and the Army Corps of Engineers 404 Permit.
23. Within the entire project limits, provide disturbed and undisturbed drainage area delineations in MicroStation Format.

24. For all drainage outlets where the runoff cannot be treated with a sediment basin and / or the sediment basin cannot be constructed to the required sediment storage or surface area requirements, provide a written explanation.
25. All perimeter Sediment Basins shall be placed outside of fill slopes.

C. Intermediate Phase

Intermediate Erosion Control Plans shall be required if design modifications and / or site conditions require additional erosion control design or design revisions to the RFC Clearing and Grubbing and / or RFC Final Grade Erosion Control Plans, including all detours where construction stormwater is not captured in the Erosion Control Plans. Intermediate Erosion Control Plans shall be submitted for review and shall be accepted prior to construction of any aspect impacted by the revised erosion control design. For any intermediate phase, comply with Section B, "Final Grade Phase" above.

II. Detail Sheets and Notes

A. Provide project specific special notes and details, including but not limited to, skimmer basin, coir fiber wattle with Polyacrylamide (PAM), etc.
B. Provide matting summary sheet(s): matting for erosion control (straw and excelsior), permanent soil reinforcement mat, and coir fiber mat.
C. Provide reforestation sheet(s): regular, wetland, streambank and / or buffer showing appropriate species.

III. Title Sheet

A. Show correct notes: NCG-01, HQW, ESA, clearing and grubbing, etc.
B. Show correct standards for project
C. List of standard NCDOT symbology
D. Show name and certification number of Level III certified individual responsible for designing and / or reviewing Erosion and Sedimentation Control Plans
E. Show name of primary NCDOT Roadside Environmental Unit Erosion and Sedimentation Control Plan reviewer

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 the Lumber River bridge, and at all jurisdictional and non-jurisdictional ponds, lakes, and other standing water bodies where 1) construction activities create surface fill impacts or 2) sufficient erosion and sediment control devices cannot be installed to contain sediment and / or turbidity impacts.
G. To contain concrete waste water and associated concrete mix from washing out ready-mix trucks, drums, pumps, or other equipment, provide Concrete Washout Structures at egress points. Concrete Washout Structures must collect and retain all concrete waste water and solids so that this material does not migrate to surface waters or into the ground water. The Concrete Washout Structures are not intended for concrete waste not associated with washout operations. The Concrete Washout Structures may include devices above or below ground and / or commercially available devices designed specifically to capture concrete waste water. Concrete Washout Structure options may be found in the special provision, available at the website noted in Section IV above. For construction details of an above grade and below grade Concrete Washout Structure, reference the website noted below:

https://connect.ncdot.gov/resources/roadside/SoilWaterDocuments/ConcreteWashoutStructuredetail.pdf

H. Borrow or waste areas that are part of the project shall require a separate Reclamation Plan, unless the borrow or waste activity is regulated under the *Mining Act of 1971*, or is a landfill regulated by the NCDEQ - Division of Waste Management (DWM). For newly created borrow pit(s) that require dewatering, Borrow Pit(s) Dewatering Basins shall be required and shall be in accordance with the applicable special provisions available at the website noted in Section IV above. The Design-Build Team shall submit the location and permit number for waste / borrow sites covered by the aforementioned Mining Act or regulated

by the NCDEQ - DWM concurrently to the Design-Build Unit and the Resident Engineer. For Reclamation Procedures, see:

https://connect.ncdot.gov/resources/roadside/FieldOperationsDocuments/ContractedReclamationProcedures.pdf

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 Design Build Unit, for review and acceptance. At anytime requested by the Engineer or the NCDOT Roadside Environmental Unit, the Design-Build Team shall provide an updated version of the Erosion and Sedimentation Control Plans for distribution to all parties involved in the construction process.

L. The Design-Build Team shall comply with the North Carolina Administrative Code *Title 15A Environmental Quality* Chapter 4, Sedimentation Control.

M. A pre-submittal meeting shall take place between the NCDOT Roadside Environmental Unit Soil & Water Engineering Section, the 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. 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 and / or 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, and the Resident Engineer. 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 and ESA areas in the field and delineate with Safety Fence or flagging. For guidance on Safety Fence and flagging in jurisdictional areas, see:

https://connect.ncdot.gov/resources/roadside/Pages/Field-Operations-Documents.aspx

T. Once RFC Erosion and Sedimentation Control Plans are issued, any major design change or addition, any change that involves calculations, and any addition, deletion, or relocation of a sediment basin shall be submitted to the NCDOT Roadside Environmental Unit, via the Design-Build Unit, for review and acceptance. Minor changes such as moving silt fence, adding or moving temporary ditches (unless adding new runoff flow to a sediment basin), and adding or moving slope drains shall be reviewed by the Engineer in the field.

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 or 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 NCG010000 permit. 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 solid waste management rules governing the disposal of solid waste (15ANCAC 13B).

Y. Ground Cover Stabilization Requirements - NCG010000 (7 - 14 Days)

Ground cover stabilization shall comply with the timeframe guidelines specified by the North Carolina Department of Environmental Quality, Division of Water Resources NCG-010000 General Construction Permit that became effective on April 1, 2019. Excluding the slopes noted below, temporary and permanent ground cover stabilization shall be provided within seven calendar days from the last land-disturbing activity. The Design-Build Team shall label all slopes subject to the seven-day ground cover stabilization requirements on all Erosion and Sedimentation Control Plans submitted to the Department for review and acceptance.

For the slopes noted below, temporary and / or permanent ground cover stabilization shall be provided within 14 calendar days from the last land-disturbing activity:

Slopes between 2:1 and 3:1, with a slope length of ten feet or less
Slopes 3:1 or flatter, with a slope length of 50 feet or less
Slopes 4:1 or flatter

Temporary and / or permanent ground cover stabilization shall be provided in accordance with the provisions in this RFP, the Vegetation Management Procedure developed by the Design-Build Team and the April 1, 2019 NCG-010000 General Construction Permit.

Z. Additional Ground Cover Stabilization Requirements

Once the Design-Build Team identifies the area for stabilization due to inactivity, the Design-Build Team shall obtain concurrence from the Engineer and adhere to the following options based on the estimated amount of time the area will remain inactive. If the area stabilized exceeds the estimated timeframe, the Design-Build Team shall implement the next level of stabilization as directed by the Engineer.

All application rates noted below are in pounds per acre.

Short Term Stabilization - For areas that will remain inactive for up to 21 days

Erodible areas shall be stabilized utilizing non-vegetative cover. Non-vegetative cover options include straw mulch, hydraulic applied erosion control products or rolled erosion control products. If straw mulch is used, it shall provide 100% groundcover and be tacked sufficiently to hold the mulch in place for the duration of the inactive period. All other methods shall be installed according to the manufacturer's directions.

Mid-Term Stabilization -For areas that will remain inactive for up to 90 days

Erodible areas shall be stabilized utilizing the following stabilization protocol:

March 1 - August 31	**September 1 - February 28**
50# German or Browntop Millet	50# Rye Grain or Wheat
500# Fertilizer	500# Fertilizer
4000# Limestone	4000# Limestone

At the Engineer's sole discretion, the use of limestone on sandy soils that require topsoil for stabilization may be eliminated. 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

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

* On cut and fill slopes 2:1 or steeper, the Design-Build Team shall apply centipede at a rate of five pounds per acre.

Riparian and Wetland Locations

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

Waste and Borrow Areas

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

**** Approved Tall Fescue Cultivars**

06 Dust
2nd Millennium
3rd Millennium
Apache III
Avenger
Barlexas
Barlexas II
Bar Fa
Barrera
Barrington
Barrobusto
Barvado
Biltmore
Bingo
Bizem
Blackwatch
Blade Runner II
Bonsai
Braveheart
Bravo
Bullseye
Cannavaro
Catalyst
Cayenne
Cessane Rz
Chipper
Cochise IV
Constitution
Corgi
Corona
Coyote
Darlington
Davinci
Desire
Dominion
Dynamic
Dynasty
Endeavor
Escalade
Essential
Evergreen 2
Falcon IV
Falcon NG
Falcon V
Faith
Fat Cat
Festnova
Fidelity
Finelawn Elite
Finelawn Xpress
Finesse II
Firebird
Firecracker LS
Firenza
Five Point
Focus
Forte
Garrison
Gazelle II
Gold Medallion
Grande 3
Greenbrooks
Greenkeeper
Gremlin
Greystone
Guardian 21
Guardian 41
Hemi
Honky Tonk
Hot Rod
Hunter
Inferno
Innovator
Integrity
Jaguar 3
Jamboree
Justice
Kalahari
Kitty Hawk 2000
Legitimate
Lexington
LSD
Magellan
Matador
Millennium SRP
Monet
Mustang 4
Ninja 2
Ol' Glory
Olympic Gold
Padre
Patagonia
Pedigree
Picasso
Piedmont
Plantation
Proseeds 5301
Prospect
Pure Gold
Quest
Raptor II
Rebel Exeda
Rebel Sentry
Rebel IV
Regiment II
Regenerate
Rendition
Rhambler 2 SRP
Rembrandt
Reunion
Riverside
RNP
Rocket
Scorpion
Serengeti
Shelby
Sheridan
Signia
Silver Hawk
Sliverstar
Shenandoah Elite
Sidewinder
Skyline
Solara
Southern Choice II
Speedway
Spyder LS
Sunset Gold
Taccoa
Tanzania
Trio
Tahoe II
Talladega
Tarheel
Terrano
Titan ltd
Titanium LS
Tracer
Traverse SRP
Tulsa Time
Turbo
Turbo RZ
Tuxedo RZ
Ultimate
Venture
Umbrella
Van Gogh
Watchdog
Wolfpack II
Xtremegreen

***** Approved Creeping Red Fescue Cultivars**

Aberdeen Boreal Epic Cindy Lou

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 by the Engineer.

Soil Analysis

If vegetation establishment indicates a deficiency in soil nutrients or an incurred pH level is present, the Design-Build Team shall take soil samples and apply additional soil amendments to the affected area and as directed by the Engineer.

Fertilizer Topdressing

In accordance with the requirements noted below, the Design-Build Team shall apply a minimum of one Fertilizer Topdressing application to all permanently seeded areas immediately prior to completion of the project, twice during every growing season from April 1st through September 30th, and at other times as directed by the Engineer.

Fertilizer used for topdressing shall be 10-20-20 analysis applied at a rate of 500 pounds per acre; or a different analysis that provides a 1-2-2 ratio applied at a rate that provides the same amount of plant food as a 10-20-20 analysis and as directed by the Engineer.

Fertilizer used for waste and borrow areas shall be 16-8-8 grade applied at a rate of 500 pounds per acre; or a different analysis that provides a 2-1-1 ratio applied at a rate that provides the same amount of plant food as a 16-8-8 analysis and as directed by the Engineer.

Supplemental Seeding

For all supplemental seeding, the kinds of seed and proportions shall be the same as specified above for *Long Term Stabilization*, with the exception that centipede seed shall not be allowed in the seed mix. The rate of application for supplemental seeding shall be between 25# to 75# per acre. Prior to topdressing, the Design-Build Team shall determine the actual rate per acre for supplemental seeding and submit the supplemental seeding rate and areas to the Department for review and acceptance.

To prevent disturbance of existing vegetation, minimum tillage equipment, consisting of a sod seeder, shall be used to incorporate seed into the soil where degree of slope allows. Where degree of slope prevents the use of a sod seeder, a clodbuster (ball and chain) may be used.

Mowing

At a minimum, the Design-Build Team shall 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 2018 NCDOT *Standard Specifications for Roads and Structures*.

The Design-Build Team shall take all reasonable precautions to comply with all regulations of all authorities having jurisdiction over public and private land governing the protection of erosion and sedimentation. Any fines, remediation required or charges levied against the Department for failing to comply with all rules and regulations concerning erosion and sediment control, due to the Design-Build Team's negligence, carelessness, or failure to implement the Erosion and Sedimentation Control Plans and Specifications; or failure to maintain an approved Storm Water Pollution Prevention Plan (SWPPP), regardless of absence of neglect, shall be deducted from monies due the Design-Build Team. In addition to said fines, remediation required, or charges levied, any associated engineering costs or actions taken by the Department in order for the Department to comply with rules and regulations, as a result of the Design-Build Team's negligence, carelessness, or failure to implement the Erosion and Sedimentation Control Plans and Specifications; and / or the SWPPP, regardless of absence of neglect, shall be deducted from the monies due to the Design-Build Team.

GEOENVIRONMENTAL SCOPE OF WORK (1-4-21)

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

I-5987

Sites of concern were identified in the December 7, 2015 I-5879 *GeoEnvironmental Hazardous Materials Report for Planning* and the Department developed the December 9, 2019 I-5879 Right of Way Recommendations based on the Department's preliminary design. If the Design-Build's design and / or construction methods require the aforementioned Right of Way Recommendations to be updated, the Design-Build Team shall hold a right of way consultation with the Department's GeoEnvironmental staff, Design-Build Unit and key Design-Build Team members. The Department shall require 90 days from the date of the aforementioned consultation to investigate and provide updated Right of Way Recommendations. The updated Right of Way Recommendations shall be completed prior to the Design-Build Team making offers to purchase right of way on these sites of concern.

I-6064A, B & C

Sites of concern were identified in the July 18, 2019 *GeoEnvironmental Phase I Report* for the M-0194 Feasibility Study for I-95 from Mile Marker 12 to 22. After submittal of the Right of Way / 60% Roadway Plans developed by the Design-Build Team, the Design-Build Team shall hold a right of way consultation with the Department's GeoEnvironmental staff, Design-Build Unit, and key Design-Build team members.

Sites of concern within the proposed right of way that are noted in the July 18, 2019 *GeoEnvironmental Phase I Report* for the M-0194 Feasibility Study for I-95 from Mile Marker 12 to 22 and 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.

I-5987 / I-6064A, B & C

The Design-Build Team shall notify the Design-Build Unit, in writing, of any underground storage tanks (USTs) containing fuel, chemicals, or heating oil tanks discovered during property appraisals. The Department will require 90 days from the date of written notification to investigate and provide Right of Way Recommendations. The Right of Way Recommendations shall be completed prior to the Design-Build Team making offers to purchase the right of way on sites containing USTs.

The Design-Build Team shall adhere to all Right of Way Unit procedures regarding the acquisition of contaminated property and all Right of Way Recommendations provided by the Department. (Reference the Right of Way Scope of Work found elsewhere in this RFP).

After the parcels with identified contamination and / or underground storage tanks (USTs) are acquired and cleared of all above ground structures, the Department will 1) remove from the right of way USTs identified in the I-6064 *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 unless noted otherwise elsewhere in this RFP. The Department will remove the aforementioned USTs and contaminated soil within 60 days of written notification that the Design-Build Team has removed all the above-ground structures. All contaminated soil not required for removal to complete the project shall be left in place and undisturbed.

If contaminated groundwater is encountered and dewatering is required in areas of known contamination, the Design-Build Team shall containerize the groundwater in vessels provided by the Department. The Department will be responsible for the sampling and disposal of the water.

It is important to note that petroleum contaminated soil may be encountered during any earthwork activity on this project.

III. INFORMATION PROVIDED BY NCDOT

- July 18, 2019 *GeoEnvironmental Phase I Report* for M-0194 Feasibility Study for I-95 from Mile Marker 12 to 22
- I-6064 (M-0194) Microstation file for the locations of the sites of concern
- December 7, 2015 I-5879 *GeoEnvironmental Hazardous Materials Report for Planning*
- December 9, 2019 I-5879 *Right of Way Recommendations*
- I-5879 GeoEnvironmental Phase II Reports
- I-5879 Microstation file for the locations of sites of concern (sites are included in the I-6064 MicroStation file)
- December 11, 2020 *Report of Site-Assessment Activities and Work-Plan Amendment Three*
- *I6064_VOC area of Potential Impact* Microstation file for potential area of Volatile Organic Compounds

IV. UNKNOWN CONTAMINATED SITES

The Design-Build Team shall immediately notify the Department if the Design-Build Team's operations encounter or expose any abnormal condition that may indicate the presence of a hazardous, contaminated, and / or toxic material not previously identified. If the Engineer elects to have the Design-Build Team remove and dispose of contaminated material, the removal and disposal of this material shall be performed as extra work in accordance with Article 107-25 of the 2018 NCDOT *Standard Specifications for Roads and Structures.*

V. GEOTECHNICAL INVESTIGATIONS WITHIN VOLATILE ORGANIC COMPOUND AREAS

The Design-Build Team's attention is directed to the fact that Volatile Organic Compound (VOCs) were detected in the groundwater within the project area. The area of potential contamination is shown in the *I6064_VOC area of Potential Impact* Microstation file provided by the Department.

In accordance with the requirements above, the Department will remove all associated contaminated soil anticipated to require excavation to complete the project within the VOC area of potential contamination, excluding material excavated during geotechnical investigation operations.

The Design-Build Team shall not perform any type of excavation, including but not limited to geotechnical investigations, within the area of potential contamination during the Design-Build procurement. Post award, the Design-Build Team shall adhere to the following requirements when performing geotechnical investigations within the area of potential contamination. All costs associated with the removal, treatment and disposal of excavated material associated with the geotechnical investigations shall be the Design-Build Team's responsibility. (Reference the Geotechnical Engineering Scope of Work found elsewhere in this RFP)

- The Design-Build Team shall employ a geoenvironmental firm that is prequalified by NCDOT in *Discipline Code 330 - Hazardous Waste Site Analysis & Remediation* to oversee and document the disposal of VOC contaminated soil and groundwater encountered during geotechnical investigation operations.

- All geotechnical boring cuttings and excavated material shall be drummed and tested for VOCs.

- Contaminated material removed during geotechnical investigation operations shall be transported to a waste treatment and disposal facility that is fully approved and permitted by all applicable environmental regulatory agencies to receive, treat and / or dispose of the material. Prior to performing any geotechnical investigation activity or removing any potentially contaminated material from the project limits, the Design-Build Team shall submit the treatment and disposal facility credentials to the

Department and the Department shall approve the use of the facility. Contaminated material shall only be removed to the extent necessary to complete a task or as directed by the Engineer. The Design-Build Team shall provide all transportation manifests and certificates of acceptance from the receiving treatment and disposal facility to the Department on a weekly basis.

- The Department will be the regulatory generator of all contaminated waste excavated and removed from within the project limits. The Design-Build Team, with the written approval of the Engineer, will be authorized to sign all waste transportation and disposal manifests on behalf of the Department.

- At all times during geotechnical investigation operations, the Design-Build Team shall maintain qualified personnel on-site for field screening and / or to monitor ambient air quality. The qualified personnel shall be knowledgeable in the use of an Organic Vapor Analyzer, Flame Ionization Detector, Photo Ionization Detector, and other appropriate monitoring equipment.

- The Design-Build Team shall be entirely responsible for compliance with all OSHA, EPA, DOT, NCDEQ, and local rules and regulations pertaining to excavation, transportation and treatment / disposal of the contaminated material associated with geotechnical investigations. Examples of such rules and regulations include, but are not limited to, 29 CPR 1910 General Industry Standards and 1926 Construction Standards, and 40 CPR 260 Hazardous Waste Management System, 261 General, Identification and Listing of Hazardous Waste, 262 Standards Applicable to Generators of Hazardous Waste, 263 Standards Applicable to Transporters of Hazardous Waste, 264 Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities, 265 Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities, 49 CPR 173 Shippers-General Requirements for Shipments and Packagings, 49 CPR 1 78 Specifications for Packagings, 15A NCAC 13A North Carolina Hazardous Waste Management Rules, NCGS § 130A-310 Inactive Hazardous Sites, the Federal Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Federal Resource Conservation and Recovery Act (RCRA).

- Prior to leaving the project limits, all equipment, tools, etc. utilized in the removal of contaminated materials shall be thoroughly cleaned to the satisfaction of the Engineer. As required by the rules and regulations in the preceding paragraph, as well as all other OSHA, EPA, DOT, NCDEQ, and local rules and regulations that may be appropriate, the Design-Build Team shall appropriately collect, containerize and dispose of all water used in the cleaning operation.

GEOTECHNICAL ENGINEERING SCOPE OF WORK (7-14-21)

I. General

All geotechnical data, tests, computations and supporting subsurface investigations and documentation submitted by the Design-Build Team shall be provided in English Units.

Obtain the services of a firm prequalified for geotechnical work by the NCDOT Geotechnical Engineering Unit. A list of prequalified firms and the Discipline Code requirements can be found at the websites noted below:

https://www.ebs.nc.gov/VendorDirectory/search.html?s=pc&a=new

https://connect.ncdot.gov/resources/Geological/Pages/default.aspx

The prequalified geotechnical firm shall use the personnel and office location(s) that were submitted to the Department for their latest prequalification approval.

The prequalified geotechnical firm shall prepare foundation design recommendation reports for use in designing structure foundations, roadway foundations, retaining walls, sound barrier foundations, overhead sign structure foundations, and temporary structures.

The Engineer of Record who prepares the foundation design recommendation reports shall be a Professional Engineer registered in the State of North Carolina who has completed a minimum of three geotechnical design projects of scope and complexity similar to that anticipated for this project using the load and resistance factor design (LRFD) method and in accordance with the latest edition of the AASHTO *LRFD Bridge Design Specification*.

The prequalified geotechnical firm shall also determine if additional subsurface information, other than that required and noted elsewhere in this RFP, is required based upon the subsurface information provided by the NCDOT and the final roadway 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* and the Geotechnical Investigations Within Volatile Organic Compound Area requirements noted in GeoEnvironmental Scope of Work found elsewhere in this RFP. Multi-use paths and greenways shall be considered a roadway when performing subsurface investigation and laboratory testing. Submit additional information collected by the Design-Build Team to the NCDOT Geotechnical Engineering Unit, via the NCDOT Design-Build Unit, for review and acceptance. The Design-Build Team shall provide the final Subsurface Investigation report in electronic and hardcopy format to the NCDOT for its records.

Unless noted otherwise herein, the Design-Build Team shall design foundations (except for sign foundations), embankments, slopes, retaining walls, and sound barrier walls in accordance with the current edition of the AASHTO *LRFD Bridge Design Specifications*,

NCDOT *LRFD Driven Pile Foundation Design Policy,* all applicable NCDOT Geotechnical Engineering Unit Standard Provisions, NCDOT *Structures Management Unit Manual,* and NCDOT *Roadway Design Manual*. The NCDOT *LRFD Driven Pile Foundation Design Policy* is located on the NCDOT Geotechnical Engineering Unit's website at:

https://connect.ncdot.gov/resources/Geological/Pages/default.aspx

For *Geotechnical Guidelines for Design-Build Projects,* the Design-Build Team shall adhere to the guidelines located at the following website:

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

Only approved products and / or approved retaining wall types which have NCDOT Geotechnical Standard Provisions shall be acceptable. Products and / or retaining wall types that are not approved, are approved for provisional use, or are proprietary shall not be allowed. Alternative Technical Concepts (ATCs) that propose non-approved, provisionally approved, or proprietary products / retaining wall types are not permitted and shall not be evaluated or considered. Concepts that use a combination of approved products / retaining wall types and / or require revisions to the NCDOT Geotechnical Standard Provisions shall require an approved ATC.

A minimum of one standard penetration test (SPT) / rock core borings shall be required per bent for all bridges except dual or triple bridges. A minimum of two SPT / rock core borings shall be required across the roadway typical section at each bent location for dual and triple bridges. All driven piles shall be located within 75 feet of a SPT / rock core boring. All drilled piers and other types of bridge foundations shall be located within 25 feet of a SPT / rock core boring. The Design-Build Team shall extend all borings to a depth of 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 200 feet, 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.

Seismic designs per Sections 10.5.4.2 and 11.5.4.2 of the AASHTO *LRFD Bridge Design Specifications* will not be required.

II. ADDITIONAL DESIGN REQUIREMENTS

A. Structure Foundations

- Spread footings / shallow foundations will not be allowed for bridge foundations, sound barrier walls, dynamic message sign (DMS) foundations, cantilevered sign foundations, overhead sign foundations, high mast light foundations, or signal pole foundations.

- Permanent steel casings shall be required for drilled piers that are constructed in six inches or more of water. Permanent steel casings shall also be required for drilled piers constructed on stream banks and within 10 feet of the top of stream banks.

- The 100-year and 500-year design scour elevations for the bridge(s) on I-95 over the Lumber River shall be equal to 1) the 100-year design scour elevation and the 500-year geotechnically adjusted scour elevation shown in the March 9, 2021 Design Scour Memo provided by the Department; or 2) the Bridge Survey Report developed by the Design-Build Team and accepted by the Department. The 500-year design scour elevations for the bridge(s) on I-95 over CSX Railroad shall be in accordance with the Hydraulics Scope of Work found elsewhere in this RFP. At all bridge locations, the design scour elevations developed by the Design-Build Team shall not be geotechnically adjusted.

- ATCs that geotechnically adjust design scour elevations at bridges and retaining walls are not permitted and shall not be evaluated or considered.

- All end bent fill slopes shall be 2:1 or flatter. All end bent cut slopes shall be 2:1 or flatter. All end bent slope protection shall be in accordance with the Structures Management Unit Standard Drawings SP1, SP2 or RR1, as appropriate.

- Analyze drilled pier and pile bent foundations using either LPile or FB-Pier. Design drilled piers and vertical piles in pile bents with a sufficient embedment in soil and / or rock to achieve “fixity”.

- For box culverts, the Design-Build Team shall submit details for undercut of unsuitable material or recommendations for use of more than one foot of conditioning material to the NCDOT Geotechnical Engineering Unit, via the NCDOT Design-Build Unit, for review and acceptance.

  Retaining walls and / or taller headwalls / end walls shall not be used to reduce the length of proposed culverts and or the length of culvert extensions unless shown on the Preliminary Roadway Plans provided by the Department.

B. Roadway Foundations

- The Design-Build Team shall design and construct cut and fill slopes in accordance with the following requirements:

    - Excluding cut and fill slopes for the railroad track and railroad ditches, all unreinforced and non-rock plated / riprapped proposed cut and fill slopes shall be 3:1 (H:V) or flatter.

    - Roadway cut and fill slopes shall have a minimum factor of safety of 1.3 for global stability.

    - From Station 315+00 -L- to the bridge(s) on I-95 over the Lumber River, the proposed I-95 cut and fill slopes shall adhere to the following requirements:

        - From Station 347+00 -L- to the bridge(s) on I-95 over the Lumber River, the proposed roadway embankment on the west side of I-95 shall be 2:1 (H:V) fill slopes.

        - Excluding 1) the area required to transition to the aforementioned 2:1 (H:V) fill slopes, and 2) the areas required to transition to the 2:1 (H:V) bridge end bent slopes, all other proposed I-95 roadway cut and fill slopes shall be 4:1 (H:V) or flatter.

        - In accordance with the 2018 Roadway Standard Drawing No. 275.01, the Design-Build Team shall rock plate **all** fill slopes steeper than 3:1 (H:V) with Class II riprap.

- Reinforced soil fill slopes shall only be used to minimize impacts to 1) natural gas regulator stations, 2) sanitary sewer lift / pump stations, and 3) cultural, historical or otherwise protected landmarks or topographic features, and will only be allowed in areas that specific fill slope design parameters are not required elsewhere in this RFP.

- In accordance with the project specifications, Roadway Standard Drawings, and the Erosion and Sedimentation Control Scope of Work found elsewhere in this RFP, provide drainage recommendations, including but not limited to lateral ditches, underdrains, and shoulder drains, for the new I-95 through lanes, existing mainline through lanes, and all -Y- Lines, ramps, loops and service roads designed and constructed on new location, excluding the transitions required to tie to existing, to meet the following conditions:

    - Maintain a minimum three-foot vertical separation between the groundwater table and the bottom of the pavement structure (asphalt base course, ABC, or cement treated base course, as applicable for the pavement design).

- Subsurface / pipe underdrains and shoulder drains shall use coarse aggregate (No. 57 stone).

- Where the organic content exceeds 5% by weight, within the construction limits of new embankments and existing embankments to be raised, undercut all organic soils to at least the slope stake line(s).

- Calculate and report estimated settlement and rate of settlement at bridge approach embankments within 250 feet of end bents. Add wait periods, settlement monitoring, and soil improvement techniques that keep long term settlements equal to or less than one inch prior to performing fine grading of the subgrade.

- A minimum of two embankment settlement gages shall be required at each end bent 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.

- Calculate and report estimated settlement and rate of settlement for roadway embankments. Add wait periods, settlement monitoring, and soil improvement techniques that keep long term settlements equal to or less than four inches prior to performing fine grading of the subgrade.

- Where computed settlement is greater than six inches in roadway embankments, monitor settlement across the width of the embankment at a maximum spacing interval of 250 feet parallel to the roadway survey / centerline and 50 feet perpendicular to the roadway survey / centerline using settlement gages or other approved methods.

- Soil improvement techniques that mitigate long term settlement problems or 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 *Ground Improvement Methods FHWA publication NHI-04-001* or *Geosynthetic Design and Construction Guidelines FHWA-HI-95-038.*

- Mitigate all unsuitable soils to the extent required to improve the stability of the proposed embankment, walls, or subgrade. Use any suitable material to backfill undercut areas except when employing shallow undercut in accordance with Section 505 of the NCDOT 2018 *Standard Specifications for Roads and Structures* which requires the use of Select Material, Class IV. For undercut backfilling in water, use Select Material, Class III.

- Conduct proofrolling in accordance with Section 260 of the 2018 *Standard Specifications for Roads and Structures*. A minimum load capacity of 35 tons shall

be required. In areas where proofrolling fails or is not practical, the Engineer will conduct DCP testing in accordance with the following:

- The Engineer will conduct DCP testing on the soils beneath the pavement base at a spacing of 100 feet when the Design-Build Team has notified the Department a location has been prepared (Reference the Pavement Management Scope of Work found elsewhere in this RFP). If the DCP tests indicate poor soils beneath the pavement base, the Engineer will provide direction to undercut and place Class IV subgrade stabilization. (Reference the *Aggregate Subgrade* Standard Special Provision found elsewhere in this RFP) Payment of the Class IV subgrade stabilization for these undercut areas will be paid for as extra work in accordance with Subarticle 104-8(A) of the 2018 *Standard Specifications for Roads and Structures* at the unit price of $50.00 per cubic yard (in place volume). This payment will be considered full compensation for the subgrade undercut, removal and proper disposal of the undercut material, and the placement and compaction of the Class IV subgrade stabilization.

C. Permanent Retaining Wall Structures

- Design life of permanent retaining walls shall be 100 years.

- The lateral deflection of permanent sheet pile retaining walls shall be limited to 1.5 inches or less for the service limit state. Permanent sheet pile retaining walls sections shall conform to the requirements of Section 1084-2 of the 2018 *Standard Specifications for Roads and Structures.* Excluding the sheet pile wall located on the east side of I-95 between the bridge(s) on I-95 over the Lumber River and SR 1536 (Carthage Road), the sheet piles shall be galvanized, metalized, or made of marine grade steel (ASTM A690). When using galvanized or metallized sheet piles, all potentially exposed surfaces, plus an additional 20 feet, shall be galvanized or metallized. The sheet pile wall located on the east side of I-95 between the bridge(s) on I-95 over the Lumber River and SR 1536 (Carthage Road) shall be marine grade steel (ASTM A690) with 0.200 inches of sacrificial steel thickness added to the sheet pile thickness needed for design. Weep holes utilizing a two-part filter system shall be installed in all sheet pile retaining walls. (Reference the *Anchored Sheet Pile Retaining Walls* Project Special Provision found elsewhere in this RFP)

  Install sheet piling with an appropriate hammer. Remove and replace any section damaged during handling and installation. Remove any rock or strong material by means such as excavation and backfilling, drilling, or by punching, as necessary, to ensure sheet piles can be driven to the appropriate tip elevation.

- In accordance with the Hydraulics Scope of Work found elsewhere in this RFP, scour countermeasures shall be provided along retaining walls and outlet protection shall be provided for storm drainage pipes passing through a retaining wall face.

- **** NOTE **** Deleted bullet pertaining to rip rap scour protection at inlet / outlet locations of storm drainage pipes / culverts passing through retaining wall faces.

- Retaining walls designed and constructed at the following locations shall be sheet pile walls:

    - East side of I-95 between the bridge(s) on I-95 over the Lumber River and SR 1536 (Carthage Road) - The section of this retaining wall between Station 361+10.00 -L- and Station 363+20.00 shall be designed and constructed for scour without scour countermeasures. The design scour elevation in the Retaining Wall Design Scour Memo provided by the Department shall be used for the service and strength limit state analyses. (Reference the Hydraulics Scope of Work found elsewhere in this RFP)

    - West side of I-95 between the bridge(s) on I-95 over the Lumber River and SR 1536 (Carthage Road)

    - East side of I-95 between the bridge(s) on I-95 over the CSX Railroad and bridge(s) over the Lumber River - The sheet pile tip elevation for this wall shall not be higher than elevation +100.00 feet.

    - East side of SR 1792 (Khan Drive) from the proposed reinforced concrete box culvert conveying Fivemile Branch and continuing north until Fivemile Branch no longer parallels SR 1792 (Khan Drive)

- **** NOTE **** Relocated bulled on sheet piling installation.

- From Station 315+50 -L- to the bridge(s) on I-95 over the Lumber River, retaining walls will not be allowed on the west side of I-95.

- Retaining walls and abutment walls shall be designed and constructed to allow for rapid draw down where walls could be inundated during flood events up to and including a 500-year event.

- For design and construction of mechanically stabilized earth (MSE) retaining walls, refer to the NCDOT *Policy for Mechanically Stabilized Earth Retaining Walls* which can be found at the NCDOT Geotechnical Engineering Unit's website at:

    https://connect.ncdot.gov/resources/Geological/Pages/Products.aspx

    Only coarse aggregate will be allowed for reinforced fill in MSE retaining walls.

- When backfill is required for retaining walls supporting I-95, including all ramps and loops, the backfill shall adhere to the following requirements:

    - For soldier pile walls, use Class V or Class VI for a minimum distance of 0.25H behind the bottom of the wall and 0.50H behind the top of the wall, where "H" is the wall height. A single piece of Type 2 geotextile, that extends a minimum of six inches on both sides of the joint, shall be used to cover all horizontal joints between wall panels.
    - For cast-in-place walls, use Class III (Type 1, Type 2 (A-3 only) or Type 3), Class V, or Class VI for a minimum distance of 0.25H behind the bottom of the wall and 0.50H behind the top of the wall, where "H" is the wall height.
    - Use a Type 2 geotextile to separate the Class III, Class V and Class VI backfill from the common borrow used in the embankment.

- With the exception of walls covered by a Roadway Standard Drawing, design and construct permanent retaining walls in accordance with the applicable NCDOT *Standard Specifications for Roads and Structures* or Geotechnical Engineering Unit Project Special Provisions, which can be provided upon request by the Design-Build Team. Geotechnical Provisions and Notes can be found at the NCDOT Geotechnical Engineering Unit's website at:

    https://connect.ncdot.gov/resources/Geological/Pages/Geotech_Provisions_Notes.aspx

- 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, scour elevations when applicable, and finished grade elevations at incremental stations
    - Wall alignment with stations and offsets
    - Typical sections showing top and bottom of wall, drainage, embedment, rip rap, 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 Roadway Standard Drawing, 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 453.01 (Standard Cast in Place (CIP) Gravity Retaining Wall) does not consider traffic impact loads applied to the top of the wall and shall not be used along roadways where moment slabs and crash barriers are required at the top of the wall.

- Locate retaining walls at toes of slopes unless restricted by right of way limits. The Design-Build Team shall submit global stability calculations for slopes at retaining walls and obtain acceptance from the NCDOT prior to construction. Excluding slopes at bridge end bents, as defined under the Structure Foundations Section above, all slopes behind walls shall be in accordance with the Roadway Foundations Section above.

- Drainage over the top of retaining 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 6-7A, Figure 3, 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).

- Precast or cast-in-place 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.

- Excluding concrete median barrier installed in the I-95 median, abutment retaining walls, and retaining walls located along the shoulder point behind sound barrier walls, 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 retaining walls, 2) all proposed elements acting as a retaining wall, including but not limited to stretch barrier where the delta in elevation of the finished grades on each side of the barrier is 30.0 inches or more, and 3) all existing retaining walls to remain in place that are a minimum of 30.0 inches tall and will not have a slope behind the wall in the final condition. 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 not drive, re-drive, and / or re-strike piles at end bents with abutment walls after the abutment walls have been built in order to eliminate down drag (negative skin friction) loads.

- All deep foundations for end bents with abutment retaining walls shall extend a minimum of ten feet below the retaining wall foundation or leveling pad. For drilled-in piles behind such retaining walls, the penetration can be reduced to five feet below the bottom of the wall provided the Design-Build Team analyzes and determines that the vertical piles are "fixed" in natural ground such that the decrease in pile embedment shall not significantly increase the top deflection under lateral loading. The calculations and supporting documentation for this analysis shall be submitted to the NCDOT for review and acceptance prior to construction.

- The Design-Build Team will not be required to adhere to the minimum six-foot separation between sound barrier walls and retaining walls. Where sound barrier walls are designed and constructed within ten feet of a retaining wall, including but not limited to MSE retaining walls, the Design-Build Team shall adhere to the following requirements:

    - Sound barrier wall deep foundations shall be fully independent from retaining wall foundations. Sound barrier wall foundation lengths shall be based on existing grade prior to adding fill for retaining walls for axial capacity. Lateral capacity design may include resistance from embankment fill.

    - Retaining walls shall be designed to withstand lateral loads from sound barrier wall foundations. Lateral loads / pressures shall be determined using L-Pile or FB MultiPier or other similar, approved software. A reduction in the computed loads / pressures (at the foundation member) is allowed to account for its distance from the back of the wall. Overlaps in the pressure distributions shall be added together to determine the total pressure.

- Can / sleeves shall be used to construct sound barrier wall foundations through all MSE retaining wall reinforced fill, regardless of the distance between the sound barrier wall and the MSE retaining wall. The can / sleeves shall be 16 gauge

galvanized corrugated steel pipe and filled with Select Material, Class III, Type 1, Type 2 (A-3 only), or Type 3.

D. Temporary Structures

- Design temporary retaining structures, which include earth retaining structures and cofferdams, in accordance with current allowable stress design AASHTO *Guide Design Specifications for Bridge Temporary Works*, the *Temporary Shoring* Standard Special Provision found elsewhere in this RFP and the applicable NCDOT Project Special Provisions available upon request by the Design-Build Team. The only submittal required to use the standard sheeting design is the "Standard Shoring Selection Form".

- Traffic control barrier on top of walls shall be in accordance with the NCDOT Work Zone Traffic Control Unit details available upon request by the Design-Build Team. If anchored barrier is required, then anchor the barrier in accordance with NCDOT 2018 Roadway Standard Drawing No. 1170.01.

III. ADDITIONAL CONSTRUCTION REQUIREMENTS

- The Design-Build Team shall investigate, propose, and submit proposed remedial measures to the NCDOT Geotechnical Engineering Unit for review and acceptance (prior to incorporating recommended remedial measures into the project) for any construction problems related to the following:

    - 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 acceptance prior to beginning construction. Hammer approvals should 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.

- The prequalified geotechnical firm which prepares the embankment design for a bridge or roadway fill shall review any necessary settlement monitoring data at least weekly (during fill placement and a minimum of two weeks once full height is achieved) and provide monthly updates to the NCDOT Geotechnical Engineering Unit. This same firm will issue a release letter ending the wait period for an embankment fill once the settlement criteria listed elsewhere in this RFP is met. Settlement monitoring data and recommendations shall be submitted to the NCDOT Geotechnical Engineering Unit, via the Design-Build Unit, for review and acceptance prior to issuing a release letter.

- The Design-Build Team shall be responsible for any damage and / or claim caused by construction, including but not limited to damage caused by vibration (see Article 107-14 of the NCDOT 2018 *Standard Specifications for Roads and Structures*). The Design-Build Team shall be responsible for deciding if any pre- and post-construction monitoring and inventories need to be conducted. Any monitoring and inventory work shall be performed by a prequalified consulting firm.

- If the Design-Build Team's design and / or construction methods impact the existing City of Lumberton levee, the Design-Build Team shall reconstruct the levee in kind. Driving a sheet pile wall into the existing levee located on the east side of I-95, between the bridge(s) on I-95 over the CSX Railroad and bridge(s) over the Lumber River, will be allowed and will not be considered an impact. If however, the sheet pile wall installation requires additional activities, including but not limited to excavation of the levee, these additional activities shall be deemed an impact to the levee, and the Design-Build Team shall repair all impacts in kind. The latest assessment of the City of Lumberton's levee can be found at the National Levee Database website referenced below. I-95 shall not be considered part of the City of Lumberton's levee.

  https://levees.sec.usace.army.mil/#/levees/system/390005000001/summary

- 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.

- Use Pile Driving Analyzer (PDA) testing on a minimum of two production piles for each pile size and type for each bridge with driven piles using the approved hammer driving system for the pile. Each PDA tested pile shall be driven to the maximum RDR for the end bent / bent(s) the PDA tested pile covers. The spacing between PDA tested piles shall not exceed 200 feet and at least one PDA tested pile shall be located at an end bent. Additional PDA testing shall be performed at other end bent / interior bents as needed to stay within the maximum spacing requirement. Changes in hammer driving systems and / or additional similar hammer driving systems would require additional PDA testing. Additional PDA testing may be warranted based on AASHTO

LFRD Bridge Design Specifications and should be recommended as needed by the geotechnical foundation design engineer and submitted to the NCDOT for review and acceptance. Dual bridges shall not be considered as a single bridge when determining the amount and location of required PDA testing.

- A prequalified PDA consultant shall perform the required PDA testing, provide PDA reports, and develop pile driving criteria. All PDA consultants shall be prequalified a minimum of 30 days prior to performing any pile driving on the project. Geotechnical Contractor Prequalification requirements can be found at the NCDOT Geotechnical Engineering Unit's website at:

  https://connect.ncdot.gov/resources/Geological/Documents/19-05-01_Contractor%20Prequalification%20Requirements.pdf

- PDA reports shall conform to the current NCDOT requirements and format and be signed and sealed by a Professional Engineer registered in the State of North Carolina who meets the experience requirements for the PDA Engineer in responsible charge of the PDA report. In addition, the recommendations within the PDA report shall address the cause of any Integrity Factor (BTA) values less than 100 and clarify the condition of the pile. PDA reports with driving criteria recommendations shall be reviewed and accepted by NCDOT prior to driving any production piles at the end bents / bents the PDA tested pile covers. PDA reports for miscellaneous piles tested to confirm ultimate resistance or acceptable pile integrity shall be reviewed and accepted by NCDOT prior to incorporating the pile into an end bent, bent or footing.

- For drilled piers the following shall apply.

  - Use current NCDOT inspection forms for drilled piers available on the NCDOT Geotechnical Engineering Unit's webpage. Construct and inspect drilled piers in accordance with Section 411 of the 2018 NCDOT *Standard Specifications for Roads and Structures* and the *Drilled Piers* Project Special Provision located on the NCDOT Geotechnical Engineering Unit's website.

  - The Department will inspect drilled piers using the Shaft Inspection Device (SID) for any pours using the wet method of concrete placement and for any drilled pier excavations that cannot be visually inspected or have remained open longer than 24 hours and cannot be dewatered due to unstable soil or rock.

  - The Design-Build Team shall notify Matt Hilderbran, PE by e-mail (mrhilderbran@ncdot.gov) a minimum of five days prior to required SID testing, followed by a confirmation two days prior to required SID testing. The Design-Build Team shall notify Matt Hilderbran of all SID testing cancellations as soon as possible at the e-mail address noted above and at (919) 329-4015.

- Install Crosshole Sonic Logging (CSL) tubes in all drilled piers. CSL test a minimum of 25% of drilled piers at each bridge or one per bent, whichever is greater. If a CSL test identifies any defect in the drilled pier, the Department has the right to request additional CSL testing and / or tomography as needed. The Department will determine which piers will be CSL tested. Submit CSL and tomography test information and results to the Geotechnical Engineering Unit, via the Design-Build Unit, for review and acceptance.

- Drilled pier tip elevations shall not be changed during construction unless the prequalified geotechnical firm which prepares the bridge foundation design redesigns the drilled pier from either an SPT / rock core boring, performed in accordance with ASTM standards at the subject pier location, or observations of the drilled pier excavation. If a drilled pier is designed based on a boring, do not drill a boring inside an open drilled pier excavation. Locate the boring within three pier diameters of the center of the subject pier and drill to a depth of two pier diameters below the revised tip elevation. If a drilled pier is redesigned based upon observations of the drilled pier excavation, the geotechnical engineer of record shall be present during the excavation to determine the actual subsurface conditions.

- The geotechnical grade point shall be defined as the location where the proposed subgrade and natural ground intersect. At all geotechnical grade points, the Design-Build Team shall undercut the existing soils within two feet of the bottom of the proposed subgrade in accordance with the requirements below.

    - The undercut shall extend along the profile to a point where the elevation difference from the bottom of the proposed subgrade to natural ground is greater than two feet, or to 25 feet on each side of the geotechnical grade point, whichever is less.

    - The lateral extent of the undercut shall extend to a point where the elevation difference from the bottom of the proposed subgrade to natural ground is greater than two feet or to one foot outside of the paved shoulder / face of curb of the proposed roadway typical section, whichever is less.

    - The base of the undercut shall parallel the proposed subgrade.

- Send copies of any inspection forms related to foundations, settlement, sound barrier walls, or retaining wall to the NCDOT for review.

HYDRAULICS SCOPE OF WORK (7-12-21)

Project Details

- The Design-Build Team shall employ a private engineering firm to perform hydraulic design for all work required under this contract. The private engineering firm must be prequalified for Tier II hydraulic design work under the Department's normal prequalification procedures prior to the Technical Proposal submittal date.

- The Design-Build Team shall hold a pre-design meeting with the Design-Build Unit and Hydraulics Review Engineer after acceptance of the Preliminary Roadway Plans developed by the Design-Build Team.

- Within the walled roadway sections with outside concrete barrier, the shoulder point shall be defined as the point where the projected paved shoulder elevation and slope intersects the back of the concrete barrier.

Design Freeboard for Modeled Water Surfaces

- Except as allowed otherwise below, the Design-Build Team shall utilize the 100-year water surface elevation design files provided by the Department and provide a minimum 1.5 feet freeboard below the mainline shoulder point at the following locations:

  - South of SR 1536 (Carthage Road) on the west side of I-95
  - North of NC 211 (North Roberts Avenue) on the east and west sides of I-95

- From Station 100+00 -L- to Station 106+00 -L-, on the west side of I-95 only, the minimum mainline design freeboard may be less than 1.5-foot, only if the water surface elevation does not encroach into any permanent mainline travel lane based on the 100-year water surface elevation design files provided by the Department.

- Within the I-95 / NC 72 - NC 711 (Caton Road) interchange limits (Exit 17), on the west side of I-95 only, the minimum mainline design freeboard may be less than 1.5-foot only if the I-95 southbound entrance and exit ramps provide a minimum 1.5-foot freeboard below the shoulder point, based on the 100-year water surface elevation design files provided by the Department.

- In addition to the aforementioned freeboard requirements, the modeled water surface elevations provided by the Department from Hurricanes Matthew and Florence shall not encroach into any permanent mainline travel lane beyond the encroachment that occurs based upon the Department's Preliminary Design.

- Alternative Technical Concepts (ATC) that modify or reduce the 100-year, Hurricane Matthew or Hurricane Florence water surface elevations provided by the Department are not permitted and shall not be evaluated or considered.

Design Freeboard for Box Culverts and Pipes

- For all proposed box culverts and pipes, a minimum 1.5-foot freeboard shall be required below the shoulder point during the design storm.

- The Design-Build Team shall not steepen slopes, reduce easements and / or reduce right of way solely to obtain the aforementioned freeboard requirement.

Storm Drainage System Design

- The Design-Build Team shall design all storm drainage systems using Geopak Drainage, including but not limited to incorporating discharges from allowable routing programs.

- Raised median island cuts will not be allowed.

- Slotted concrete median barrier will not be allowed for permanent installations.

- From Station 438+00 -L- to Station 446+00 -L-, the mainline median storm drainage systems shall provide direct system interconnections between the mainline northbound and southbound lanes to provide relief for overtopping flows at the Meadow Branch and Fivemile Branch crossings. Specifically, at all median storm drain box locations, the Design-Build Team shall provide 1) dual median storm drain boxes, one on each side of the median barrier, that are directly opposite each other and connected with a pipe beneath the median barrier; or 2) oversized drainage boxes beneath the median barrier with grates on both sides of the median barrier. This interconnection may be accomplished with multiple storm drainage systems throughout the aforementioned station range.

- 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.

- From the southern project limits to the southern end of the Lumber River bridge, the Design-Build Team shall install duckbill valves on all new pipe outlets located on the west side of I-95 that have hydraulic connectivity to the east side of I-95. If an existing flap gate is found outside the aforementioned limits, the Design-Build Team shall install duckbill values on any new pipe that conveys some or part of the same flow that was passing through the existing flap gate.

- In accordance with the criteria specified below, the Design-Build Team shall design and construct outlet protection for pipes that pass through a retaining wall face. The outlet protection analysis shall neglect the effects of backwater.

  - 100-year design storm for all cross-pipe outlets, including but not limited to those with system connections, and all system pipe outlets at sags
  - Minimum 50-year design storm for all other pipe outlets

- 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

  - Mainline median storm drainage system structures that provide direct system interconnections between the mainline northbound and southbound lanes.

- Existing and proposed longitudinal pipe (trunkline) shall not be located beneath the proposed roadway travel lanes.

- 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.

Hydraulic Spread

- The hydraulic spread shall not encroach into any operational lane beyond the limits noted below:

  - For roadways with shoulders, including those with expressway gutter and shoulder berm gutter, the hydraulic spread shall not encroach into a permanent travel lane and shall not encroach more than two feet into an operational temporary travel lane.

  - For all other roadways, the hydraulic spread shall not exceed the values specified in Table 10-1 of the current North Carolina Division of Highways *Guidelines for Drainage Studies and Hydraulics Design*.

  - For bridges on alignments with design speeds greater than 45 mph, the hydraulic spread shall not encroach into an operational permanent or temporary through lane on a bridge. 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 or temporary exclusive turn lane.

  - For bridges on alignments with design speeds equal to or less than 45 mph, the hydraulic spread shall not encroach more than four (4) feet into an operational permanent or 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 or temporary exclusive turn lane.

- 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.

- **** Note **** Deleted bullet pertaining to rainfall intensity requirements for the hydraulic spread analysis of temporary travel lanes.

- The Design-Build Team shall analyze spread for all bridges within the project limits and, as necessary, provide mitigation that adheres to the hydraulic spread requirements noted above. If required, the Design-Build Team shall adhere to the bridge drainage system requirements noted below:

  - The Design-Build Team shall design bridge drainage without the use of bridge scuppers (open-grated inlets) or closed / suspended drainage systems. If deck drains are used on the bridge, they shall be vertical pipes at the flow line through the deck with no elbow and shall be consistent with that shown in the current NCDOT Stormwater Best Management Practices Toolbox.

  - The Design-Build Team shall use 4" deck drains adjacent to pedestrian facilities.

  - The Design-Build Team shall provide bridge drainage features that prevent direct discharge 1) into waterways, 2) onto any existing / future greenway, travel lane or paved shoulder or 3) within 25 feet of the centerline of any existing or future railroad track.

  - The maximum allowable deck drain spacing shall be 12-foot on center.

Hydroplaning Analysis

- Excluding areas that the Design-Build Team will be uniformly overlaying the existing pavement structure, the Design-Build Team shall perform a hydroplaning risk assessment and, as necessary, provide mitigation that minimizes hydroplaning risk for all new and existing roadways within the construction limits. (Reference the Roadway and Pavement Management Scopes of Work found elsewhere in this RFP) The Design-Build Team shall include a brief summary of the mainline hydroplaning risk assessment in the Technical Proposal.

- The Design-Build Team shall utilize the following methods to perform the hydroplaning risk assessment:

  - NCDOT Hydroplaning Risk Assessment guidance

  - *FDOT Hydroplaning Risk Analysis Design Guidance,* HP Program, 2014

- The Design-Build Team shall use a 70 mph speed for the mainline hydroplaning analysis, regardless of the design speed or any future posted speeds.

- 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 April 2014.

  - To the maximum extent practicable, stormwater runoff shall be diverted away from surface waters.

  - To the maximum extent practicable, on-site stormwater control measures shall be employed to minimize water quality impacts.

  - Underground detention will not be allowed.

  - Detention will not be allowed in islands, including but not limited to islands approaching or within an interchange.

  - No additional right of way will be acquired solely for stormwater management.

- In accordance with the *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 the associated *NCDOT Compliance Documentation Workflow for Rule 15A NCAC 04B .0109*. Such mitigation measures shall first consider long-term maintenance of the proposed mitigation. Due to Lumber River backwater flooding concerns in the area of this project, it is preferred not to extend the runoff hydrograph. Therefore, flow through treatment stormwater controls and 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.

I-95 Structures at the Lumber River, Meadow Branch and Fivemile Branch

- The proposed bridge(s) on I-95 over the Lumber River shall be a minimum of 500 feet in length and meet or exceed the effective opening provided in the Bridge Survey Report (BSR) provided by the Department. The Lumber River Bridge low cord shall not be lower than the low cord shown in the BSR provided by the Department. The Design-Build Team shall not reduce the span length over the Lumber River and the bents shall not encroach on the main river channel more than that shown in the BSR provided by the Department.

- The proposed reinforced concrete box culvert conveying Meadow Branch under I-95 shall have minimum barrel dimensions of 3 @ 10’ x 11’; and a minimum effective opening of 290 square feet, excluding any area that is buried below the streambed or blocked by sills and / or baffles.

- The proposed reinforced concrete box culvert conveying Fivemile Branch under I-95 shall have minimum barrel dimensions of 3 @ 10’ x 11’; and a minimum effective opening of 290 square feet, excluding any area that is buried below the streambed or blocked by sills and / or baffles.

- The Department will develop and provide a signed and sealed Bridge Survey Report (BSR) and Culvert Survey Report (CSR) that meets FEMA NFIP requirements for the bridge(s) on I-95 over the Lumber River and the box culverts under I-95 at Meadow Branch and Fivemile Branch. If the Design-Build Team’s design or construction methods require a revision to the aforementioned documents, the Design-Build Team shall be fully responsible for 1) developing a new BSR or CSR for the Department’s review and approval; and 2) preparing a new CLOMR or MOA package, as necessary, for the Department’s submittal to the North Carolina Floodplain Mapping Program (NCFMP). All costs associated with developing the new BSR and / or CSR and obtaining NCFMP approval, shall be the responsibility of the Design-Build Team. The Design-Build Team is cautioned that there are several hotels and homes downstream of the I-95 Meadow Branch and Fivemile crossings and changes to the effective opening may result in an increase of water surface on the lowest adjacent grade and / or finished floor elevation. The Department will not honor any requests for additional contract time or compensation for any efforts required to develop new BSRs / CSRs or obtain the revised NCFMP approval. (Reference the Right of Way Scope of Work found elsewhere in this RFP for additional requirements)

- Unless required otherwise elsewhere in this RFP, at a minimum, the Design-Build Team shall provide riprap to the limits shown in the Department's BSR and CSRs, regardless of who develops the BSR and / or CSR (NCDOT or the Design-Build Team). (Reference the Geotechnical Engineering Scope of Work found elsewhere in this RFP)

Bridge Scour Analysis and Design

- The Design-Build Team shall perform a scour analysis of the proposed bridge(s) on I-95 over CSX Railroad that adheres to the following:

  - A HEC-RAS 1-Dimensional (1-D) riverine model shall be used to generate input values for the HEC-18 scour evaluation method.
  - The proposed conditions 500-year flow rate within the 1-D model shall be determined as that which generates a flood elevation of 127.2 feet NAVD 88 at Section 3 of the 1-D model, the cross section commonly associated with the upstream toe of fill. The resultant flow rate shall be used for scour evaluation and countermeasures.
  - A D50 particle size of 0.2 mm shall be used within the HEC-18 method.
  - A downstream boundary condition of Normal Depth S = 0.0001 ft/ft shall be used.
  - The analysis shall not include the proposed City of Lumberton floodgate.
  - The Design-Build Team shall provide scour countermeasures in accordance with HEC-23.

- The Department will provide a scour analysis for the proposed bridge(s) on I-95 over the Lumber River based on the Department's Preliminary Plans. If the Design-Build Team revises the design of the Lumber River bridge(s), the Design-Build Team shall perform a scour analysis using the method described for the proposed bridge(s) on I-95 over CSX Railroad and the 100-year and 500-year water surface elevations provided by the Department for the Department's review and acceptance.

Scour Analysis and Countermeasures at Retaining Walls

- The Design-Build Team shall adhere to the following requirements for the proposed retaining walls located on the east and west sides of I-95 between the bridge(s) on I-95 over the Lumber River and SR 1536 (Carthage Road):

  - The Design-Build Team shall **not** provide scour countermeasures for the section of the retaining wall located on the east side of I-95 within the mainline Station range defined in the Geotechnical Engineering Scope of Work found elsewhere in this RFP.

  - Excluding the section of the retaining wall located on the east side of I-95 within the mainline Station range defined in the Geotechnical Engineering Scope of Work found elsewhere in this RFP, the Design-Build Team shall provide scour countermeasures along the base of retaining walls in accordance with the June 9, 2021 *Lumber River Retaining Wall - Minimum Scour Countermeasure Detail* provided by the Department.

- Excluding the proposed retaining walls located on the east and west sides of I-95 between the bridge(s) on I-95 over the Lumber River and SR 1536 (Carthage Road), the Design-Build Team shall perform scour analyses and provide countermeasures at retaining walls in accordance with the following requirements:

  - ** **NOTE** ** Deleted bullet for the retaining wall located on the west side of I-95 between the bridge(s) on I-95 over the Lumber River and SR 1536 (Carthage Road).

  - The Design-Build Team shall perform a scour analysis and provide appropriate scour countermeasures that eliminate scour for the retaining wall located on the east side of SR 1792 (Khan Drive) where Fivemile Branch parallels SR 1792 (Khan Drive) in accordance with *Guidelines for Drainage Studies and Hydraulics Design, Section 8.6.2 - Scour Analysis* and HEC-23.

  - At all other retaining wall locations, excluding locations where concrete barrier and roadway paved shoulders are provided along the base of retaining walls, the Design-Build Team shall design and install scour countermeasures along the base of retaining walls where flow velocities are greater than 2 feet / second for the 500-year storm event, as noted in the 2-D flow velocity shapefile mesh provided by the Department. At a minimum, scour countermeasures shall include Class II riprap three feet wide, keyed in a minimum of 3.5 feet. The Design-Build Team shall calculate shear stresses within these areas to confirm Class II riprap is sufficient to eliminate potential scour and provide additional scour countermeasures, as necessary, if the minimum countermeasures are not sufficient.

Drainage Structures

Throughout this RFP, the term *drainage structures* shall include box culverts, cross pipes, drainage boxes and storm drainage systems.

- Unless allowed otherwise elsewhere in this RFP, the Design-Build Team shall replace **all** existing pipes within the existing / proposed right of way of the mainline, and all -Y- Lines, service roads, ramps, loops and interchange quadrants with the appropriate pipe type, in accordance with the *Drainage Pipe* Project Special Provision found elsewhere in this RFP. The Design-Build Team shall remove or fill with flowable fill all existing pipes not retained for drainage.

- Unless allowed otherwise elsewhere in this RFP, the Design-Build Team shall remove and replace **all** existing drainage boxes with the appropriately sized drainage box.

- Unless allowed otherwise elsewhere in this RFP, the Design-Build Team shall remove and replace **all** existing box culverts with the appropriately sized reinforced concrete box culvert.

- Unless required by the FEMA Regulated Streams section below, the Design-Build Team will not be required to analyze or replace the existing 3 @ 14’ x 9’ box culvert under NC 211 (North Roberts Avenue) north of the I-95 interchange. At a minimum, the Design-Build Team shall

clean out the existing box culvert and provide any necessary channel improvements required to maintain the effective opening.

- The Design-Build Team shall remove, fill with flowable fill, or fill with a material approved by the Engineer, in writing, the existing concrete box culverts conveying Meadow Branch and Fivemile Branch under I-95.

- The Design-Build Team will not be required to analyze or replace drainage structures within the limits of construction that consist solely of pavement marking obliterations and / or revisions.

- The Design-Build Team shall not install temporary or permanent elliptical pipes.

- 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:

  - 15% from Begin Project to Station 260+00 -L-
  - 20% from Station 260+00 -L- to Station 360+00 -L-
  - 25% from Station 360+00 -L- to End Project

  The Design-Build Team shall not include the effects of storage when computing discharges for hydraulic design and analysis for areas less than 50% impervious. For drainage areas where impervious surfaces are greater than 50%, routing will be allowed. EPA SWMM, USACE HMS, Win TR-20, HydroCAD or equivalent are acceptable programs for routing. A storm drainage duration of 24 hours shall be used in developing the hydrograph.

- Revise the *Guidelines for Drainage Studies and Hydraulic Design* as follows:

  - Table 7-1, Design Frequency

    - Along the mainline, replace the 50-year frequency for Bridges, Culverts and Cross Pipes with a 100-year frequency
    - Along the mainline, replace the 50-year frequency for Storm Drain Systems at Sags (without relief) with a 100-year frequency

  - Table 7-1, Peak Discharge Design Frequency

    - Design frequency for Temporary / Detours, Storm Drain System on Grade shall be ten years.
    - Design frequency for Temporary / Detours, Storm Drain System at Sags (without relief) shall be 25 years.

- Table 7-2, Peak Discharge Method Selection
    - Rational Method is acceptable up to the lower limit of the applicable USGS methods.
    - Delete the NCDOT Hwy. Hydrologic Charts column
- Delete Appendix C - NCDOT Hydrologic Charts
- Delete Appendix J - NCDOT Ditch Stability Charts
- Section 8.5.2.8 Freeboard
    - Delete the second bullet and replace with the following statement:

      All existing bridges to be replaced with new bridges shall adhere to the freeboard requirements for new location bridges.
- 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.

- Excluding the existing 3 @ 14’ x 9’ box culvert under NC 211 (North Roberts Avenue) north of the I-95 interchange, a maximum HW/D = 1.2 shall not be exceeded for all existing and proposed box culverts and pipes (including all extensions) during the design storm.

- Revise the *NCDOT Pipe Material Selection Guide* as follows:
    - Delete Note No. 5 and replace with the following:
        - All cross-pipes on the mainline, including all ramps, loops and interchange quadrants, shall be upsized by a minimum of six inches in diameter above that which would be hydraulically and / or jurisdictionally required. Upsizing shall be in addition to any upsizing required due to burial below the streambed.
        - All cross-pipes on -Y- Lines and service roads that are beneath a fill height that is equal to or greater than fifteen (15) feet, as measured from the top of the pipe to the corresponding road surface above the pipe, shall be upsized by a minimum of six inches in diameter above that which would be hydraulically and / or jurisdictionally required. Upsizing shall be in addition to any upsizing required due to burial below the streambed.

- All storm drainage systems shall maintain a hydraulic grade line that is a minimum of 0.5 feet below the inlet rim elevation or top of junction box; and shall adhere to all other requirements as identified in Chapter 10 of the *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" 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

- For all cross structures requiring a hydraulically effective waterway opening of thirty square feet or more, excluding any area that is buried below the streambed, a reinforced concrete box culvert shall be required. The minimum reinforced concrete box culvert barrel height (inside dimension) shall be six feet, with a minimum six-foot clear opening height above the streambed. The minimum reinforced concrete box culvert barrel width (inside dimension) shall be six feet.

- Cross drainage shall be conveyed with a single drainage structure (pipe or box culvert). More than one line of pipe and / or three box culvert barrels serving the same watershed shall not be allowed.

- All proposed drainage boxes, including but not limited to catch basins, drop inlets and junction boxes, shall have a grate or manhole access.

- All cross pipes installed within walled roadway sections, with a four-foot or taller retaining wall located on one or both sides of the roadway, shall be welded steel pipe.

- Excluding the exemption below, storm drainage systems (including outlet pipes located beneath the retaining wall) installed in walled roadway sections, with a four-foot or taller retaining wall located on one or both sides of the roadway, shall adhere to the following requirements:

  - Outside the Volatile Organic Compound area of potential contamination, 1) polypropylene pipe, with connectors conforming to ASTM D3212-20, shall be used for all storm drainage system pipes in the median and shoulders running parallel to the roadway, and 2) welded steel pipe shall be used for all other pipes.
  - Within the Volatile Organic Compound area of potential contamination, 1) sealed ductile iron pipe shall be used for all storm drainage system pipes in the median and shoulders running parallel to the roadway, and 2) welded steel pipe shall be used for all other pipes.

- Resilient connectors that conform to ASTM C923 shall be used at all pipe connections to drainage structures.
- At all pipe connections to drainage structures, pipes shall extend a minimum of six inches beyond the internal wall of the drainage structure.

- For walled sections of I-95 where a four foot or taller retaining wall is only located on one side of the roadway, storm drainage system pipes and structures located in 1) the median, 2) the unwalled side of I-95, and / or 3) the walled side of I-95 with a retaining wall shorter than four feet are exempt from the walled roadway section requirements noted above.

- ATCs that modify the aforementioned welded steel cross pipes and / storm drainage system requirements in walled roadway sections are not permitted and shall not be evaluated or considered.

- Within all unwalled roadway sections and the exempt walled roadway sections noted above, all storm drainage systems and cross pipes within the Volatile Organic Compound area of potential contamination shall be sealed and consist of ductile iron pipe and / or welded steel pipe. Polypropylene pipe shall not be allowed within the Volatile Organic Compound area of potential contamination. (Reference the GeoEnvironmental Scope of Work found elsewhere in this RFP).

- Within the construction limits 1) south of the US 74 Alt. bridge, and 2) along SR 1791 (Dawn Drive) and SR 1792 (Khan Drive) where the existing curb and gutter may be retained, the Design-Build Team will not be required to replace existing drainage structures that are hydraulically and structurally sufficient. Within the aforementioned limits, the Design-Build Team shall analyze all drainage structures for hydraulic and structural deficiencies that are located within the existing / proposed right of way. Using the hydraulic discharges for the future build-out land use projections, drainage structures that do not adhere to the requirements in Sections 9.5.1.3 and 9.5.2.3 of the *Guidelines for Drainage Studies and Hydraulic Design*, including all addenda, memos and revisions, and / or the freeboard, backwater, 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 1) remove all hydraulically, and hydraulically and structurally deficient box culverts and / or pipes, and 2) replace the aforementioned box culverts and / or pipes with the appropriately sized box culvert and / or pipe, including any upsizing required elsewhere in this scope of work. 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), the Design-Build Team shall 1) remove all hydraulically, and hydraulically and structurally deficient box culverts and / or pipes, and 2) replace the aforementioned box culverts and / or pipes with a box culvert. 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 the proposed replacement structure 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 replacement structures on the plans, and 2) provide a *Box Culverts and Cross Pipes Hydraulic Deficiency Assessment and Proposed Replacement Structure Table* that contains the box culvert and cross pipe attributes noted below for box culverts, and cross pipes 18" in diameter or greater.

- 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 Replacement Structure(s) Details
- HW/D for Build-out Discharges at Existing Structure
- HW/D for Build-out Discharges at the Proposed Structure
- Hydraulic Freeboard at Sag for Build-out Discharges at Existing Structure
- Hydraulic Freeboard at Sag for Build-out Discharges at Proposed Structure
- Comments

- 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-directional cracking
  - Spalling
  - Seepage and infiltration into the pipe
  - Pipe failures, including but not limited to deferential 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 2018 *Standard Specifications for Roads and Structures*, 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 / replacement costs will be paid for as extra work in accordance with Subarticle 104-8(A) of the 2018 NCDOT *Standard Specifications for Roads and Structures*.

Permit Coordination

- The Design-Build Team shall conduct an interagency hydraulic design review meeting and an interagency permit impacts meeting prior to the final submittal of the environmental permit applications. (Reference the *Environmental Permits Scope of Work* found elsewhere in this RFP.) All work resulting from the interagency hydraulic design review meeting and the interagency permit impacts meeting shall be the Design-Build Team's responsibility. A minimum of five weeks prior to the appropriate interagency meeting, the Design-Build Team shall provide 1) hydraulic plans and 2) permit drawings, calculations, and impact sheets for the USACE 404 Permit and the NCDWR Section 401 Certification to the Design-Build Unit. The Design-Build Team shall take minutes of the interagency hydraulic design review meeting and the interagency permit impacts meeting and provide them to the Department within three business days of the aforementioned meetings.

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 an approved CLOMR and MOA. Based on the Department's preliminary design, the Department will provide an approved CLOMR and MOA for Meadow Branch, Fivemile Branch, and Lumber River. For all FEMA regulated streams for which the Department does not provide an approved CLOMR and / or MOA, including but not limited to all waterways that FEMA considers a stream (e.g. Underpass Overland Flow South and North), and / or if the Design-Build Team's design and / or construction method nullify an approved CLOMR and / or MOA provided by the Department, 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 Design-Build Unit, in writing, of all structures that may require purchase due to an increase in the 100-year water surface elevation. The Design-Build Team 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 insurable 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 Design-Build Team shall be responsible for all fees associated with the CLOMR(s) and / or MOA(s).

- The Department's preliminary design does not impact insurable structures within the floodplain(s) due to an increase in the 100-year water surface elevation. If the Design-Build Team demonstrates to the Department's sole satisfaction that the Department's preliminary design impacts insurable structures within the floodplain(s) due to an increase in the 100-year water surface elevation, the Design-Build Team shall notify the Design-Build Unit, in writing, of all structures that may require purchase. 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 ensure that construction and / or removal of all structures in FEMA regulated floodplains adhere 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 Design-Build 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.

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 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 (7-14-21)

GENERAL

A pre-design meeting shall take place between the NCDOT Transportation Systems Management & Operations Unit (TSMOU), the Work Zone Traffic Control Group, the Design-Build Team, the Design-Build Unit, the Division Traffic Engineer, the Regional Traffic Engineer, Statewide Traffic Operations Center (STOC) Engineer, local municipalities (if applicable), and any other pertinent NCDOT personnel. The Department shall 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 and the STOC Engineer throughout the project duration.

The Design-Build Team shall design, furnish, and install new ITS devices within the project limits. Integrate the new DMS and CCTV cameras into the existing computer and network hardware and software at the NCDOT Division 6 Traffic Services Office (TSO) at 558 Gillespie Street, Fayetteville, NC 28301 and the STOC at 1636 Gold Star Drive, Raleigh NC 27607. Major items of work include, but are not limited to, the following:

- Install three (3) new Closed-Circuit Television (CCTV) Cameras
- Install three (3) new Dynamic Message Signs (DMS) on pedestal structures
- Junction boxes (electrical and communications)
- Wood poles
- Electrical service equipment
- Portable Changeable Message Signs (PCMS) and portable CCTV camera assemblies as identified herein

The Design-Build Team shall furnish and install guardrail and / or concrete barrier to protect permanent ITS devices and temporary guardrail or concrete traffic barrier to protect temporary ITS devices, as required.

Determine the new location of each ITS device, obtain the Engineer's approval of the location, install the devices and implement test procedures, then integrate the devices into the existing computer and network hardware and software at the NCDOT Division 6 TSO and the STOC.

Prior to any underground work, locate existing utilities, communications cable, power cable, and adjust work activities to protect these facilities. Immediately cease work and notify the Engineer and the affected owners if damage to existing utilities occurs. Repair damages to existing utilities, communications cable, and / or power cable at no cost to the Department.

Perform all work in accordance with the ITS Project Special Provisions found elsewhere in this RFP, the 2018 NCDOT *Standard Specifications for Roads and Structures,* the 2018 NCDOT *Roadway Standard Drawings,* and the ITS & Signals Generic Project Special Provisions effective on the Technical Proposal submittal date, found at the following website:

https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

PROJECT OPERATION REQUIREMENTS

It is the Department's desire to provide uninterrupted traffic incident management and traveler information operations throughout the life of the project. Thus, the Design-Build Team shall identify the approximate location of the new ITS devices and when they will be installed and operational in their permanent location in the Technical Proposal.

The Design-Build Team shall keep the existing DMSs and CCTV cameras operational until a permanent device or portable replacement device is installed and integrated with the NCDOT Division 6 TSO and the STOC. 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 Division 6 TSO and the STOC shall be provided at no additional cost to the Department. PCMSs and portable CCTV cameras used to replace existing DMSs and CCTV cameras shall be in addition to the PCMSs and portable CCTV cameras required for work zone traffic control and incident management during construction. (Reference the Transportation Management Scope of Work found elsewhere in this RFP)

The Design-Build Team shall remove and deliver all existing DMS and CCTV equipment and all cell modems used for portable ITS devices to the NCDOT Division 6 TSO at 558 Gillespie Street, Fayetteville, NC 28301. Contact Frank West, Jr. at (910) 364-0606 two weeks in advance to coordinate the delivery of the aforementioned equipment.

Intermediate Contract Time #35 for Failure to Restore Communication

The Design-Build Team shall maintain communications with all permanent and temporary ITS devices integrated with the NCDOT Division 6 TSO and STOC. 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 NCDOT Division 6 TSO and STOC within 24 hours.

Liquidated Damages for Intermediate Contract Time #35 for failure to restore communication or provide a replacement device within 24 hours are $500.00 per hour or any portion thereof.

DESIGN REQUIREMENTS

- **Communications**

  Design the field-to-center communication network using Cellular Modem technology. For all equipment not specified herein, provide product specifications for the Department's review and approval prior to incorporation. Furnish and install all new field equipment within the project limits and all central equipment at the NCDOT Division 6 TSO and the STOC.

The Department will furnish all cellular modems used on the project. The Design Build Team shall request the modems through the Engineer at least eight (8) weeks prior to scheduled installation.

Remove existing communications equipment and deliver removed equipment to the NCDOT Division 6 TSO at 558 Gillespie Street, Fayetteville, NC 28301.

- **CCTV Cameras**

The Design-Build Team shall strategically locate and install three (3) new CCTV cameras on new 60-foot wood poles at locations that provide optimum viewing. New CCTV camera installations, including equipment cabinets, shall comply with the requirements of the *Digital CCTV Camera Assembly* and *CCTV Wood Pole* Project Special Provisions found elsewhere in this RFP.

Install one CCTV camera on a wood pole at each of the following locations:

- I-95 at Exit 17
- I-95 at Exit 19
- I-95 at Exit 20 - Replace Existing

Determine the exact location of each CCTV camera, obtain the Engineer's written approval of the locations, and install the cameras. All components required for the CCTV camera installations shall be new. Furnish site surveys, including but not limited to bucket truck or drone surveys, to ensure camera coverage areas are acceptable.

Install new electrical service equipment at all new CCTV camera locations unless power service is not available. Install solar power assembly equipment at any CCTV camera location where power service is not available. Obtain approval from the Engineer for any solar power location. Comply with the National Electrical Code (NEC), the National Electrical Safety Code (NESC), the 2018 NCDOT *Standard Specification for Roads and Structures*, the Project Special Provisions, and all local ordinances. All work involving electrical service shall be coordinated with the appropriate utility company and the Engineer.

- **Dynamic Message Signs (DMS)**

The Design-Build Team shall strategically locate, design, and install three (3) new Type 2C pedestal mount DMSs. DMSs shall not be located behind sound barrier walls. Furnish and install new DMS and associated equipment as defined in the *Dynamic Message Sign* Project Special Provisions found elsewhere in this RFP.

Install one DMS at each of the following locations:

- I-95 northbound at MM 21 - Replace Existing
- I-95 southbound at MM 21 - Replace Existing

- I-95 southbound at MM 16 - Replace Existing

The DMSs installed under this project shall be full color DMS selected from the most current version of the NCDOT ITS & Signals Qualified Products List.

Determine the exact location of the DMSs by coordinating with the Engineer. Obtain the Engineer's written approval of the locations and install the DMSs.

Install new electrical service equipment at all new DMS locations. Comply with the National Electrical Code (NEC), the National Electrical Safety Code (NESC), the 2018 NCDOT *Standard Specifications for Roads and Structures*, the Project Special Provisions, and all local ordinances. All work involving electrical service shall be coordinated with the appropriate utility company and the Engineer.

MATERIALS & CONSTRUCTION

Furnish and install new materials and hardware unless stated otherwise elsewhere in this RFP. Adhere to the requirements of the 2018 NCDOT *Standard Specifications for Roads and Structures* and the 2018 NCDOT *Roadway Standard Drawings* and the ITS & Signals Generic Project Special Provisions version effective on the Technical Proposal submittal date.

➢ **CCTV Cameras**

Install each stand-alone CCTV camera on a 60-foot Class 3 wood pole. Install CCTV equipment in a 336S equipment cabinet mounted on the pole. Install the following minimum equipment in each CCTV equipment cabinet:

- Power equipment including power supplies, circuit breakers, surge protectors, and other related materials or solar power assembly if approved by the Engineer.
- Cellular modem

Perform all work in accordance with the applicable ITS Project Special Provisions found elsewhere in this RFP, and other standards listed elsewhere in this RFP.

➢ **Dynamic Message Signs (DMS)**

Install DMSs on a single metal pedestal type structure with ladders, ladder safety cages, platforms, and walkways leading to the DMS maintenance access door. The bottom of each DMS shall be 25 feet higher than the highest point of the roadway. Install DMS equipment in an approved equipment cabinet mounted on the structure. Install the following minimum equipment in each DMS equipment cabinet:

- DMS controller
- UPS and power equipment including power supplies, circuit breakers, surge protectors, and other related materials.
- Cellular Modem

Provide a fixed ladder, of the same material as the pedestal structure, leading to and ending at the access platform. Access to the ladder shall not be obstructed by the DMS foundation. Equip the ladder with a security cover (ladder guard) and lock to prohibit access by unauthorized persons. Design the rungs on 12-inch center to center typical spacing. Start the first ladder rung no more than 18 inches above the concrete landing pad. Attach the security cover approximately six feet above the concrete landing pad. 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.

Furnish and install a level concrete pad a minimum of four inches deep, 24 inches wide, and 36 inches long to serve as a landing pad for accessing the ladder. Design and install the landing pad directly below the bottom rung of the ladder. Provide pre-formed or cast-in place concrete pads.

Perform all work in accordance with the applicable Project Special Provisions found elsewhere in this RFP, and other standards listed elsewhere in this RFP.

- **Conduit**

Except as required otherwise in the Structures Scope of Work found elsewhere in this RFP, furnish and install one (1) - 2 inch conduit (for power) and all necessary hardware by trenching or directional drilling in accordance with Section 1715 of the 2018 NCDOT *Standard Specifications for Roads and Structures* for installing the power service to the ITS devices. Conduit shall not be placed in the median or under the roadway, except for lateral traverse crossings. (Reference the Electrical Service Section below)

The four-inch conduit duct system attached to the proposed bridges shall be terminated in a communications junction box beyond the approach slab at each end of the bridge. Ensure the junction boxes for bridge conduit termination are installed in an area of flat ground and that they are easily accessible for future conduit installations. The aforementioned communications junction box for the termination of the four-inch duct system north of the bridge(s) on I-95 over the Lumber River shall be located within the I-95 / SR 1536 (Carthage Road) interchange Quadrant B. (Reference the Structures Scope of Work found elsewhere in this RFP)

- **Junction Boxes**

  - **Electrical**

    Furnish and install junction boxes (pull boxes) for electrical services with all necessary hardware in accordance with Sections 1098-5 and 1716 of the 2018 NCDOT *Standard Specifications for Roads and Structures*. Provide standard junction boxes with minimum inside dimensions of 16”(l) x 10”(w) x 10”(d) for electrical service, with a concrete collar / skirt of six-inch to eight-inch depth, 12 inches wide all around, and flush with the top

surface. Install electrical junction boxes at maximum intervals of three hundred (300) feet or at locations where underground splicing is necessary.

Provide junction box covers with standard "Electric" logo, pull slots and stainless-steel pins.

- **Communications**

For conduit attached to bridges, furnish and install junction boxes (pull boxes) with all necessary hardware in accordance with Sections 1098-5 and 1716 of the 2018 NCDOT *Standard Specifications for Roads and Structures*. Provide H-20 load rated junction boxes with minimum inside dimensions of 36"(l) x 24"(w) x 24"(d), "mouse holes" to accommodate horizontal conduit entrances into the junction box for future fiber installations, and a concrete collar / skirt of six-inch to eight-inch depth, 12 inches wide all around, and flush with the top surface.

Provide Tier 22 junction box covers with standard "NCDOT Fiber Optic" logo, pull slots and stainless-steel pins.

- **Wood Poles**

Furnish and install wood poles, with all necessary grounding systems and hardware necessary in accordance with Section 1720 of the 2018 NCDOT *Standard Specifications for Roads and Structures*. Provide wood poles sized as necessary for the intended application.

- Use 60-foot CCTV Class 3 wood poles as defined in the *CCTV Wood Pole* Project Special Provision found elsewhere in this RFP.

- Use 40-foot Class 4 wood poles for approved applications.

- Use 6" x 6" x 8' treated wood posts for underground electrical service structures.

Furnish and install related items of work including but not limited to risers with weatherhead or heat shrink tubing and all necessary hardware in accordance with Section 1720 of the 2018 NCDOT *Standard Specifications for Roads and Structures*.

- **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. 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 in accordance with Section 1700 of the 2018 NCDOT *Standard Specifications for Roads and Structures*. (Reference the Utilities Coordination Scope of Work found elsewhere in the RFP for additional coordination / approval requirements and payment responsibilities)

OTHER CODES AND STANDARDS

All ITS materials shall conform to the latest version of the applicable standards of the National Electrical Code (NEC), National Electric Manufacturer's Association (NEMA), the Underwriters' Laboratories, Inc. (UL), the Electronic Industries Association (EIA), the International Municipal Signal Association (IMSA), and the National Electrical Safety Code (NESC). All materials and workmanship must conform to the requirements of the NESC, standards of the American Society for Testing and Materials (ASTM); American National Standards Institute (ANSI). Comply with all federal laws, state laws, and city codes in accordance with the 2018 NCDOT *Standard Specifications for Roads and Structures*.

SUBMITTALS

Submit a set of 60% preliminary plans, 90% unsealed set of project plans, including specifications for materials, catalog cuts, and installation and testing requirements for review. Upon acceptance by the Department, provide a 100% set of sealed plans and specifications to the Department. No construction of the ITS devices shall begin until the Department has accepted the 100% sealed plans and specifications.

QUALIFIED PRODUCTS LIST

Submit a listing of items on the NCDOT 2018 Qualified Products List (QPL) to receive approval for use on the project. Catalog cuts will not be required for items on the QPL. The QPL website is:

https://connect.ncdot.gov/resources/safety/Pages/default.aspx

ADDITIONAL REQUIREMENTS

For all ITS devices and components within the entire project limits (I-6064A, B, C and I-5879), 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 scope, including but not limited to, ITS devices, ITS conduit system, and all related ITS components, from the beginning of construction until the final acceptance of the project by the NCDOT. After acceptance of the project, the Design-Build Team shall be responsible for repairing the system due to faulty materials or workmanship in accordance with the *Twelve Month Guarantee* Project Special Provision found elsewhere in this RFP, or longer if the Design-Build extends the aforementioned warranty period.

- **Plan of Record Documentation**

  Prepare and submit to the Department Plan of Record (POR) documentation that depicts the conduit and ITS device locations. Submit final POR documentation in electronic and hard

copy format for Department approval. Provide electronic plans in MicroStation (latest release in use by the Department). Submit hard copy documentation on 22-inch x 34-inch plan sheets. POR documentation shall include the final location and depth of conduits, wiring external to the cabinets, locations of splice enclosures, junction box locations, and Single Mode Fiber Optics (SMFO) cable terminations. Include in the POR documentation real world coordinates for all ITS devices, splice enclosures, junction boxes, and equipment cabinets installed or utilized under this project. Provide the coordinates in feet units using the North Carolina State Plane coordinate system (1983 North American Datum also known as NAD '83). Furnish coordinates that do not deviate more than 1.7 feet in the horizontal plane and 3.3 feet in the vertical plane. Global positioning system (GPS) equipment able to obtain the coordinate data within these tolerances may be used.

- **Integration**

Upon completion of the ITS device installations, integrate the new devices with the NCDOT Division 6 TSO - Transportation Management System and the STOC. Ensure all existing ITS devices along the project corridor remain integrated with the NCDOT Division 6 TSO - Transportation Management System and the STOC.

Modify, as necessary, the existing central hardware and software modules including but not limited to databases, to provide operators access to new devices through the operators' Graphical User Interface. Coordinate with and obtain the Engineer's approval prior to starting any work in the NCDOT Division 6 TSO - Transportation Management System or the STOC, or modifying any existing hardware or software.

- **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.

LIGHTING SCOPE OF WORK (6-9-21)

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 2018 NCDOT *Standard Specifications for Roads and Structures*, 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 roadway lighting 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 1) required elsewhere in this RFP, 2) incorporated at the Department's discretion and / or 3) 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 Plans, results in the removal and / or reduction of lighting equipment from the Preliminary Lighting Plans provided by the Department, all construction 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 thirty business 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 Provision found elsewhere in this RFP for additional requirements.

CARTHAGE ROAD INTERCHANGE LIGHTING

In addition to the roadway lighting shown on the Department's Final Lighting Plans, the Design-Build Team shall provide and install foundations for 1) decorative 'teardrop' lighting along Carthage Road and the I-95 interchange ramps, and 2) decorative 'post top' lighting along the outer rails of the bridge on Carthage Road. Foundations along the ramps may be installed in the turf shoulder or may be integral to the moment slab on top of the retaining wall. For foundations installed in the turf shoulder, the Design-Build Team shall use the R1 or R2 foundation design

shown in Roadway Standard Drawing No. 1405.01, and as modified in the Department's Final Lighting Plans. The Design-Build Team shall be responsible for the design and installation of all other foundations, pilasters for foundations installed on the bridge barrier rail, and outriggers / pilasters installed on the moment slab barrier rail. Reference the Department's Final Lighting Plans for anchor bolt requirements for all decorative lighting foundations. The City of Lumberton will provide and install all decorative lighting poles after the foundations have been installed.

FAA Coordination and Approval

The roadway lighting to be constructed within the glide path for aircraft approaching Runway 13 at the Lumberton Regional Airport shall require FAA approval prior to construction. The Department has obtained an approved *FAA 7460-1 Notice of Proposed Construction or Alternation* (FAA 7460-1) to construct the roadway lighting based upon the Department's Preliminary Roadway Plans and Lighting Plans. The aforementioned approved FAA 7460-1 is valid until November 2022 and has an 18-month extension option.

If the Design-Build Team 1) does not begin construction of the roadway lighting foundations within the runway approach within the initial 18-month valid period or the 18-month extension (this shall apply to the original FAA 7460-1, as well as any additional FAA 7460-1 that is required) or 2) raises the I-95 vertical profile within the runway approach above the Department's preliminary design, the Department will be required to submit a subsequent FAA 7460-1 for approval. The Design-Build Team shall assume it can take up to six months for the Department to obtain approval of a subsequent FAA 7460-1. No requests for additional contract time or compensation will be allowed if approval of a subsequent FAA 7460-1 is obtained within this six-month period. The Department will not honor any request for additional contract time or compensation for any efforts required in order to obtain approval of subsequent FAA 7460-1, including but not limited to public involvement, additional design effort, additional construction effort, and / or additional environmental agency coordination and approvals. The Department will not honor any requests for additional contract time or compensation, including idle equipment or mobilization or demobilization costs, for the Design-Build Team mobilizing personnel, materials (or ordering materials), or equipment prior to the Department obtaining approval of a subsequent FAA 7460-1. The Department will only consider requests for contract time extensions for obtaining approval of a subsequent FAA 7460-1 if the six-month period is exceeded due solely to the FAA's review time. (Additional contract time extensions will not be granted if approval of subsequent FAA 7460-1 is not obtained due to the Design-Build Team's design modifications.) If time were granted, it would only be for that time exceeding the six-month period. This six-month period is considered to begin on the date a valid approved FAA 7460-1, including the 18-month extension, expires, or the date the Department submits a subsequent FAA 7460-1 for approval that is based on the Design-Build Team's RFC Roadway Plans and the Department's associated Final Lighting Plans, as appropriate.

No erection of roadway lighting poles shall occur within the glide path for Runway 13 of the Lumberton Regional Airport without a valid approved FAA 7460-1.

EXISTING LIGHTING

Along I-95, between Exit 17 to north of Exit 22, interchange and continuous lighting exists. This lighting shall be left in place and operational until it becomes a conflict with construction. The

Design-Build Team shall remove and dispose of existing lighting system components at the locations shown on the Final Lighting Plans provided by the Department. (Reference the *Lighting* Project Special Provision found elsewhere in this RFP for additional details)

MAINTENANCE

Throughout construction, the Design-Build Team shall assume responsibility for routine maintenance of the newly installed lighting system(s) and any relocated lighting components in accordance with Division 14 of the 2018 NCDOT *Standard Specifications for Roads and Structures*, 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 operational at project acceptance.

PAVEMENT MANAGEMENT SCOPE OF WORK (7-14-21)

I-95 REQUIREMENTS

The pavement design for the I-95 travel lanes, the I-95 median paved shoulders and the I-95 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-95 Travel Lane, Median Shoulder and Outside Shoulder Pavement Design (new construction and widening locations)

The pavement design for the I-95 travel lanes, I-95 median paved shoulder and I-95 outside paved shoulder shall consist of the following:

3.0” S9.5D
4.0” I19.0C
11.5” B25.0C

ALTERNATE 2 - ASPHALT PAVEMENT (AGGREGATE BASE COURSE)

I-95 Travel Lane, Median Shoulder and Outside Shoulder Pavement Design (new construction and widening locations)

The pavement design for the I-95 travel lanes, I-95 median paved shoulder and I-95 outside paved shoulder shall consist of the following:

3.0” S9.5D
4.0” I19.0C
7.0” B25.0C
10.0” ABC

ALTERNATE 3 - ASPHALT PAVEMENT (CEMENT TREATED AGGREGATE BASE COURSE)

I-95 Travel Lane, Median Shoulder and Outside Shoulder Pavement Design (new construction and widening locations)

The pavement design for the I-95 travel lanes, I-95 median paved shoulder and I-95 outside paved shoulder shall consist of the following:

3.0” S9.5D
4.0” I19.0C
5.5” B25C
8.0” CTBC

ALTERNATE 4 - CONCRETE PAVEMENT (ASPHALT SHOULDERS)

I-95 Travel Lane Pavement Design (new construction and reconstruction locations)

The pavement design for the mainline travel lanes shall consist of the following:

13.5” doweled jointed concrete
Nonwoven Geotextile Drainage Interlayer *
1.25” S9.5B
6.0” ABC

* The Nonwoven Geotextile Drainage Layer shall be in accordance with the *Nonwoven Geotextile Interlayer* Project Special Provision found elsewhere in this RFP. The Nonwoven Geotextile Drainage Interlayer and the S9.5B layer shall extend to the shoulder drains. In areas where shoulder drains are not present, the Nonwoven Geotextile Drainage Layer shall not be provided along the direction of travel (e.g. the elevated sections with MSE retaining walls).

For each direction of travel, the outside travel lane concrete shall be increased by 1.0-foot to a width of 13 feet while maintaining a 12-foot striped lane.

The transverse joints shall be uniformly spaced 15 feet apart.

I-95 Median Shoulder and Outside Shoulder Pavement Design (new construction and reconstruction locations)

The pavement design for the mainline median paved shoulder and the mainline outside paved shoulder shall consist of the following:

3.0” S9.5C
4.0” I19.0C
6.5” B25.0C
Variable Depth ABC (minimum 6.0” thickness)

ALTERNATE 5 - CONCRETE PAVEMENT (ROLLER COMPACTED CONCRETE SHOULDERS)

I-95 Travel Lane Pavement Design (new construction and reconstruction locations)

The pavement design for the mainline travel lanes shall consist of the following:

13.5” doweled jointed concrete
Nonwoven Geotextile Drainage Interlayer *
1.25” S9.5B
6.0” ABC

* The Nonwoven Geotextile Drainage Layer shall be in accordance with the *Nonwoven Geotextile Interlayer* Project Special Provision found elsewhere in this RFP. The Nonwoven Geotextile Drainage Interlayer and the S9.5B layer shall extend to the shoulder drains. In areas where shoulder drains are not present, the Nonwoven Geotextile Drainage Layer shall not be provided along the direction of travel (e.g. the elevated sections with MSE retaining walls).

For each direction of travel, the outside travel lane concrete shall be increased by 1.0-foot to a width of 13 feet while maintaining a 12-foot striped lane.

The transverse joints shall be uniformly spaced 15 feet apart.

I-95 Median Shoulder and Outside Shoulder Pavement Design (new construction and reconstruction locations)

The pavement design for the mainline median paved shoulder and the mainline outside paved shoulder shall consist of the following:

8.0” Roller-Compacted Concrete without dowels
Variable Depth ABC (minimum 6.0” thickness)

Median and outside shoulder joints shall match the adjacent travel lane joint spacing and location. The Design-Build Team shall utilize personnel and / or a subcontractor that 1) has a minimum of five years of experience in designing and placing RCC and 2) has constructed a minimum of 100,000 SY of RCC pavement with quality results and smooth texture appearance. The Design-Build Team shall identify the personnel and / or subcontractor that will design and construct the RCC pavement, and their associated qualifications, in the Technical Proposal, providing examples and quality results of their previous RCC pavement construction. In addition, an RCC industry representative, with specific expertise in RCC highway construction, shall be on site during the placement operations and shall attest to the quality of the product and its smoothness. The Design-Build Team shall design and construct the RCC pavement in accordance with the *Roller Compacted Concrete* Project Special Provision found elsewhere in this RFP.

I-95 Shoulder Reconstruction

At a minimum, the Design-Build Team shall remove and dispose of / recycle the existing I-95 paved shoulders within the limits noted below:

- I-95 southbound median and outside paved shoulders from the southern project limits to Station 135+00 -L-
- I-95 southbound outside paved shoulder from Station 135+00 -L- to Station 260+00 -L-

Within the aforementioned limits, the Design-Build Team shall remove and dispose of / recycle the I-95 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-95 Travel Lane and Shoulder Reconstruction

In accordance with the requirements below, additional I-95 travel lane and shoulder reconstruction may be allowed / required solely due to the Design-Build Team's proposed grade and / or pavement design chosen:

- In sections where the I-95 proposed crown point is raised less than the thickness of the mainline pavement design chosen above the existing crown point, the Design-Build Team may elect to reconstruct the I-95 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-95 pavement design chosen, as defined above. If the Design-Build Team does not elect to reconstruct the I-95 pavement structure within these sections, the Design-Build Team shall resurface the existing I-95 existing pavement structures as required elsewhere in this RFP, including but not limited to providing all required pavement wedging.

- In accordance with Section 250 of the 2018 *Standard Specifications for Roads and Structures*, the Design-Build Team shall remove and dispose of / recycle the existing I-95 pavement structures or break up the existing I-95 pavement structures in sections where the I-95 proposed crown point is raised the thickness of the mainline pavement design chosen, or more, above the existing crown point. In areas where the Design-Build Team removes and disposes of / recycles the existing I-95 pavement structures, the Design-Build Team shall remove the 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-95 pavement design chosen, as defined above.

- In accordance with Section 250 of the 2018 *Standard Specifications for Roads and Structures*, the Design-Build Team shall remove and dispose of / recycle the existing I-95 pavement structures or break up the existing I-95 pavement structures **throughout the project limits**, if the Design-Build Team elects to utilize the concrete pavement design defined above. In areas where the Design-Build Team removes and disposes of / recycles the existing I-95 pavement structures, the Design-Build Team shall remove the 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. Throughout the project limits, the Design-Build Team shall install the I-95 concrete pavement design, as defined above. The most northern and southern sections within the I-95 project limits that consist solely of pavement marking

obliterations and / or revisions are excluded from the requirement to remove and dispose of / recycle or break up the I-95 pavement structure.

I-95 Pavement Resurfacing / Uniform Overlay

Excluding the I-95 sections below, the Design-Build Team shall uniformly mill the I-95 pavement that remains in place (travel lanes and shoulders) to a depth of 2.0" and resurface with a minimum 3.0" of S9.5D and use the alternate pavement design chosen, as defined above, for all widening: (Reference the Roadway Scope of Work found elsewhere in this RFP)

- Sections of I-95 where the existing pavement structure is removed or broken-up and reconstructed as described in **Potential I-95 Travel Lane & Shoulder Reconstruction** section above.
- Sections of I-95 where the existing surface course consists of S9.5D* and due to an increase in crown point elevation, the entire existing pavement to remain in place will be resurfaced with at least 2.5" of I19.0C and 3.0" of S9.5D.
- I-95 construction limits that consist solely of pavement marking obliterations and / or revisions and the existing surface course consists of S9.5D*. In these areas the Design-Build Team shall uniformly overlay the existing pavement (travel lanes and shoulders) with a minimum pavement depth that equals half the full thickness of the surface course of the pavement design chosen, as defined above.

* Note: The limits of the existing S9.5D surface course are from approximately Station 243+00 -L- to the northern project limits.

I-95 Full-Depth Pavement Repair

In accordance with Section 654 of the 2018 *Standard Specifications for Roads and Structures*, the Design-Build Team shall repair (remove, dispose of / recycle and reconstruct) the I-95 pavement structure at locations identified by the Engineer that are outside the limits defined in the **I-95 Travel Lane and Shoulder 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-95 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-95 full-depth pavement repair, the Design-Build Team shall install the Alternate 1 pavement design, as defined above. The I-95 full-depth pavement repairs that are 1) outside the limits defined in the **I-95 Travel Lane and Shoulder 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 2018 *Standard Specifications for Roads and Structures* at the unit price of $200.00 per square yard. All work tasks required for the I-95 full-depth pavement repair, including but not limited to traffic control and portable lighting, shall be considered inclusive in the aforementioned unit price.

OTHER REQUIREMENTS

Other pavement designs for this project are listed in **Table 1** below:

Lines on I-6064 / I-5879	Surface	Intermediate	Base	ABC	Stab
-Y2- (NC 72 / NC 711 - Caton Road) -Y5- (NC 211 - North Roberts Avenue)	3.0" S9.5C	4.0" I19.0C	-	8.0"	No
-Y4- (SR 1536 - Carthage Road) -SR1- (SR 1586 - Lackey Street) -SR2- (SR 1590 - Capuano Street) -SR3- (SR 1590 - N. Rowland Avenue) -SR4- (SR 1791 - Dawn Drive) -SR5- (SR 1792 - Khan Drive)	3.0" S9.5B	4.0" I19.0C	-	6.0"	No
SR 2499 (West 5th Street) ***	3.0" S9.5B	2.5" I19.0C	-	6.0"	No
SR 1591 (Crystal Road) -SR6- (SR 1589 - Kenric Drive) (SR 1587 - Hackett Street) -SR7- (SR 1588 - Cox Road) -SR8- (SR 1592 - Hester Drive) -SR9- (SR 1593 - Jonathan Drive / Cottonwood Street) VFW Road Service road located right of Station 315+00 -L-	3.0" S9.5B	-	-	8.0" *	No
-Y1- Ramps (Exit 13)	3.0" S9.5D	4.0" I19.0C	7.0" B25.0C	-	No
-Y2- Ramps (Exit 17)	3.0" S9.5C	4.0" I19.0C	-	8.0"	No
-Y4- Ramps (Exit 19)	3.0" S9.5C	4.0" I19.0C	3.0" B25.0C	8.0"	No
-Y5- Ramps (Exit 20)	3.0" S9.5C	3.5" I19.0C	-	8.0"	No
-Y4- Roundabouts **	3.0" S9.5B	4.0" I19.0C	-	6.0"	No

* Use prime coat at normal application rate.

** Roundabouts shall include a 7.0" jointed concrete truck apron that includes a 4 x 4 W3.5 x W3.5 wire mesh reinforcement.

*** Within the construction limits required to tie to existing near the intersection with -Y2-, use the -Y2- pavement design.

For the -Y- Line, ramp, loop, service road and roundabout pavement designs noted in **Table 1** above, the Design-Build Team may substitute an asphalt base course layer for the ABC layer. If such an alternative is proposed, the Design-Build Team shall use B25.0C asphalt base course.

The additional thickness of the asphalt base course, used as a substitute for the ABC layer, shall be equal to half of the proposed ABC thickness specified for the roadway unless placed directly on unstabilized subgrade. If placed directly on unstabilized subgrade, the asphalt base course shall be a minimum of 4.0" thick or half of the proposed ABC thickness specified for the roadway, whichever is greater.

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 (travel lanes and shoulders) of all -Y- Lines, ramps, loops and service roads with a minimum depth that equals the full thickness of the surface course provided in **Table 1** above. (Reference the Roadway Scope of Work found elsewhere in this RFP)

Within 1) the -SR3- (SR 1590 - North Rowland Avenue) construction limits, 2) the SR 2499 (West 5th Street) construction limits, excluding the construction limits required to tie to existing near the intersection with -Y2-, and 3) the -SR6- (SR 1589 - Kenric Drive) construction limits, the Design-Build Team shall resurface 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.

Within the -SR2- (SR 1590 - Capuano Street) construction limits, the Design Build Team shall uniformly mill the existing pavement (travel lanes and shoulders) to a depth of 1.5" and resurface with a minimum 3.0" of S9.5B.

Within the -Y2- (NC 72 / NC 711 - Caton Road) and the SR 2499 (West 5th Street) construction limits required to tie to existing near the intersection with -Y2-, the Design Build Team shall uniformly mill the existing pavement (travel lanes and shoulders) to a depth of 1.5" and resurface with a minimum 1.5" of S9.5C.

Within the -Y4- (SR 1536 - Carthage Road) construction limits, the Design Build Team shall uniformly mill the existing pavement (travel lanes and shoulders) to a depth of 1.5" and resurface with a minimum 1.5" of S9.5B.

From the -Y5- (NC 211 - North Roberts Avenue) western construction limits to Station 22+00 -Y5-, the Design Build Team may uniformly mill the existing pavement (travel

lane and shoulders) to a depth of 1.5" and resurface with a minimum 1.5" S9.5C. Should the Design-Build Team elect to mill the section noted above, the Design-Build Team shall begin the transition from a minimum 1.5" resurfacing depth to the deeper minimum resurfacing depth required elsewhere in this RFP at Station 22+00 -Y5-. (Reference the Roadway Scope of Work found elsewhere in this RFP)

Where the existing curb and gutter may be retained within the -SR4- (SR 1791 - Dawn Drive) construction limits (from Station 10+00 -SR4- to +/- Station 17+00 -SR4-), the Design-Build Team shall uniformly mill the existing pavement to a depth of 1.5" and uniformly overlay with 1.5" S9.5B. (Reference the Roadway Scope of Work found elsewhere in this RFP)

Where the existing curb and gutter may be retained within the -SR5- (SR 1792 - Khan Drive) construction limits (from Station 10+00 -SR5- to +/- Station 20+00 -SR5-), the Design-Build Team shall uniformly mill the existing pavement to a depth of 1.5" and uniformly overlay with 1.5" S9.5B. The Design-Build Team shall begin the transition from a uniform overlay to the minimum resurfacing depth required elsewhere in this RFP at +/- Station 20+00 -SR5-. (Reference the Roadway Scope of Work found elsewhere in this RFP)

Within 1) the -SR4- (SR 1791 - Dawn Drive) construction limits between +/- Station 17+00 and 62+00, 2) the -SR8- (SR 1592 - Hester Drive) construction limits between Station 10+00 and 19+00, and 3) the -SR9- (SR 1593 - Jonathan Drive / Cottonwood Street) construction limits, the Design-Build Team shall remove and dispose of / recycle the existing travel lane and shoulder pavement structures, in their entirety, to the top of the subgrade, including but not limited to the removal and disposal of existing aggregate base course; and replace with the pavement design in **Table 1** above.

From the SR 1588 (Cox Road) realignment to Crystal Road, the Design-Build Team shall remove and dispose of / recycle the existing VFW Road travel lane 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. (Reference the Roadway Scope of Work found elsewhere in this RFP)

Within the -Y1- Ramp A and D construction limits, the Design Build Team shall uniformly mill the existing pavement to remain in place (travel lanes and shoulders) to a depth of 2.0" and resurface with a minimum of 2.0" of S9.5D.

Within the -Y1- Ramp D construction limits, the Design-Build Team shall remove and dispose of / recycle the existing 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; and replace with the -Y1- ramp pavement design in **Table 1** above.

Excluding multi-use paths located on berms adjacent to curb and gutter, the pavement design for all multi-use paths shall consist of 2.0 inches S9.5B, 6.0 inches ABC, and a Soil Stabilization Geotextile Fabric or 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)

The pavement design for the West Lumberton Floodgate maintenance roads shall consist of 8" ABC.

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 shall uniformly overlay areas of I-95, including all ramps and loops, with 1.5" S9.5C. 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 Design-Build Unit for review and acceptance or rejection.

Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall pave from 1) the edge of all paved shoulders to the face of all single face barrier / guardrail, including but not limited to areas that consist solely of guardrail replacement, 2) from the edge of all paved shoulders to the edge of all expressway / shoulder berm gutter and 3) from the edge of all paved shoulders to the face of proposed retaining walls and sound barrier walls located on the outside

shoulder with 6" ABC (or 4" B25.0C), a split seal and at least two lifts of surface course. If 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-95, 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.

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.

The rate of application and the maximum and minimum thickness per application and layer shall be in accordance with the NCDOT Roadway Design Manual and 2020 Asphalt QMS manual.

Excluding the elevated sections of I-95 constructed with MSE walls, the Design-Build Team shall design and construct shoulder drains as follows:

- 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 mainline concrete pavement alternate.

- 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, and all outlets shall be located at drainage structures. Shoulder drains shall be placed to drain the entire pavement structure. The shoulder drain design and outlet locations shall be submitted to the Design-Build 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-6064A, B, & C / I-5879 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)

- ATCs that use Cement Stabilization in lieu of ABC are not permitted and shall not be evaluated or considered.

- The permanent mainline travel lane pavement design in the ATC shall adhere to the design parameters noted below.

    - Full Depth Asphalt

        - Minimum 18.5" thickness

    - Asphalt on ABC

        - Minimum 14.0" asphalt thickness

        - Minimum 10.0" ABC thickness

    - Asphalt on CTBC

        - Minimum 12.5" 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.

    - Asphalt resurfacing on the existing pavement structure

        - 2.0" of milling must be performed in all areas where the existing pavement will be retained and the existing surface course consists of S12.5D (the southern project limits to approximately Station 243+00 -L-).

        - Unless noted otherwise elsewhere in this RFP, the existing pavement to remain in place shall be resurfaced with a minimum 3.0" asphalt thickness that consists of at least 1.5" S9.5D.

- In areas that contain existing S9.5D surface course, the total thickness of S9.5D (existing plus resurfacing) shall not exceed 3.5" unless separated by a layer of I19.0C.

➢ Full Depth Concrete Travel Lanes

- Minimum 13.5" concrete thickness
- Uniform 15-foot joint spacing
- Base shall be non-erodible and shall include a permeable drainage layer and a separator layer below the drainage layer (must drain the pavement structure while protecting the subgrade from moisture)

- 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 (1-4-21)

General

The Design-Build Team shall prepare Pavement Marking Plans in accordance with the information on the following websites, the version of the following references effective on the Technical Proposal submittal date, and the contract requirements contained herein:

- The Signing and Delineation Unit website

  https://connect.ncdot.gov/resources/safety/Pages/Signing-and-Delineation.aspx

- Signing and Delineation Unit Procedures Manual

  https://connect.ncdot.gov/resources/safety/Pages/Signing-and-Delineation.aspx

- Traffic Engineering Practices, Policies, and Legal Authority (TEPPL)

  https://connect.ncdot.gov/resources/safety/Teppl/Pages/Teppl-Select-Topics.aspx

- *Manual on Uniform Traffic Control Devices* (MUTCD)

  http://mutcd.fhwa.dot.gov/kno_2009r1r2.htm

- *Guidelines for Preparation of Signing and Final Pavement Marking Plans for Design-Build Projects*

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

- *Design-Build Submittal Guidelines*

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

- NCDOT *Standard Specifications for Roads and Structures*

- NCDOT *Roadway Standard Drawings*

In case of conflicting design parameters, and / or ranges, in the various resources, the proposed design shall adhere to the most conservative values, unless noted otherwise elsewhere in this RFP.

Final Pavement Marking Plan Requirements

The Design-Build Team shall select a Private Engineering Firm (PEF) that has experience designing and sealing Pavement Marking Plans for NCDOT on comparable projects. The

Design-Build Team shall 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 *Manual for Uniform Traffic Control Devices* (MUTCD).

If sidewalk is constructed, the Design-Build Team shall show and station all curb ramps in the Pavement Marking Plans for signalized intersections, non-signalized intersections and points of pedestrian crossings. Curb ramps shall be constructed per current ADA standards and with guidance from the 2018 NCDOT Roadway Standard Drawings. If the roadway geometry does not allow for the use of standard details, contact the Contract Standards and Development Unit for alternate approved curb ramp designs.

Final Pavement Marking Project Limits

The Design-Build Team shall install all pavement markings and markers located within and outside the project limits, resulting from the project construction. The Final Pavement Marking Plans shall address all required modifications to existing pavement markings and markers located outside the project limits to ensure appropriate tie-ins. At a minimum, the Design-Build Team shall modify existing pavement markings and markers located outside the project limits to ensure that all lanes in each direction are open to traffic.

Pavement Markings, Markers and Delineation

The Design-Build Team shall submit a complete set of Final Pavement Marking Plans that includes the -L- Line, and all -Y- Lines, ramps / loops, and service roads for review and acceptance. The Design-Build Team shall not place any final pavement markings or markers until the aforementioned Final Pavement Marking Plans are reviewed and accepted by the Department.

The Design-Build Team shall 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 2018 NCDOT *Standard Specifications for Roads and Structures*, and in accordance with the manufacturer's procedures and specifications.

In accordance with the NCDOT Roadway Standard Drawing No. 1205.08, Sheet 1 of 8, and guidance found on the Signing and Delineation Unit's webpage, 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 pavement markings and pavement markers on the final surface as follows:

Road	Marking	Marker
Asphalt Surfaces	Thermoplastic with Standard Glass Beads	**Roadways** • Non-cast iron snowplowable markers **Bridge Decks** • Raised markers
Concrete Surfaces	Cold Applied Plastic Tape, Type 2	

On concrete surfaces, the Design-Build Team shall install contrast cold applied plastic Type 2 for skip lines and mini-skips.

On concrete surfaces, the Design-Build Team shall install Heated-in-Place Thermoplastic or Cold Applied Plastic (Type 2 or 3) markings for stop bars, symbols, characters, crosswalks, and diagonals.

On asphalt surfaces, the Design-Build Team shall install Heated-in-Place Thermoplastic or Extruded Thermoplastic markings for stop bars, symbols, characters, crosswalks, and diagonals.

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 2018 NCDOT *Standard Specifications for Road and Structures*, the Design-Build Team shall remove curing compound from all other concrete surfaces prior to placing final pavement marking materials.

The Design-Build Team shall only remove pavement markings from asphalt surfaces by grinding.

The Design-Build Team shall only remove pavement markings from concrete surfaces by hydroblasting.

The Design-Build Team shall tie proposed pavement marking lines to existing pavement marking lines.

The Design-Build Team shall replace any pavement markings that have been damaged by the end of each day's operation.

PUBLIC INVOLVEMENT AND INFORMATION SCOPE OF WORK (10-13-20)

General

NCDOT will take the lead role on this project and be responsible for a portion of the public involvement and information efforts, through the Department's Public Involvement Group and Communications Office, respectively. At a minimum, the Design-Build Team shall designate a contact for public involvement and information inquiries / coordination.

The Design-Build Team shall hold an initial project coordination meeting with NCDOT at least six weeks prior to the start of construction to discuss project impacts to the public. This information will be used by the Department to create a Public Involvement and Information Plan.

The Design-Build Team shall prepare all required corridor and design public hearing maps in accordance with the Public Involvement Map Information Guide and the Corridor Public Hearing Map Checklist and / or Design Public Hearing Map Checklist located at the following website:

https://connect.ncdot.gov/projects/Roadway/Pages/Guidelines--Standards.aspx

The Department will develop, with assistance from the Design-Build Team, the specific list of target audiences for this project. The following groups are identified as typical target audiences to receive informational materials:

- Governmental agencies
- Municipalities directly affected by construction
- Transportation services
- Emergency services
- Neighborhood groups and private homes
- Industry and businesses
- Chamber of Commerce
- Individual schools affected by the project
- County / City school systems
- Any other organization as deemed necessary by the Department.

The Department will be responsible for establishing, creating, maintaining and updating a project website. However, throughout the project duration, the Design-Build Team shall coordinate public involvement activities with the NCDOT Public Involvement Officer assigned to the project; and provide weekly updates, photos and other needed announcements to the Communications Office to ensure the accuracy of the aforementioned project website.

In the Technical Proposal, the Design-Build Team shall discuss their approach to providing the public access to project personnel for inquiries on vehicular and pedestrian traffic impacts.

The Design-Build Team shall include in their lump sum bid for the project, all costs associated with their involvement in the Public Involvement and Information Scope of Work.

Public Involvement

Unless noted otherwise elsewhere in this RFP, the NCDOT Public Involvement Group will be responsible for the activities noted below:

- Organizing public meetings, including venue selection, reservation and fee
- Excluding corridor and design public hearing maps, developing and producing informational print materials for all meetings and workshops
- Soliciting and administering advertisements, as deemed necessary
- Mailings to the identified target audiences, including postage
- If necessary, developing and producing informational print materials for Limited English Proficiency (LEP) outreach
- Web page updates related to public involvement efforts

To ensure that project information can be distributed to the public using standard methods, including but not limited to newspaper notices, the Design-Build Team shall coordinate with the Public Involvement Officer assigned to the project.

The Design-Build Team shall also coordinate with the Public Involvement Officer to promote public awareness for this project. The amount of public involvement required for this project shall be directly based on the Design-Build Team's Transportation Management Plans and construction details. The Design-Build Team's responsibilities shall include, but are not limited to, the following:

- Providing information requested by the Department to develop and produce informational printed materials for all meetings and workshops
- Developing and providing corridor and design public hearing maps for presentation at all public meetings / workshops
- Providing details surrounding the impacts to the public
- Providing advance notice to the Department of upcoming project impacts
- Assisting the Department in the development of the target audience list
- At a minimum, the Design-Build Team shall attend and speak at Public Information Meetings and Local Government Officials Meetings during development of the preliminary design. The aforementioned meetings shall occur prior to the interagency hydraulic design review meeting and cover the design modifications required elsewhere in this RFP, as well as all design modifications incorporated by the Design-Build Team. (Reference the Environmental Permits and Hydraulics Scopes of Work found elsewhere in this RFP) The Design-Build Team shall attend and speak at other public meetings / workshops as required herein.
- Hand delivery of time sensitive informational materials

The minimum public involvement requirements solely associated with the Transportation Management Plans shall include, but are not limited to the following:

- Public Meetings - If Beginning of Construction meeting for area businesses and residents is held, attending and / or speaking at this event.

- Distribution of Informational Materials - For beginning of construction and for all road closures with detour routes, the Design-Build Team shall be responsible for providing time sensitive informational material, provided by the Department, directly to the target audiences. If the Design-Build Team informs the Department of the aforementioned activities less than thirty (30) calendar days in advance, the Design-Build Team shall hand deliver the materials to the impacted target audiences.

Public Information

Unless noted otherwise elsewhere in this RFP, the NCDOT Communications Office will be responsible for the activities noted below:

- Providing media announcements, including social media
- Scheduling interviews, as needed
- Website updates related to project progress

To ensure that project information can be distributed to the public using standard methods, including but not limited to notifying media outlets and updating the project website, the Design-Build Team shall inform the Department at least thirty (30) calendar days in advance of any construction activity that will significantly impact the public. These activities shall include, but are not limited to, the start of construction, major traffic shifts, road closures, ramp closures, detours, night work and project completion.

Throughout construction, the aforementioned Design-Build contact shall provide weekly updates to the NCDOT Communications Office, including, but not limited to, traffic control phasing, graphic illustrations, project pictures, etc.

RAILROAD COORDINATION SCOPE OF WORK (4-14-21)

The Design-Build Team shall be responsible for coordinating with CSX Transportation (CSXT) to secure the railroad agreements necessary for replacement of two (2) bridges on I-95 over the rail operated and maintained by CSXT and improvements to the at-grade rail crossing on SR 1588 (Cox Road). The Design-Build Team shall be responsible for any modification 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 CSXT right of way and shall secure any necessary agreements required by the NCDOT and / or CSXT.

The Design-Build Team shall be responsible for all CSXT costs associated with this project to include, but not be limited to, plan reviews, materials furnished by CSXT, signals and communications work, track and related construction by CSXT and / or their representative(s), any delays to train operations or maintenance crews, required insurances, railroad flagging, right of way acquisition, and construction engineering.

Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall be responsible for all construction required. CSXT will be responsible for furnishing and installing the rubber rail seal flangeway and any necessary improvements to the railway, including but not limited to rails and ties at the SR 1588 (Cox Road) at-grade crossing. CSXT will not incur any cost, and the Design Build Team shall not enter into or onto the CSXT rail corridor until the Agreements are executed, insurance requirements are met, and CSXT receives written authorization to proceed with the work provided in the Agreements.

Preparation for Construction within the Existing Railroad Owners Right of Way

I. The Design-Build Team shall comply with the following guidelines and any other guidelines as required by CSXT, unless noted otherwise in this RFP and / or a design exception is received from CSXT and NCDOT, via the NCDOT Design-Build Unit:

A. *AREMA Manual for Railway Engineering,* latest edition

B. *CSX Transportation Public Project Information,* latest edition

C. *Federal Aid Policy Guide 23 CFR 140I*

D. *Federal Aid Policy Guide 23 CFR 646*

E. NCDOT *Construction Manual* Section 105-8

F. NCDOT *Standard Specifications for Roads and Structures,* Section 107-9 (Excluding Paragraph 2)

G. *North Carolina Administrative Code* Section T19A: 02B, 0150 through 0158

H. *Manual on Uniform Traffic Control Devices***,** latest edition

I. 2018 AASHTO *A Policy on Geometric Design of Highways and Streets*

J. NCDOT *Roadway Design Manual*

II. The Design-Build Team shall verify the number of trains per day and the maximum speed allowed with CSXT. The Design-Build Team shall have no claims whatsoever against either CSXT or NCDOT for any delays and / or additional costs incurred based on changes to the following information:

Number of trains per day	8-10
Type of trains per day	Freight
Maximum train speed	49 mph

Railroad inspection and maintenance requirements, in addition to normal train operations, will occur that may impact construction activities.

III. This project has two sites located on the CSXT Corridor at approximately Milepost SE 295.15 (Structure) and Milepost SE 195.04 (at-grade crossing). The corridor contains one freight track at these locations. The track is considered oriented east / west with increasing mileposts from west to east. The CSXT right of way is 200 feet wide (100 feet each side of the centerline of the existing track). Railroad traffic shall be maintained at current levels at all times.

IV. The Design-Build Team shall design, replace and construct a new bridge(s) over the CSXT Corridor to span the existing track and a future track. Preliminary layout shall be verified with CSXT. The bridge(s) over the CSXT Corridor shall be long enough and high enough to accommodate one (1) future track, all required drainage, and all anticipated FEMA requirements. The centerline of the future track shall be spaced 15 feet south of the centerline of the existing track. The bridge(s) over the CSXT Corridor shall provide a minimum 23-foot vertical clearance above the highest rail (existing and future). The bridge(s) over the CSXT Corridor shall provide a minimum horizontal clearance of no less than 25 feet from the centerline of the existing and future track to any 1) substructure element located above the top of rail elevation or 2) future maintenance road.

V. The Department will provide a draft Authorization for Construction Agreement for the SR 1588 (Cox Road) at-grade railroad crossing. The Design-Build Team shall be responsible for all coordination with the railroad and the Department necessary for the Railroad to partially execute this Agreement, including but not limited to all required Agreement modifications. (Reference Coordination with CSX Transportation Section below) The Department recommends the use of rubber rail seal and asphalt at the SR 1588 (Cox Road) at-grade railroad crossing. In accordance with the 2018 AASHTO*, A Policy on Geometric Design of Highways and Streets, Railroad - Highway Grade Crossing Section* and the NCDOT *Roadway Design Manual,* the Design-Build Team shall modify

the SR 1588 (Cox Road) vertical alignment at the at-grade railroad crossing. (Reference the Roadway Design Scope of Work found elsewhere in this RFP)

Arrangements for Protection and Adjustments to Existing and Proposed Railroad Crossing Surface and Roadbeds

I. The Design-Build Team shall make the necessary arrangements with CSXT for the installation of temporary grade crossing surfaces, including but not limited to, associated temporary drainage, removal of temporary construction crossings after completion of project, shoring plans, railroad force account estimates and agreements. The temporary grade crossing surface shall conform to CSXT 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 CSXT, or their representative, at the Design-Build Team's expense.

The Design-Build Team shall not commence any work on CSXT right of way / easement until all agreements have been executed, insurance acquired and approved in accordance with CSXT policies and procedures, and all construction plans have been approved by NCDOT and CSXT. The Design-Build Team shall make the necessary arrangements with CSXT 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 CSXT property resulting from their operations and CSXT may issue a stop order until all dangerous situations are remedied.

The Design-Build Team shall be responsible for providing Railroad Protective Liability Insurance for Bodily Injury Liability, Property Damage Liability, and Physical Damage to Property to CSXT, identifying CSXT as the insured party, during the duration of the time work is being performed on or over the railroad right of way / easement. The Design-Build Team shall be responsible for verifying and obtaining the appropriate insurance and coverage with CSXT. Other insurance requirements, including those for all subcontractors, are detailed in the documents referenced herein. The Design-Build Team shall be responsible for any required Roadway Worker Protection training / certifications.

II. Prior to any utility installation, removal or relocation across CSXT right of way / easement, 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 CSXT and private utility owners to obtain the necessary permits and secure the appropriate Encroachment Agreements. At a minimum, the Design-Build Team shall assist the private utility owners in obtaining their respective Encroachment Agreements in the private utility owner's name. In accordance with the requirements noted herein and CSXT specifications, the private utility owner(s) will be responsible for all associated fees and providing the necessary insurance coverage.

All work associated with any utility installation across CSXT's right of way / easement shall adhere to the requirements noted herein and CSXT specifications.

III. After negotiations among the Department, the Design-Build Team and CSXT have been finalized, and approval obtained from the Board of Transportation, the Design-Build Team shall submit executed agreements and plans to NCDOT's State Structures Engineer and Rail Division Surfaces and Encroachments Manager, via the NCDOT Design-Build Unit, for plan approval and final agreement execution by NCDOT, prior to authorizing railroad work. After approval by NCDOT, one copy of each executed agreement will be returned to the Design-Build Team and one copy forwarded to the NCDOT's Resident Engineer, prior to any construction work by the Design-Build Team or CSXT. This section particularly applies if a modification to an agreement is necessary.

Coordination with CSX Transportation

The Design-Build Team shall coordinate with the primary owner of CSXT through the CSXT General Engineering Consultant (GEC), Alfred Benesch & Company. The Design-Build Team shall coordinate with Larry J. Shaw, PE at Alfred Benesch & Company, 201 North Illinois Street, 16th Floor, Indianapolis, IN 46204, (317) 417-1902 to obtain coordination procedures for plan approval and, if needed, a partially executed legal agreement with CSXT and the NCDOT as the parties in the agreement for proposed roadway work. The Department will review the agreement prior to submittal to the CSXT. The Department will execute and distribute the Agreements within 14 calendar days of Board of Transportation approval. All agreements, and any modifications thereto, shall include necessary Force Account items, including but not limited to, preliminary engineering, construction engineering, flagging, signal and communication lines, crossing surfaces, track materials, construction, and other work performed by CSXT, as necessary. (The Design-Build Team will not be responsible for the cost of flagmen required for CSXT to perform maintenance operations and / or operations of specific trains through the project construction area.) CSXT has sole authority to determine the need for flagging required to protect its operations and property. The railroad agreements state that the Department will be responsible for payment of the CSXT's Force Account work and CSXT expenses; however, the Design-Build Team shall reimburse the Department for these costs including all Force Account estimate overruns. This reimbursement shall be incidental to the lump sum price bid for the project. Upon request, the Department will provide copies of the CSXT invoices to the Design-Build Team for review. The Design-Build Team shall have ten (10) days to provide comments to the Department, after which the Department will pay the invoice. The Design-Build Team shall be responsible for maintaining records to verify the invoice items.

The preliminary plan and final plan submittals to CSXT shall include 1) roadway plans, the Railroad's "Overhead Bridge Crossing Data," appropriate roadway plan sheets showing impacts to the CSXT right of way / easement, 2) erosion control plans, 3) drainage calculations for any drainage on or across the CSXT's right of way / easement and 4) bridge plans showing the vertical and horizontal alignments and preliminary general drawings. Electronic versions of the preliminary plans, final plans and data shall be submitted to the CSXT GEC, via the NCDOT Design-Build Unit. If plan re-submittals, RFC Plans and / or any additional information are required, the Design-Build Team shall submit electronic versions to the CSXT GEC, via the NCDOT Design-Build Unit. Working Drawings affecting CSXT's operations and / or right of way / easement shall follow the submittal process as outlined in the 2018 NCDOT *Standard Specifications for Roads and Structures* or Special Provisions. The Design-Build Team shall allow 30 days for review of all railroad submittals.

Coordination with NCDOT Rail Division

All plans submitted to CSXT, as required above, shall be submitted to the NCDOT Rail Division, via the NCDOT Design-Build Unit.

RIGHT OF WAY SCOPE OF WORK (2-4-21)

**** NOTE ** Prior to negotiating property acquisition with property owners, the Design-Build Team shall meet with the appropriate NCDOT Location and Surveys, Right of Way, and Design-Build personnel.**

- 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. Terry Niles, in the NCDOT Right of Way Unit, at 919-707-4400. 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-6064A, B & C / I-5879 in Robeson County.

- The Department's preliminary design does not require acquisition of property outside of the project limits due solely to a rise in the floodplain water elevation on insurable structures. If the Design-Build Team's design or construction methods require acquisition of property outside of the project construction limits due solely to an allowable rise in the floodplain water elevation on insurable structures, the cost of both the acquisition services and the actual cost of the property shall be the responsibility of the Design-Build Team. (Reference the Hydraulics Scope of Work found elsewhere in this RFP) The following exception applies to this paragraph:

  If the Design-Build demonstrates to the Department's sole satisfaction that the Department's preliminary design requires acquisition of property outside of the project limits due solely to a rise in the floodplain water elevation on insurable structures, 1) the Department will bear the actual cost of the property and 2) the acquisition services will be considered extra work and paid for in accordance with Article 104-7 of the 2018 NCDOT *Standard Specifications for Roads and Structures*.

- Upon acceptance of the Right of Way plans developed by the Design-Build Team for the 1) southbound widening of I-95 in the vicinity of the bridge(s) on I-95 over the CSX Railroad and 2) realignment of SR 1588 (Cox Road), VFW Road and SR 1587 (Hackett Street), the Design-Build Team shall immediately begin the process to acquire the right of way, easements, and / or control of access required for the Design-Build Team's design and construction methods on the following parcels:

  - Omnisource Southeast, LLC - Parcel ID No. 938179143700
  - Spartan, LLC - Parcel ID No. 938179684407
  - Mark & Linda Parker - Parcel ID No. 938270901700
  - Freeman Investments Inc. - Parcel ID No. 938280300700

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. (Reference the Utilities Coordination 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 December 21, 2018 *Right of Way Manual*.

- The Department will prepare all Condemnation Maps. The Design-Build Team shall prepare all Final Condemnation Reports and provide updated MicroStation CADD files, upon request, to the Department for preparation of the Condemnation Maps. Upon approval of the Final Condemnation Report, the Department will require a minimum of eight weeks to file the condemnation claim. For all plan revisions on condemned parcels that modify the area acquired, modify the control of access and / or impact the appraised value, the Design-Build Team shall be responsible for the following:

  - The Design-Build Team shall notify the Division Right of Way Agent, the Area Negotiator, Area Appraiser, Location and Surveys Unit, and the Attorney General, in writing, that revisions have been made that impact a condemned parcel and provide updated plan sheets, revised MicroStation CADD files, and revised area takes.

  - The Design-Build Team shall consult with the Attorney General and the Area Appraiser to determine the status of the negotiations and appraisal(s).

  - If the Attorney General and / or Area Appraiser recommend an updated appraisal, the Design-Build Team shall provide an updated Summary Sheet to the Area Appraiser for the Department's use in obtaining an updated appraisal(s).

  - Upon receipt of the approved updated appraisal(s), the Design-Build Team shall develop a revised written offer. If settlement is not reached, the Design-Build Team shall submit an updated Final Condemnation Report and revised MicroStation CADD files. If settlement is reached, the Design-Build Team shall notify the Attorney General and Area Appraiser in writing and submit an updated Final Condemnation Report with all necessary documentation, including but not limited to, revised MicroStation CADD files.

  - The Department will be responsible for payment for the additional deposit to the Attorney General's Office and the Attorney General will prepare and file an Amendment to the Declaration of Taking.

- 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 December 21, 2018 *Right of Way Manual*, the Design-Build Team may prepare red-line adjustments for parcels that are not condemned. The Department must approve a red-line adjustment, in writing, prior to the Design-Build Team making an offer based on the red-line adjustment.

  - The Design-Build Team shall prepare, execute and record documents conveying title to acquired properties to the Department with the Register of Deeds.

- 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.

- 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 Transmittal Summaries and / or Narrative Appraisals for all right of way, control of access and easement acquisitions. Claim Reports will not be allowed for any acquisition.

- Prior to acquiring right of way, control of access and / or easement from any parcel with contaminated soil, the Design-Build Team shall provide a written priority list of all properties with contaminated soil that require right of way, control of access and / or easement acquisition to the Division Right of Way Agent, the Area Negotiator, the Area Appraiser, and the Real Property Coordinator, Terry Niles. 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 (7-12-21)

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 (SDU) Procedures Manual*

  https://connect.ncdot.gov/resources/safety/Pages/Signing-and-Delineation.aspx

- Traffic Engineering Practices, Policies, and Legal Authority (TEPPL)

  https://connect.ncdot.gov/resources/safety/Teppl/Pages/Teppl-Select-Topics.aspx

- *Manual on Uniform Traffic Control Devices* (MUTCD)

  http://mutcd.fhwa.dot.gov/kno_2009r1r2.htm

- *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

- *Guidelines for Preparation of Signing and Final Pavement Marking Plans for Design-Build Projects*

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

- *Design-Build Submittal Guidelines*

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

- NCDOT *Standard Specifications for Roads and Structures*

- NCDOT *Roadway Standard Drawings*

In case of conflicting design parameters, and / or ranges, in the various resources, the proposed design shall adhere to the most conservative values, unless noted otherwise elsewhere in this RFP.

Signing Requirements for Technical Proposal

The Design-Build Team shall select a Private Engineering Firm (PEF) that has experience in the preparation, design, and sealing of Signing Plans for NCDOT on comparable projects. The 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 Design-Build Unit shall meet to discuss and review the Design-Build Team's 25% Preliminary Signing Plans.

The Design-Build Team shall provide 25% Pavement Markings Plans that have been reviewed and accepted by the Department and the latest Roadway Plans with the 50% Preliminary Signing Plans submittal.

Signs to be Furnished by Design-Build Team

The Design-Build Team shall furnish signs in accordance with the specifications provided by the NCDOT.

Signing Project Limits

Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall design, fabricate and

install all Type A, B, D, E and F signs and supports (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 not install overhead sign structures or ground mounted Type A or B signs within the runway glide path for the Lumberton Regional Airport.

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 turn-arounds / 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-95 at **1/2-mile** intervals along both sides of the mainline. The Design-Build Team shall install each mile marker on one three-pound U-channel post. Mile markers shall be located at the outside shoulder point or a maximum of 15 feet from the edge of travel lane. The Design-Build Team shall install mile markers such that the bottom of the mile marker shall be four feet above the edge of travel lane (edgeline) elevation. Excluding whole mile locations, mile marker designs shall be in accordance with the Intermediate Reference Location Signs (D10-2a) referenced in the Standard Highway Signs (2004 Edition and the 2012 Supplement to the 2004 Edition). At whole mile locations, 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 as required by the MUTCD Table 2C-5, the Design-Build Team shall fabricate and install advisory speed signing as shown in Figure 2C-3 of the MUTCD. In addition to signing shown in Table 2C-5 of the MUTCD, the advisory speed signing shall include W1-8, W13-6, W13-7, W1-13R, and E13-1P signs.

The Design-Build Team shall design, fabricate and install multi-lane crossroad signing, as shown in Figures 2D-11 and 2D-13 of the MUTCD, for the I-95 / NC 72 / NC 711 (Caton Road) interchange.

Prior to submittal of RFC Signing Plans, the Design-Build Team shall coordinate with the Signing and Delineation Unit and the Design-Build Unit on destination cities and / or street names on guide signs.

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.

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 2J.01.

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-95) shall be 70 mph. (Reference the Roadway Scope of Work found elsewhere in this RFP)

Interstate, US and NC Route Designation

The Design-Build Team shall coordinate all interstate, US and NC highway routing with the Transportation Mobility and Safety Division of NCDOT. Prior to designing any signs that display new or revised Interstate, US or NC routes, the Design-Build Team shall confirm all highway routes with the Department. Concurrent with the Release for Construction (RFC) Signing Plans submittal, the Design-Build Team shall notify the State Signing and Delineation Engineer, in writing, of all new or revised Interstate, US or NC routes.

Sign Locations

The Design-Build Team shall determine the station location of all signs and sign structures.

Unless otherwise noted in this RFP, the Design-Build Team shall provide a minimum of two advanced guide signs for all freeway / expressway interchange approaches.

The Design-Build Team shall provide one advanced guide sign on I-95 southbound for the NC 211 (North Roberts Avenue) interchange approach.

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 signs supports in accordance with the NCDOT Roadway Standard Drawings. The associated software for the design of Type A and B ground mounted sign supports, may be referenced on the website noted below:

https://connect.ncdot.gov/resources/safety/Pages/Signing-and-Delineation.aspx

Prior to installation, the Design-Build Team shall 1) field verify all Type A and B ground mounted sign supports, 2) recalculate the field verified S-Dimensions, using the latest edition of the design software on the website noted above, and 3) revise the beam sections, where applicable. The Design-Build Team shall use the most recent version of the ground mounted sign support selection workbook tool, in accordance with the submittal schedule outlined in the “Instructions” tab of the tool.

Unless otherwise approved by the Department, the vertical mounting height for ground mounted Type D, E and F signs shall be a minimum of seven feet and maximum of eight feet from the edge of the travel lane to the bottom of the sign.

On freeways and expressways, the minimum lateral offset for Type A and B ground mounted signs on breakaway supports shall be 30 feet, unless approved otherwise by the Department. The lateral offset shall be measured from the edge of the travel lane closest to the shoulder to the closest sign edge.

On freeways and expressways, all Type A and B ground mounted signs on simple (non-breakaway) supports shall be protected by guardrail, barrier or another form of approved positive protection. The minimum lateral distance between the face of guardrail and the closest sign edge shall be six feet.

Unless noted otherwise elsewhere in this RFP, all Type D, E and F signs shall be installed on U-channel posts in accordance with the NCDOT Roadway Standard Drawings. Type D signs shall not exceed eight feet in width and / or 24 square feet. Unless positively protected, all Type D signs shall be installed on a maximum of two U-channel posts.

Signing Along Elevated Sections of I-95

Type A and B (logo and supplemental) signs and supports shall be located behind the I-95 outside barrier and offset a minimum of six inches from the back of the barrier. Excluding areas where Type A and B signs will be located over a service road, the Type A and B signs shall be a minimum of seven feet and maximum of eight feet from the I-95 pavement surface to the bottom of the sign. In areas where the Type A and B signs will be located over a service road (lane or shoulder), the vertical clearance beneath the sign assemblies shall be no less than 17 feet and no greater than 18 feet from the service road pavement surface (lane or shoulder) to the bottom of the sign, unless otherwise approved by the Department. Cantilevered / pedestal type structures may be used for Type A and B signs.

As shown in Figure 2J-1 of the MUTCD, the Design-Build Team will be allowed to vertically stack messages and panels on logo signs installed in the elevated sections of I-95.

The Design-Build Team shall attach Type D, E and F signs supports to the back of the I-95 outside barrier. The Department prefers that the Type D, E and F signs not encroach into the shoulder of any roadway. If the edge of the sign must encroach into a roadway shoulder, the edge of the sign shall not extend more than six inches into any roadway shoulder. The Design-Build Team shall not use U-channel posts to mount signs to the I-95 outside barrier.

The outside support for overhead sign structures shall be located behind the I-95 outside barrier and offset a minimum of six inches from the back of the barrier.

The Design-Build Team shall include a representative sample of the proposed Type A, B, D, E, and F sign installation details in the Technical Proposal for the various situations along the I-95 elevated sections.

Bridge Mounted Signs

The Design-Build Team shall only design, fabricate and install Type D, E and F signs on the proposed Lumber River bridge. The Design-Build Team shall not design, fabricate or install signs on any other bridge.

Unless approved otherwise by the Department, the vertical mounting height for bridge mounted signs shall be a minimum of seven feet and maximum of eight feet from the bridge deck to the bottom of the sign.

All bridge mounted signs shall be mounted behind the bridge rail.

The Design-Build Team shall not use U-channel posts to mount bridge mounted signs.

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.24 - Signing for Interchange Lane Drops, Section 2A.17 - 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
- I-95 / NC 211 (North Roberts Avenue) interchange -Y5RPA-, -Y5RPC- and -Y5-

At the northern end of the project, the Design-Build Team will not be required to provide overhead signing for freeway lane ends (freeway lane drop) on I-95 northbound.

Pull-Through overhead signing will not be required for the NC 211 (North Roberts Avenue) through lanes.

The wind speed for the overhead sign structure and foundation designs for this project shall be 110 mph.

The Design-Build Team shall design, fabricate and install overhead sign supports and foundations in accordance with Section 906 of the NCDOT *Standard Specifications for Roads and Structures*, 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 the 2018 Roadway 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 and Type A and B signs on the I-95 elevated sections, pedestal mounted overhead signs will not be allowed.

Overhead Sign Structure Inventory Numbers

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 Roadway 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

Prior to modifying an existing overhead sign assembly to accommodate proposed signs that exceed the original wind load area, the Design-Build Team shall perform a structural analysis of the overhead sign structure. 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.

If the Department can't 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 NCDOT *Standard Specifications for Roads and Structures.*

Guardrail or other Positive Protection for Overhead Sign Supports

Except as allowed otherwise elsewhere in this RFP, overhead sign supports shall be located a minimum of 40 feet from the edge of the outside travel lane(s) 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(s) 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 NCDOT *Standard Specifications for Roads and Structures*) All signs and supports remaining / existing at the completion of this project shall be plumb, oriented correctly and adhere to AASHTO requirements.

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 sign structures. These Signing Plans shall be provided in .pdf and MicroStation format.

STRUCTURES SCOPE OF WORK (6-1-21)

Project Details

The Design-Build Team shall design and construct all structures necessary to complete this project, including, but are not limited to, the following:

- Replace Bridge No. 770025 on NC 72 / NC 711(Caton Road) over I-95 (Exit 17)
- Replace Bridge Nos. 770144 and 770145 on I-95 over CSX Railroad
- Replace Bridge Nos. 770146 and 770147 on I-95 over the Lumber River
- Replace Bridge No. 770148 on SR 1536 (Carthage Road) over I-95 (Exit 19)
- Replace Bridge No. 770102 on NC 211 (North Roberts Avenue) over I-95 (Exit 20)
- Replace Culvert No. 770150; existing 2 @ 10' x 8' RCBC under I-95, SR 1791 (Dawn Drive), SR 1792 (Kahn Drive) at Meadow Branch
- Replace Culvert No. 770464; existing 2 @ 10' x 8' RCBC under I-95, SR 1791 (Dawn Drive), SR 1792 (Kahn Drive) at Fivemile Branch
- All reinforced concrete box culverts required by the Design-Build Team's design
- 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)

The bridge(s) on I-95 over the Lumber River shall meet the geometric criteria in the Bridge Survey Report (BSR) provided by the Department or the BSR prepared by the Design-Build Team and accepted by the Department. (Reference the Hydraulics Scope of Work found elsewhere in the RFP) All other bridges shall meet the geometric criteria shown in the accepted Preliminary Roadway Plans developed by the Design-Build Team.

The minimum vertical clearance for bridges constructed over all interstates, freeways and arterials shall be 17'-0". The minimum vertical clearance for bridges constructed over all future maintenance roads, local roads and collector roads shall be 15'-6". The minimum vertical clearance for bridges constructed over all multiuse paths, and greenways shall be 10'-0".

The bridge(s) on I-95 over CSX Railroad shall accommodate the future construction of two 16-foot wide gravel maintenance roads without the need to modify the end bent slope. (Reference the Roadway Scope of Work found elsewhere in this RFP) For minimum horizontal and vertical railroad clearance requirements for the bridge(s) on I-95 over CSX Railroad reference the Railroad Coordination Scope of Work found elsewhere in this RFP. For the future maintenance roads, no additional horizontal clearance is required beyond the required roadway width.

For the bridge(s) on I-95 over CSX Railroad, provide protective fencing on both sides of the bridge for the span over the CSX Railroad tracks. (Reference the Bridge Mounted Chain Link Fence Example provided by the Department)

Bridge barrier rails for Bridge Nos. 770025 and 770102 shall be per Standard Drawing BMR34. Unless noted otherwise elsewhere in this RFP, all other bridge barrier rails shall be per Standard Drawing CBR1.

On all bridges with multi-use paths, the Design-Build Team shall design and construct a positive separation barrier between vehicular traffic and pedestrian traffic. The barrier shall be a 2'-6" concrete dual flat-faced barrier with a metal handrail that extends a minimum of 42" above the walking surface. Unless noted otherwise elsewhere in this RFP, the barrier shall meet AASHTO Manual for Assessing Safety Hardware, TL-3 crash test requirements. A glare screen shall not be provided on the barrier. The multi-use path may be raised or level with the finished grade of the bridge deck.

The Design-Build Team shall design and construct Bridge No. 770148 in accordance with the following requirements:

- Outside bridge barrier rails shall be flat-faced concrete barriers meeting AASHTO Manual for Assessing Safety Hardware, TL-3 crash test requirements and stamped on both faces with a church rail pattern.

- The Design-Build Team shall provide light foundation pilasters, all conduit, pull boxes and circuitry necessary to accommodate the future decorative street lighting for the bridge. Provide a six-inch PVC sleeve through the backwall at the southeast and northwest corners of the bridge for conduit installation through the backwall. (Reference the *Lighting* Project Special Provision and Lighting Scope of Work found elsewhere in this RFP)

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.

All bridges shall be designed in accordance with the NCDOT *Structures Management Unit Manual* for Seismic Zone 2. Alternative Technical Concepts (ATC) that modify or reduce the seismic design requirements are not permitted and shall not be evaluated or considered.

Bridges over waterways and the bridge(s) on I-95 over the CSX Railroad, shall be designed and constructed with spill through slopes with rip rap slope protection and scour protection. (Reference the Hydraulics Scope of Work found elsewhere in this RFP)

End bents and end slopes at each end of a bridge shall have the same appearance.

All 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.

Link slabs may be used for bridges with spans up to 100 feet, provided the girders in adjacent spans are the same depth.

The Design-Build Team shall furnish and install a four-inch duct conduit system for future communications cable on the bridge(s) on I-95 over the Lumber River. (Reference the ITS Scope of Work and the *Fiber Optic Conduit System (RGC - Hanging)* Project Special Provision found

elsewhere in this RFP, and Standard Drawing ECS1) The four-inch duct conduit system shall be installed along the most western side of the bridge(s).

The Design-Build Team shall furnish 28 decorative concrete panels to be installed at the following locations:

- The end bent wing walls of the bridges at Exits 17, 19, 20 and 22, unless allowed otherwise elsewhere in this RFP.

- The ends of the center interior bent caps of the bridges at Exits 17, 19, 20 and 22.

- The ends of the interior bent caps between the mainline and collector distributor roads at Exit 13.

The Design-Build Team shall install the concrete decorative panels on the bridges to be replaced and deliver the remaining panels and the concrete mold used to make the panels to the City of Lumberton. The decorative panels shall be approximately four inches thick and cover the entire face of the interior bent caps. The decorative panels for the end bents shall be the same size as the interior bent cap panels. For dual bridges, only furnish and / or install decorative panels on the southernmost and northernmost end bent wing wall and interior bent cap faces. Post award, the Design-Build Team shall coordinate with the City of Lumberton to determine the aesthetic design for the decorative panels and where to deliver the remaining panels to be installed by others.

If the Design-Build Team elects to design and construct vertical abutments with turn back abutment walls at Exits 17, 19 and / or 20, the Design-Build Team will be allowed to install the decorative panels on the face of the turn back abutment wall. If the Design-Build Team elects to design and construct vertical abutments at Exits 17, 19 and / or 20 that are completely parallel to I-95 (without turn back end bent wing walls or turn back abutment walls), the Design-Build Team shall attach the decorative panels to the outside face of the bridge deck overhang, adjacent to the vertical abutment.

Unless noted otherwise elsewhere in this RFP, the following will not be allowed on the project:

- Cored slab, box beam, fracture critical, deck girder and cast-in-place deck slab bridges
- Precast bridge barrier rails
- Precast reinforced box culverts
- Metal plate arch culverts
- Interior pile bents at roadway grade separations or railroad grade separations
- Attachment of sign structures to bridges
- Bridge attachments (excluding ITS) in the overhang of roadway grade separation structures
- Excluding barrier rails on Bridge No. 770148, casting of conduit in the bridge deck or barrier rail for roadway bridges
- Modular expansion joints
- Monotube or cantilever DMS (if required on project) support structures
- Shallow foundations behind MSE abutment walls
- Bridge spans with less than four (4) girder lines

- Multiple girder depths on an individual bridge
- Sound barrier walls constructed on top of retaining walls
- Concrete cylinder piles

ATCs that utilize concrete cylinder piles are not permitted and shall not be evaluated or considered.

Structure Removal

Excluding Culvert No. 770150 and Culvert No. 770464, the Design-Build Team shall remove and dispose of all existing structures to be replaced. (Reference the Hydraulics Scope of Work found elsewhere in this RFP) Except as noted otherwise below, the aforementioned structures shall be removed and disposed of in accordance with the 2018 *Standard Specifications for Roads and Structures.*

At the bridge locations noted below, the Design-Build Team shall salvage the following items:

- Bridge No.770144 and 770145 - All the existing sheet piling
- Bridge No. 770148 - All W-beam guardrail and end treatments

The Design-Build Team shall carefully remove all material to be salvaged in a manner that prevents damage. Prior to delivery to the Department, the Design-Build Team shall stockpile all salvaged material to prevent damage.

The Design-Build Team shall return all salvaged material to the Department. A minimum of one week prior to delivery, the Design-Build Team shall contact Michael Fisher, Assistant Division 6 Bridge Maintenance Engineer during normal business hours (910-364-0670) to coordinate a specific day and time for the Design-Build Team to deliver the salvaged material to the Department.

Box Culverts

As required by the Design-Build Team's design, the Design-Build Team shall design and construct all proposed reinforced concrete box culverts and replace all existing reinforced concrete box culverts, unless noted otherwise elsewhere in this RFP. Reinforced concrete box culvert designs and construction shall be in accordance with the Culvert Survey Reports prepared by the Department or prepared by the Design-Build Team and accepted by the Department. (Reference the Hydraulics Scope of Work found elsewhere in the RFP)

Sound Barrier Walls and Retaining Walls

The Design-Build Team shall design and construct all sound barrier walls required by the Design-Build Team's design. If possible, sound barrier walls on bridges should be avoided. If the final design requires a sound barrier wall on a bridge, the maximum height of the sound barrier wall shall be limited to ten feet, measured from the top of the roadway deck to top of the sound

barrier wall. (Reference the Roadway Scope of Work and Geotechnical Engineering Scope of Work found elsewhere in this RFP)

Regardless of wall height, sound barrier walls shall be designed in accordance with the latest edition of the AASHTO *LRFD Bridge Design Specifications*.

All proposed sound barrier wall and retaining wall surfaces (excluding sheet pile walls) shall have equivalent surface treatment. (Reference the *Architectural Concrete Surface Treatment* Project Special Provisions found elsewhere in this RFP)

Excluding sound barrier walls on bridges, concrete piles shall be used for all sound barrier walls. All ground mounted sound barrier walls shall be detailed in accordance with Structure Standard Drawings SBW1 and SBW2. (Reference the *Sound Barrier Wall* and *Architectural Concrete Surface Treatment* Project Special Provisions, the Roadway Scope of Work and the Geotechnical Engineering Scope of Work found elsewhere in this RFP)

The Design-Build Team shall apply non-sacrificial anti-graffiti coating on all exposed surfaces of sound barrier walls and all retaining walls, including MSE walls. (Reference the *Architectural Concrete Surface Treatment* Project Special Provision found elsewhere in this RFP)

General

The Design-Build Team's primary design firm shall be on the Department's list of firms qualified for bridge design and maintain an office in North Carolina.

Unless allowed or directed otherwise in this RFP, designs shall be in accordance with the latest edition 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 Design Manual* (including Policy Memos) and NCDOT *Bridge Policy Manual.*

Use of Florida Department of Transportation Prestressed Florida I-Beams (FIB), the Prestressed Concrete Committee for Economic Fabrication (PCEF) prestressed concrete girders, and Modified Bulb Tee girders will be allowed. However, the structural details associated with the aforementioned items, including but not limited to mild reinforcing and reinforcing cover, shall be subject to Department review and acceptance post-award.

Unless allowed or directed otherwise in this RFP, all construction and materials shall be in accordance with 2018 NCDOT *Standard Specifications for Roads and Structures*, NCDOT *Structures Management Unit Project Special Provisions* and NCDOT *Structures Management Unit Standard Drawings*.

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.

TRAFFIC SIGNALS AND SIGNAL COMMUNICATIONS SCOPE OF WORK (7-14-21)

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. 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* and the *Guidelines for the Preparation of ITS & Signal Plans by Private Engineering Firms* available on the Design-Build Unit's website located at:

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

The Design-Build Team shall select a Private Engineering Firm (PEF) that has experience designing and sealing Traffic Signal, Electrical Detail, and Signal Communications Plans for NCDOT on comparable projects. The Private Engineering Firm 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 (TSMOU), the Work Zone Traffic Control Group, the Design-Build Team, the Design-Build Unit, the Division Traffic Engineer, the Regional Traffic Engineer, Statewide Traffic Operations Center (STOC), local municipalities (if applicable), and any other pertinent NCDOT personnel before signal submittals begin. Traffic Signal, Electrical Detail, and Signal 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 accepted by the TSMOU prior to beginning traffic signal construction or plan implementation.

The Design-Build Team shall coordinate and implement all signal designs at the appropriate time as directed by the Engineer. Prior to final design and installation, the Design-Build Team shall coordinate all signal phasing recommendations with the Division Traffic Engineer, the Regional Traffic Engineer, local municipalities (if applicable), and the NCDOT TSMOU. 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, 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 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.

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.

All temporary signal installations may utilize wood poles for signal supports. 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 Operations Office located at 558 Gillespie St, Fayetteville, NC 28301. 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 Unit. Once all the traffic signal locations have been finalized and accepted by the Department, the Design-Build Team shall submit a written request for the SINs to the NCDOT ITS & Signals Unit, via the Design-Build 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

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*
- NCDOT *Standard Roadway Drawings*
- Signals and ITS Project Special Provisions
- ITS and Signals Design Manual
- *Manual on Uniform Traffic Control Devices (MUTCD)*
- *North Carolina Supplement to the Manual on Uniform Traffic Control Devices (NCMUTCD)*

- *Guidelines for the Preparation of ITS & Signal Plans by Private Engineering Firms*
- NCDOT *Signal System Timing Philosophy Manual*

Links to additional TSMOU design standards and aides are available on website noted below:

https://connect.ncdot.gov/resources/safety/Pages/ITS-and-Signals.aspx

II. TRAFFIC SIGNALS

Unless allowed otherwise elsewhere in this RFP, the Design-Build Team shall install two (2) new traffic signals and modify six (6) existing traffic signals within project limits. All of these signals shall be interconnected as noted in the table below (Reference Section III below for the system interconnection requirements). The traffic signal detection for the final traffic patterns shall be inductive loop detection unless 1) the required location of the inductive loop is within a bridge deck, and / or 2) the Department provides written approval otherwise. The Design-Build Team shall only provide out of street detection for 1) temporary traffic patterns during construction and 2) final traffic patterns at locations where inductive loops would be located within a bridge deck. 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 intersection are listed below:

NCDOT - New Signals to be Installed (2)		
Signal Inventory Number	**Intersection Description**	**Work Requirements**
06-1392	NC 211 (North Roberts Avenue) at I-95 SB Ramps (Exit 20)	The Design-Build Team shall design and install new traffic signals to match all temporary construction phasing and the proposed final traffic pattern. This may require signal phasing changes, signal head changes, system detectors, and / or system interconnection equipment. The Design-Build Team shall install new galvanized metal poles with mast arms. The Design-Build Team shall design and install new, fully actuated traffic signals with 2070LX controllers operating ASC/3 Software in a 170 cabinet with an auxiliary output file, including base extenders. 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. The Design-Build Team shall provide crosswalks and **pedestrian signal heads** at each approach with existing or proposed sidewalk. The Design-Build Team shall maintain and / or provide the required system communication equipment as described in Section III.
06-1393	NC 211 (North Roberts Avenue) at I-95 NB Ramps (Exit 20)	

NCDOT - Existing Signals to be Modified (6)		
Signal Inventory Number	**Intersection Description**	**Work Requirements**
06-0344*	NC 211 (North Roberts Ave) at I-95 SB Ramps and SR 1586 (Lackey Street) / SR 1791 (Dawn Drive) (Exit 20)	* Note: The existing 06-0344 signal is a single signal that controls two intersections. The modified traffic signal will only control the NC 211 (North Roberts Avenue) / SR 1586 (Lackey Street) / SR 1791 (Dawn Drive) intersection. ** Note: The existing 06-0345 signal is a single signal that controls two intersections. The modified traffic signal will only control the NC 211 (North Roberts Avenue) / SR 1590 (Rowland Avenue) intersection. The Design-Build Team shall modify these existing traffic signals to match all temporary construction phasing and the proposed final traffic pattern. This may require signal phasing changes, signal head changes, system detectors, and / or system interconnections equipment. The Design-Build Team shall install new galvanized metal strain poles. The Design-Build Team shall design and install new, fully actuated traffic signals with 2070LX controllers operating ASC/3 Software in a 170 cabinet with an auxiliary output file, including base extenders. 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. The Design-Build Team shall provide crosswalks and **pedestrian signal heads** at each approach with existing or proposed sidewalk. The Design-Build Team shall maintain and / or provide the required system communication equipment as described in Section III. The Design-Build Team shall, upon completion of the final intersection configuration, and at a time agreed upon with the Engineer, remove the traffic signal equipment at the NC 211 (North Roberts Ave) I-95 SB Ramps and I-95 NB Ramps from operation and return relevant components to the Division Traffic Operations Office.
06-0879	NC 211 (North Roberts Avenue) at SR 1792 (Kahn Drive)	
06-0538	NC 72 / NC 711 (Caton Road) at I-95 / US 301 SB Ramps (Exit 17)	
06-0872	NC 72 / NC 711 (Caton Road) at I-95 / US 301 NB Ramps (Exit 17)	
06-0269	NC 72 (Caton Road) at SR 2499 (West 5th Street)	
06-0345**	NC 211 (North Roberts Avenue) at I-95 NB Ramps and SR 1590 (North Rowland Avenue)	

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 located within the project boundaries, including but not limited to the fiber optic, wireless, and cellular modem infrastructure and equipment.

Reference the ITS Scope of Work found elsewhere in this RFP for additional ITS requirements.

A. SIGNAL COMMUNICATIONS

The Design-Build Team shall design, install, and / or maintain the following fiber optic and wireless communications network signal systems as noted below:

Existing Division Signal System D06-19 - NC 72 / NC 711 (Caton Road) Closed Loop System	
Signal Inventory Number and Intersection Description	**Description of Work**
06-0538 NC 72 / NC 711 (Caton Road) at I-95 SB Ramps (Existing) 06-0872 NC 72 / NC 711 (Caton Road) at I-95 NB Ramps (Existing) 06-0269 NC 72 (Caton Road) at SR 2499 (West 5th Street) (Existing)	The Design-Build Team shall replace the existing 12-fiber trunk line along NC 72 / NC 711 (Caton Road) from the I-95 SB Ramps to SR 2499 (West 5th Street) with a 24-fiber trunk line. The Design-Build Team shall splice this new 24-fiber trunk line into an existing 24-fiber trunk line to be installed by others at or near 06-0538 and at or near 06-0269. The Design-Build Team shall install aerial or underground fiber optic splice enclosures at or near each signal and install a new 12-fiber drop cable to each signal cabinet. The Design-Build Team shall maintain the existing 900 MHz wireless communications between 06-0538 and 06-0269 until the new 24-fiber trunk line is installed fully, spliced, and fully operational. The Design-Build Team shall install new Ethernet switches in each new signal cabinet. The Ethernet switch must be 100% compatible with the existing system. The Design-Build Team shall install new fiber optic interconnect centers, fiber optic pigtails, and fiber optic jumpers in each new signal cabinet.

Existing Division Signal System D06-18 - NC 211 (North Roberts Road) Closed Loop System	
Signal Inventory Number and Intersection Description	**Description of Work**
06-0344 NC 211 (North Roberts Avenue) at I-95 SB Ramps and SR 1586 (Lackey Street) (Existing) 06-0879 NC 211 (North Roberts Avenue) at SR 1792 (Kahn Drive) (Existing) 06-1392 NC 211 (North Roberts Avenue) at I-95 SB Ramps (New) 06-1393 NC 211 (North Roberts Avenue) at I-95 NB Ramps (New) 06-0345 NC 211 (North Roberts Avenue) at I-95 NB Ramps SR 1590 (North Rowland Avenue) (Existing)	The Design-Build Team shall replace the existing 12-fiber trunk line along NC 211 (North Roberts Road) from the I-95 SB Ramps to SR 1792 (Kahn Drive) with a 24-fiber trunk line. The Design-Build Team shall splice this new 24-fiber trunk line into an existing 24-fiber trunk line to be installed by others at or near 06-0879. The Design-Build Team shall install aerial or underground fiber optic splice enclosures at or near each signal and install a new 12-fiber drop cable to each signal cabinet. The Design-Build Team shall maintain the existing 900 MHz wireless communications between 06-0344 and 06-0879 until the new 24-fiber trunk line is installed, spliced, and fully operational. The Design-Build Team shall maintain the existing 900 MHz wireless communications at 06-0345 - NC 211 (Roberts Avenue) at I-95 NB Ramps, until it is removed from service. The Design-Build Team shall install temporary 900 MHz wireless communications at 06-1393 NC 211 (Roberts Avenue) at I-95 NB Ramps and 06-0345 NC 211 (Roberts Avenue) at I-95 NB Ramps until these two signals can be added to the new 24-fiber trunk line. The Design-Build Team shall install new Ethernet switches in each new signal cabinet. The Ethernet switch must be 100% compatible with the existing system. The Design-Build Team shall install new fiber optic interconnect centers, fiber optic pigtails, and fiber optic jumpers in each new signal cabinet.

B. 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 aerially. 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 1098-5 and 1716 of the 2018 NCDOT *Standard Specifications for Roads and Structures* 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 1098-5 and 1716 of the 2018 NCDOT *Standard Specifications for Roads and Structures* and have minimum inside dimensions of 30" (l) x 15" (w) x 24" (d).

Store 50-foot of spare cable for each cable, in all junction boxes and in 20-foot of spare cable in all signal cabinets.

Furnish junction box lids with "NCDOT Fiber Optic" logo.

C. 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 2018 *NCDOT Standard Specifications for Roads and Structures* requirements. Materials, where applicable, shall be pre-approved on the Department's QPL. The QPL web site is:

https://connect.ncdot.gov/resources/safety/Pages/default.aspx

Prior to incorporation, the Design-Build Team shall provide detailed specifications for all material, equipment and / or work that is not covered in the 2018 *NCDOT Standard Specifications for Roads and Structures* for Department approval. The Design-Build Team shall provide specifications and plans that address the material requirements and construction methods. No equipment or material shall be installed until it has been approved by the Department in writing. Catalog cuts will not be required for items on the QPL. Items not listed on the QPL will require Department written approval prior to incorporation.

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 Frank West, Division 6 Traffic Engineer during normal business hours (910-864-0606), 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.

D. 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.

E. 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
- Hard copy documentation on 22 x 34 inch plan sheets

- Final location and depth of conduits, wiring external to the cabinets, locations of splice closures, junction box locations, and 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.

F. 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://www.scio.nc.gov/mission/itPoliciesStandards.aspx

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.

G. 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 #32 for Failure to Repair a Damaged NCDOT ITS and / or Signal 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, the NCDOT Division Traffic Engineer (910-864-0606) and STOC. The Design-Build Team shall repair all damages within 24 hours at no cost to the Department. The Design-Build Team shall bring all affected NCDOT fiber optic communication cables back online within the same 24 hours. A "damaged" NCDOT fiber optic communications cable is any fiber optic communications cable that is determined damaged due to an accidental or unscheduled outage event.

Liquidated Damages for Intermediate Contract Time #32 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 #33 and #34 for Failure to Reestablish NCDOT ITS Fiber Communications

During construction, the Design-Build Team shall coordinate any disruption in NCDOT fiber optic communications with the Engineer, the NCDOT Division Traffic Engineer and STOC. The Design-Build Team shall notify the Engineer, the NCDOT Division Traffic Engineer and STOC 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 approval that defines 1) an anticipated disruption timeframe and 2) a plan of action for reestablishing NCDOT communications 24 hours.

Liquidated Damages for Intermediate Contract Time #33 for failure to reestablish NCDOT fiber optic communications within 24 hours are $ 2,500.00 per day, or any portion thereof.

Liquidated Damages for Intermediate Contract Time #34 for failure to provide a plan that defines 1) an anticipated NCDOT fiber optic communications disruption timeframe and 2) a plan of action for reestablishing NCDOT communications a minimum of 21 calendar days prior to a proposed disruption in service are $10,000.00 per failure.

V. SIGNAL SYSTEM TIMING PLANS

The Design-Build Team shall develop and implement all temporary and final coordinated timing plans for the signal system along NC 72 / NC 711 (Caton Road) and NC 211 (North Roberts Avenue). This work 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 (i.e. a.m., p.m., noon, off-peak, etc.)
- School / Universities start / end and / or class change peak traffic periods
- Seasonal traffic patterns
- Pre-scheduled holiday(s) traffic patterns
- Incident management traffic patterns (i.e. detour routes, hurricane evacuations, etc.)
- Other special events traffic patterns

The Design-Build Team shall select a Private Engineering Firm (PEF) that is prequalified by NCDOT in *Discipline Code 210 - Signal System Timing Development and Implementation* and under the direct charge of a North Carolina certified Professional Engineer.

The Design-Build Team shall coordinate the number of timing plans with the Division and the Signal System Timing and Operations (SSTO) Section. The Design-Build Team shall submit a set of preliminary signal system timing plans, with supporting *Tru-Traffic*, *SYNCHRO* 9.0, and *Translink32* database files, to the SSTO Section and Division 6. All Signal System Timing Plans shall be reviewed and accepted by the SSTO Section and / or Division 6 prior to implementation. The Design-Build Team shall coordinate the development and implementation of all signal system timing plans at the appropriate times, as directed by the Engineer.

The Design-Build Team shall field implement Signal System Timing Plans in accordance with the SSTO Section's and Division 6'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.

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* 9.0, *Tru-Traffic* Reports and data, *Translink32* database files to the SSTO Section and Division 6.

Please note, the Department is developing signal timing plans designed to prioritize I-95 traffic diverted from the freeway during incidents. These timing plans will be designed, implemented, maintained, and activated by the Department. These timing plans shall not to be removed, edited, or otherwise changed by the Design-Build Team.

TRANSPORTATION MANAGEMENT SCOPE OF WORK (7-12-21)

LAWS, STANDARDS AND SPECIFICATIONS

The Design-Build Team shall design the Transportation Management Plan (TMP) in accordance with the requirements of this RFP and the version of the standards listed below that are effective on the Technical Proposal submittal date.

- NCDOT *Standard Specifications for Roads and Structures*
- NCDOT *Roadway Standard Drawings*
- FHWA *Manual on Uniform Traffic Control Devices* (MUTCD)
- NCDOT *Supplement to the Manual on Uniform Traffic Control Devices* (NCSMUTCD)
- AASHTO *A Policy on Geometric Design of Highways and Streets*
- NCDOT *Roadway Design Manual*
- AASHTO *Roadside Design Guide*
- Americans with Disabilities Act of 1990 (ADA)
- FHWA *Standard Highway Signs*
- NCDOT *Design-Build Submittal Guidelines*
- FHWA *Rule on Work Zone Safety and Mobility* (23 CFR 630 Subpart J and K)
- Transportation Research Board *Highway Capacity Manual*
- NCDOT *Transportation Management Plans Design Manual*

References

The Design-Build Team shall use the references provided on the site below as supplementary guidelines and requirements for the design and implementation of the TMP.

https://connect.ncdot.gov/projects/WZTC/

Prequalification

The Design-Build Team shall select a Private Engineering Firm (PEF) that has experience developing TMPs on comparable projects for the North Carolina Department of Transportation (NCDOT) and prequalified through NCDOT in Work Code 00541 (Traffic Management Plan - Level 1 and 2).

TRANSPORTATION MANAGEMENT PLANS

A pre-design meeting shall take place between the NCDOT Transportation Systems Management & Operations Unit (TSMOU), the Work Zone Traffic Control Group, the Design-Build Team, the Design-Build Unit, the Division Traffic Engineer, the Regional Traffic Engineer, Statewide Operations Center (STOC), local municipalities (if applicable), and any other pertinent NCDOT personnel. Excluding TMPs required prior to coring PVC sleeves in the exiting I-95 median

barrier, TMP submittals shall only be reviewed and accepted by the Department after this pre-design meeting.

The Design-Build Team shall prepare TMPs that include Temporary Traffic Control Plans (TTCP), an Incident Management Plan (IMP), and a Traffic Operations Plan (TOP), the requirements of which are included in this Scope of Work. In accordance with the Public Involvement and Information Scope of Work found elsewhere in this RFP, the Design-Build Team shall assist the Department in the development of a Public Involvement and Information Plan (PIIP).

The Design-Build Team shall produce TMPs for each phase of work that impacts road users. The TMPs shall include details of all planned detours, traffic control devices, striping, and signage applicable to each phase of work. The information on the TMP shall be of sufficient detail to allow verification of design criteria and safety requirements, including but not limited to, typical sections, alignment, striping layout, drop off conditions, and temporary drainage. The Design-Build Team shall develop TMPs that include procedures to communicate TMP information to the public about road and travel conditions within the work zone and affected roadway network.

Transportation Management Phasing Concept

A Transportation Management Phasing Concept (TMPC) shall be prepared by the Design-Build Team to present the Design-Build Team's approach to all areas covered under the TMP, including but not limited to, hauling of materials to, from, and within the project right of way. The Design-Build Team shall include the TMPC in the Technical Proposal. The Design-Build Team shall submit the TMPC for Department review and acceptance and shall address NCDOT comments on the TMPC prior to commencing production of the TMP for each phase of work or any construction. Any changes to the TMPC after acceptance by NCDOT shall require a submittal for review prior to any future phasing submittals.

Incident Management Plan

The Design-Build Team shall be an active partner in developing an Incident Management Plan (IMP) in and around the work zone.

The Design-Build Team shall develop an IMP that documents 1) the roles and responsibilities of each response agency that may participate in traffic incident management activities, and 2) the procedural and coordination aspects of managing unplanned incidents on I-95 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 construction of the project.

The IMP shall be developed in coordination with the Division Traffic Engineer, State Traffic Operations Engineer and response agencies; and shall be reviewed and accepted by the Department and the STOC. During development of the IMP, a minimum of two coordination meetings shall take place between the Design-Build Team and all relevant NCDOT incident management

personnel and response agencies. Once accepted by the Department and the STOC, the Design-Build Team shall share the IMP with all response agencies to ensure they have a clear understanding of the procedures and available resources for responding to, processing of, and clearing unplanned incidents.

Excluding traffic operations required to core PVC sleeves in the existing I-95 median barrier, the Design-Build Team shall not begin any construction activities that disrupt traffic operations on I-95, in the Departments 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 NCDOT Division 6 Traffic Services Office (TSO) and STOC, and 3) the Design-Build Team has installed all temporary stationary signing for all Incident Management Routes.

Prior to coring PVC sleeves in the exiting I-95 median barrier, the Design-Build Team shall:

- Document and distribute the contact matrix, as noted below in the IMP Contact Information section.
- Provide and install four temporary PCMSs and three portable CCTV Cameras to be used solely for incident management at the following locations. These ITS devices are included in the minimum number of devices for incident management required below in the Temporary Portable ITS Devices Section.

    - PCMS

        - I-95 northbound, south of Exit 19, (approximately Station 350+00 - L-)
        - US 301 southbound, near Robeson Community College (north of I-95)
        - I-95 southbound, north of Exit 22 (approximately Station 575+00 -L-)
        - Fayetteville Road southbound, just north of NC 211

    - Portable CCTV Cameras

        - I-95, south of Exit 20, near Tractor Supply Company (approximately Station 405+00 -L-)
        - I-95, north of Exit 20, near Golden City Buffet (approximately Station 455+00 -L-)
        - I-95, north of Exit 22, near Robeson Community College (approximately Station 540+00 -L-)

At a minimum, the IMP shall address 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
- City of Lumberton
- Law enforcement
- Fire / Rescue
- 911 dispatch
- Towing and recovery
- Emergency Medical Service (EMS)
- Hazardous materials
- Media
- Coroner and Medical Examiner
- Emergency Management

During construction, the Design-Build Team shall hold monthly meetings with incident management personnel and response agencies. These meetings may be incorporated into regular MOT or Traffic Task Force Meetings. Additionally, the Design-Build Team shall hold After Action Review meetings with incident management personnel, response agencies, and all other relevant parties following fatal and major traffic incidents.

IMP Contact Information

The Design-Build Team shall develop a contact matrix of local emergency response agencies and Design-Build Team points of contact for traffic incidents.

IMP Incident Management Routes

Preliminary Incident Management Routes with portable incident management ITS device locations will be provided by the Department. The Design-Build shall provide, install and maintain a minimum of 40 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 of ITS devices for incident management (portable changeable message signs (PCMS) and portable CCTV cameras)
- Existing stationary and temporary alternate route signing locations (reference *NCUTCD Item No. 18A-GMI-01)*
- Police traffic control during incident response plan activation (e.g. at stop-controlled intersections)
- Signal locations
- Median access locations available for emergency response vehicles on I-95
- Route identification using NCDOT naming convention (e.g. I95S MM 33-25)

Prior to routing traffic on an alternate 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 Division 6 TSO 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)

The Design-Build Team shall issue a Lane Closure Notice (LCN) to NCDOT and affected government entities a minimum of thirty (30) calendar days prior to the publication of any notices or placement of any traffic control devices associated with lane closures, detour routing, or other change in traffic control requiring lane closures. The Design-Build Team will be allowed to issue a single LCN for multiple / consecutive lane closures that occur in the same location. For a LCN

utilizing a non-NCDOT controlled facility, the Design-Build Team shall secure concurrence, in writing, from the controlling government entity.

A LCN shall contain the estimated date, time, duration, and location of the proposed work. The Design-Build Team shall keep NCDOT informed of any and all changes or cancellations of proposed lane closures prior to the date of their implementation.

If an emergency condition should occur, a LCN shall be provided to NCDOT within two (2) days after the event. For non-NCDOT controlled facilities, the Design-Build Team shall immediately notify the controlling government entity.

Road Closure Notice (RCN)

Proposed road closures on any road shall be approved by the Engineer prior to incorporation in the TMP and shall adhere to the following requirements:

- Except as allowed in ICT #6, I-95 shall not be closed.
- Except as allowed in ICT #8, NC 72 / NC 711 (Caton Road) shall not be closed.
- Except as allowed in ICT #8 and ICT #23, NC 211 (North Roberts Avenue) shall not be closed.
- Except as allowed in ICT #24 and ICT #25, SR 1536 (Carthage Road) shall not be closed.
- Except as allowed in ICT #7, ICT #9 - ICT #22 and ICT #25, all ramps and loops shall remain open.
- Except as allowed in ICT #26 and ICT #29, SR 1791 (Dawn Drive) shall not be closed.
- Except as allowed in ICT #27, SR 1792 (Khan Drive) and Tartan Road shall not be closed.
- Except as allowed in ICT #28, SR 1593 (Jonathan Drive) shall not be closed.
- Except as allowed in ICT #26, Wellington Road shall not be closed.
- Except as allowed in ICT #29, Nelson Way shall not be closed.
- Except as allowed in ICT #31, Dunn Road shall not be closed.
- Excluding the aforementioned allowable road closures, all roads 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 Road Closure Notice (RCN) to NCDOT and affected government entities a minimum of thirty (30) calendar days prior to the publication of any notices or placement of any traffic control devices associated with road closures, detour routing, or other change in traffic control requiring road closures. For a RCN utilizing a non-NCDOT controlled facility, the Design-Build Team shall secure concurrence, in writing, from the controlling government entity.

A RCN shall contain the estimated date, time, duration, and location of the proposed work. The Design-Build Team shall keep NCDOT and any other affected government entity informed of any and all changes or cancellations of proposed road closures prior to the date of their implementation.

If an emergency condition should occur, a RCN shall be provided to NCDOT within two (2) days after the event. For non-NCDOT controlled facilities, the Design-Build Team shall immediately notify the controlling government entity.

STOC Coordination

Lane Closures

In addition to the aforementioned minimum thirty (30) calendar day notice for a LCN, the Design-Build Team shall notify the STOC when the process of closing a lane, ramp or paved shoulder begins.

Lane Opening

The Design-Build Team shall notify the STOC when the process of re-opening a lane, ramp or paved shoulder begins, and again when the lane, ramp 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:

Roadway	Minimum Level of Pedestrian Accommodation
NC 72 / NC 711 (Caton Road) VFW Road SR 1536 (Carthage Road) NC 211 (North Roberts Avenue)	Absence of Need

https://connect.ncdot.gov/projects/WZTC/Pages/PedSafety.aspx

On all roadways within the project limits, the Design-Build Team shall provide safe access for wide-loads and oversized permitted vehicles through the work zone. Safe access shall include, but not be limited to, a sufficient pavement structure (Reference the Pavement Management Scope of Work found elsewhere in this RFP), maintaining the existing vertical clearance of overhead structures, providing the required vertical clearance of proposed overhead structures, and providing the minimum horizontal clear widths as follows:

Roadway	Minimum Clear Width *
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.

** Unless noted otherwise elsewhere in this RFP.

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.

- Coordinate and cooperate with the NCDOT Division 6 TSO and STOC to ensure proper messages are displayed on the DMSs and any PCMSs that are required to communicate with the NCDOT Division 6 TSO 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.

- 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 1101-13 of the 2018 *Standard Specifications for Roads and Structures*, a work zone supervisor may fulfill the role of the work zone installer during the setup, installation, and removal of temporary traffic control devices within any highway right of way, provided they are on site and directing the installation and removal of temporary traffic control devices.

At a minimum, all other individuals participating in the setup, installation, and removal of temporary traffic control devices within any highway right of way shall be certified as a qualified flagger in accordance with Article 1150-3 of the 2018 *Standard Specifications for Roads and Structures*, even if flagging is not being performed as part of the traffic control operation.

Prior to or at the preconstruction conference, the Design-Build Team shall provide the name and contact information of all qualified work zone installers to the Engineer. Additionally, the Design-Build Team shall provide a qualification statement that all other individuals participating in the setup, installation, and removal of temporary traffic control devices are qualified flaggers that have been properly trained through an NCDOT approved training agency.

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 Design-Build Unit prior to incorporation.

Excluding areas within 1,000 feet of a signalized intersection, channelizing device spacing shall not exceed a distance in feet equal to twice the posted speed limit. When channelizing devices are installed within 1,000 feet of a signalized intersection, their spacing shall not exceed a distance in feet equal to the posted speed limit. Channelizing devices shall be spaced ten feet on-center in radii. Channelizing devices shall be two feet off the edge of an open travelway when lane closures are not in effect. Skinny drums shall only be allowed as defined in Section 1180 of the NCDOT *Standard Specifications for Roads and Structures*.

Place Type III barricades, with "ROAD CLOSED" signs (R11-2) attached, of sufficient length to close entire roadway. Stagger or overlap barricades as needed to allow for ingress or egress.

PCMS should be placed off the shoulder of the roadway and behind a traffic barrier, if practical. Where placement of a traffic barrier is not practical to shield the PCMS, the PCMS should be placed off the shoulder and outside of the clear zone. If a PCMS must be placed on the roadway shoulder or within the clear zone, it shall be delineated with retroreflective temporary traffic control (TTC) devices. When PCMSs are not being used to display TTC messages, they shall be relocated such that they are outside of the clear zone or shielded behind a traffic barrier and turned away from traffic.

If any trailer mounted traffic control device must be placed on the roadway shoulder or within the clear zone, it shall be delineated with retroreflective temporary traffic control (TTC) devices.

All traffic control devices, including but not limited to, temporary or permanent barrier systems, shall be placed / located a minimum two-foot offset (shy distance) from the edge of an open travel lane.

Temporary Portable ITS Devices

In addition to the PCMSs required by the NCDOT Roadway Standard Drawings and portable devices required in the ITS Scope of Work found elsewhere in this RFP, the Design-Build Team shall provide a minimum of ten temporary PCMSs and seven portable CCTV cameras to be used solely for incident management. The Design-Build Team shall provide additional temporary PCMSs and portable CCTV cameras for incident management, as necessary, along alternate Incident Management Routes developed by the Design-Build Team. (Reference the IMP Incident Management Routes Section of this Scope of Work) The Design-Build Team will be allowed to relocate temporary PCMSs and portable CCTV cameras from an inactive Incident Management Route to an active Incident Management Route.

The PCMSs for incident management shall be used to display alternate route information ahead of detour points for incidents in the project area. The Design-Build Team shall coordinate with the STOC when alternate route information needs to be displayed. In the event of an incident, the STOC will control the applicable PCMSs to provide incident management information to motorists.

The temporary portable ITS devices for incident management shall be installed, relocated as necessary, operated, and maintained from the initiation of project construction to project completion or completion of their usefulness as determined by the Engineer.

A preliminary location plan for the incident management ITS devices will be provide 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 existing software utilized by the NCDOT Division 6 TSO and STOC and have the functionality to be operated locally in the field and controlled remotely from the NCDOT Division 6 TSO 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 as of the Technical Proposal submittal date. No vendor specific or third-party software will be allowed. PCMSs used solely by the Design-Build Team for daily traffic control operations do not need to communicate with the NCDOT Division 6 TSO or STOC.

The Department will provide cellular modems to establish the communications link between the portable ITS devices for incident management and the NCDOT Division 6 TSO 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 will not be accepted. All modems provided by the NCDOT shall be returned to the NCDOT once the project is complete or the Engineer determines the device is no longer needed. (Reference the ITS Scope of Work found elsewhere in this RFP)

Temporary Traffic Barrier Systems

Placement of temporary traffic barrier systems shall be shown on the TMPC and shall be designed in accordance with the requirements below.

The Design-Build Team shall maintain positive median cross-over protection for the entire I-95 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 a temporary crash cushion unless the approach end of the temporary traffic barrier system is offset from oncoming traffic as follows:

Posted speed limit (mph)	Minimum offset (feet)
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. Unless permitted otherwise by the barrier manufacturer, the paved surface shall extend a minimum of two feet behind all unanchored barrier.

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' beyond the start of the merge taper before flaring back towards the travel lanes in accordance with Roadway Standard Drawing No. 1101.11, Sheet 3 of 4.

When temporary traffic barrier is placed on a roadway shoulder, the Design-Build Team shall install shoulder closure signs and devices in advance of the barrier in accordance with the NCDOT Roadway Standard Drawings.

The Design-Build Team shall not place temporary traffic barrier in any paved gore area. If the work cannot be safely performed without placing temporary traffic barrier in the paved gore area, the Design-Build Team shall temporarily close the ramp or loop in accordance with ICT #9 - ICT #22.

Temporary traffic barrier used for traffic control shall not act as a retaining wall.

Temporary Alignments and Traffic Shifts

The Design-Build Team shall notify the Engineer in writing at least thirty (30) calendar days prior to any traffic pattern alteration. (Reference the Public Involvement and Information Scope of Work found elsewhere in this RFP).

Excluding median crossovers, the design speed for temporary alignments of interstates, US routes, and NC routes shall not be lower than the current posted speed limit. The minimum allowable design speed for temporary alignments on secondary roads shall be the higher of 10 mph below the posted speed limit or 35 mph.

All on-site detours shall meet the minimum number of existing lanes per direction and shall adhere to all temporary alignment requirements noted elsewhere in the RFP. All pavement transitions, including but not limited to cross slopes / superelevation, at on-site detour tie-ins shall adhere to the on-site detour design speed.

The Design-Build Team shall provide a smooth pavement surface for traffic at all times. The Design-Build Team shall not place traffic on lanes containing rumble strips unless the Design-Build Team mills the rumble strips and installs a uniform overlay on the lane prior to placing traffic on the lane. (Reference the Pavement Management Scope of Work found elsewhere in this RFP)

For temporary traffic patterns that will remain in place for a period longer than three days, including but not limited to traffic shifts, merges, and temporary alignments, breaks in the superelevation and / or breaks in a normal crown section will not be allowed within the shifting taper. Excluding the aforementioned temporary traffic patterns, breaks in the superelevation and / or breaks in a normal crown section shall only occur on a lane line or lane midpoint, and shall not exceed 0.04.

The Design-Build Team shall provide proper drainage for all temporary alignments and / or traffic shifts.

The NCDOT Roadway Standard Drawing No. 1101.11 shall be used to calculate the length of temporary merges for lane closures and temporary traffic shifts. All straight-line traffic shifts on interstate and US routes shall be designed for the full L distance (L = width of traffic shift times speed limit in mph).

Straight line traffic shifts of six feet or greater shall have the appropriate lane shift warning signs and solid white line pavement markings that separate the travel lanes. For straight line traffic shifts less than six feet, the need for signing and solid line pavement markings shall be determined by the Design-Build Team and accepted by the Department.

Temporary traffic shifts that are not covered by a standard and / or require vertical grades shall be considered a temporary alignment. All temporary alignments shall adhere to the NCDOT *Roadway Design Manual*, including all revisions, 2018 AASHTO *A Policy on Geometric Design of Highways and Streets* and the most current Transportation Research Board *Highway Capacity Manual*.

Lane and Shoulder Requirements

Unless permitted otherwise elsewhere in this RFP, maintain the existing number of travel lanes on all roads. The Design-Build Team shall adhere to the minimum lane width requirements noted below. Maintaining these requirements will not be considered lane narrowing:

- Existing travel lanes that are equal to or greater than 11 feet wide, maintain minimum 11-foot travel lanes.

- Existing travel lanes that are narrower than 11 feet, maintain the existing travel lane widths.

Maintain a minimum inside and outside paved shoulder width of four feet in each direction of I-95 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. The distance between lane closures shall be measured from the end of one closure to the beginning of the taper of the next lane closure.

Through traffic traveling in the same direction shall not be split, including separation by any type of barrier, bridge piers, existing or proposed median, or any other device.

The Design-Build Team shall remove lane closure devices from the lane when work is not being performed behind the lane closure or when a lane closure is no longer needed.

Place sets of three drums perpendicular to the edge of the travelway on 500-foot centers when unopened lanes are closed to traffic. These drums shall be in addition to channelizing devices.

When personnel and / or equipment are working within 15 feet of an open travel lane, the Design-Build Team shall close the nearest open shoulder using the NCDOT Roadway Standard Drawings, unless the work area is protected by an approved temporary traffic barrier or guardrail.

When personnel and / or equipment are working on the shoulder adjacent to an undivided facility and within five feet of an open travel lane, the Design-Build Team shall, at a minimum, close the

nearest open travel lane using the NCDOT Roadway Standard Drawings, unless the work area is protected by an approved temporary traffic barrier or guardrail.

When personnel and / or equipment are working on the shoulder adjacent to a divided facility and within ten feet of an open travel lane, the Design-Build Team shall, at a minimum, close the nearest open travel lane using the NCDOT Roadway Standard Drawings, unless the work area is protected by an approved temporary traffic barrier or guardrail.

When personnel and / or equipment are working within a lane of travel of an undivided or divided facility, the Design-Build Team shall, at a minimum, close the lane using the NCDOT Roadway Standard Drawings. The Design-Build Team shall conduct the work so that all personnel and / or equipment remain within the closed travel lane.

The Design-Build Team shall not perform work involving heavy equipment within 15 feet of the edge of travelway when work is being performed behind a lane closure on the opposite side of the travelway.

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 government entity, in writing, use only state-maintained roads for off-site detour routes.

All proposed road closures, detour routes, durations, and justifications shall be incorporated into the Technical Proposal. (All proposed road closures, detour routes, durations and justifications incorporated into the Technical Proposal shall require Department approval.)

Impacts to Other Network Roadways

The Design-Build Team shall coordinate with the Division Maintenance Engineer, Resident Engineer, Division Traffic Engineer, Rail Division, and STOC to manage traffic operations within the work zone and other roadways within the network that may be affected by the work zone activities. Coordination shall include, but not limited to, providing notification of planned lane or road closures, traffic detours, public information, traffic management, access management, and incidents.

On all roads, the Design-Build Team shall make all modifications to existing pavement markings, markers, and / or signing located outside the project limits that are necessitated by the TMP. Additionally, the Design-Build Team shall readjust the markings, markers, and / or signing located outside the project limits to the existing / proposed pattern when the temporary changes are no longer needed.

The Design-Build Team shall take steps to minimize disruptions to existing roadway facilities during construction and shall demonstrate in the TMPC how the traffic control phasing minimizes inconvenience to motorists on all roads.

Pavement Edge Drop-off Requirements

Using suitable compacted material, the Design-Build Team shall backfill with a 6:1 or flatter slope up to the edge and elevation of the existing pavement in areas adjacent to an open travel lane that has an edge of pavement drop-off as follows:

- Elevation differences greater than two inches on roadways with posted speed limits of 45 mph or greater and a paved shoulder four-foot wide or less.

- Elevation differences greater than three inches on roadways with posted speed limits less than 45 mph and a paved shoulder four-foot wide or less.

- Refer to the current AASHTO *Roadside Design Guide* for proper treatment of all other conditions.

Do not exceed a difference of two inches in elevation between open lanes of traffic for nominal lifts of 1.5 inches. Install advance warning "UNEVEN LANES" signs (W8-11) 1,000 feet in advance and a minimum of every half mile throughout the uneven area.

Signing

The Design-Build Team shall install advance work zone warning signs when work is within 40 feet from the edge of travel lane. The advance work zone warning signs shall be installed no more than three days prior to beginning construction.

When no work is being conducted for a period longer than one week, the Design-Build Team shall remove or cover all advance work zone warning signs, as directed by the Engineer. Stationary work zone warning signs shall be covered with an opaque material that prevents reading of the sign at night by a driver traveling in either direction.

When portable work zone signs are not in use for periods longer than 30 minutes, the Design-Build Team shall lay the portable work zone sign flat on the ground and collapse the sign stand and lay it flat on the ground.

The Design-Build Team shall install and maintain all detour signing and devices required for road closures. The Design-Build Team shall cover or remove all detour signs and devices required for road closures, within and outside of the project limits, when a detour is not in operation.

The Design-Build Team shall ensure proper signing is in place at all times during construction as required by the MUTCD. Guide signs shall be maintained and modified, as required by the TMP, throughout the entire project construction duration. All temporary signing shall be shown on the TTCP, IMP, and / or Temporary Signing Plans to be reviewed and approved by the Work Zone Traffic Control Section, the Signing and Delineation Unit and STOC as appropriate, prior to incorporation.

Temporary Pavement Markings, Markers, and Delineation

The Design-Build Team shall install pavement markings and markers in accordance with the NCDOT *Standard Specifications for Roads and Structures*, and in accordance with the manufacturer's procedures and specifications.

The Design-Build Team shall install temporary pavement markings and markers for temporary traffic patterns as follows:

Road	Marking	Marker
I-95, including all ramps and loops (excluding structures)	Work Zone Performance Pavement Markings (Reference the *Work Zone Performance Pavement Markings* Project Special Provision found elsewhere in this RFP)	Raised Temporary
All other roads and structures	Excluding polyurea, any marking on the Approved Product List	Raised Temporary

Temporary pavement markings on concrete surfaces shall only be removed by hydroblasting.

Prior to shifting traffic to a new pattern on I-95, including all ramps and loops, the Design-Build Team shall remove all conflicting markers and snowplowable marker castings, and patch all casting holes. In transitional areas that shift traffic from one alignment onto another and in interchange gore areas, the Design-Build Tam shall conceal all pavement markings with a uniform pavement overlay. (Reference the Pavement Management Scope of Work found elsewhere in this RFP) The Design-Build Team may place the aforementioned uniform overlay concurrently with the traffic shift or within 72 hours after traffic has been shifted. Performance pavement markings shall be used throughout the entire traffic shift, including transitional and tangential areas. Interim paint may be used until the performance pavement markings can be placed. The Design-Build Team shall conceal, in accordance with the requirements above, remove, or mill and fill all other conflicting markings.

Prior to shifting traffic to a new pattern on all other roads, the Design-Build Team shall remove all conflicting markers and snowplowable marker castings, patch all casting holes, and conceal (in accordance with the requirements above), remove, or mill and fill all conflicting markings.

Unless noted otherwise elsewhere in this RFP, removal of the temporary pavement markings on asphalt surfaces shall be accomplished by an NCDOT approved system to minimize damage to the road surface. Pavement markings shall not be obscured with any type of black pavement markings (paint or other material). The Design-Build Team shall remove all temporary pavement markings without removing more than 1/32 inch of the pavement surface.

The Design-Build Team shall tie proposed pavement marking lines to existing pavement marking lines.

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. Grinding as a method of pavement marking removal will not be permitted.

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 show temporary pavement markings on the TMP that meet the requirements of the RFP and the NCDOT *Transportation Management Plans Design Manual*.

The Design-Build Team shall only use pavement marking and marker products that conform to all NCDOT requirements and are listed on the NCDOT Approved Products List. The use of any devices that are not shown on the NCDOT Approved Products List shall require written approval from the Design-Build Unit prior to incorporation.

The Design-Build Team shall install temporary pavement markings that are the same width as existing pavement markings. For roadways that do not have existing pavement markings, the Design-Build Team shall install temporary pavement markings that are the same width required for the final pavement markings in the Pavement Markings Scope of Work found elsewhere in this RFP.

For Work Zone Performance Pavement Markings, the Design-Build Team shall maintain a minimum retroreflectivity in accordance with the *Work Zone Performance Pavement Markings* Project Special Provision found elsewhere in this RFP. For all other pavement markings, the Design-Build Team shall maintain a minimum retroreflectivity for existing and temporary pavement markings at all times during construction as follows:

White:	125 mcd/lux/m2
Yellow:	100 mcd/lux/m2

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

The Design-Build Team shall trace existing and / or proposed monolithic island locations with the proper color pavement marking prior to removal and / or installation. The Design-Build Team shall place drums to delineate existing and / or proposed monolithic islands after the removal and / or before installation.

The Design-Build Team shall not place temporary markings other than Cold Applied Plastic Type 4 - Removable Tape on any final pavement surface unless the temporary markings are placed in the exact location of the final pavement markings.

The Design-Build Team shall readjust the markings, markers, and / or signing located outside the project limits to the existing / proposed pattern when the temporary changes are no longer needed.

Temporary Traffic Signals

At all intersections, multi-lane turn lanes shall be 15 feet in width at the midpoint of the turn.

If the Design-Build Team proposes temporary traffic signals for maintenance of traffic, include the following as part of the TMP General Notes:

- Notify the Engineer in writing a minimum of two months before a temporary traffic signal installation is required.

- Shift and revise all signal heads as shown on the accepted Traffic Signal Plans.

Lighting

The Design-Build Team shall provide portable temporary construction and equipment lighting to conduct night work in accordance with the NCDOT *Standard Specifications for Road and Structures*.

For nighttime lane closures along I-95, furnish and install Work Zone Presence Lighting and Sequential Flashing Warning Lights. (Reference the *Work Zone Presence Lighting* and *Sequential Flashing Warning Lights* Project Special Provision found elsewhere in this RFP)

Temporary Shoring for Maintenance of Traffic

Temporary shoring for the maintenance of traffic shall be defined as shoring necessary to provide lateral support to the side of an excavation or embankment parallel to an open travelway when a theoretical 2:1 (H:V) slope from the bottom of the excavation or embankment intersects the existing ground line closer than five feet from the edge of pavement of the open travelway.

The Design-Build Team shall be responsible for all required temporary shoring including designing, furnishing, installing, maintaining, and removing the shoring.

The Design-Build Team shall identify where temporary shoring will be used for maintenance of traffic on the TMPC and include cut sections showing offsets to the travelway.

The Design-Build Team shall install temporary traffic barrier as shown on the “PCB at Temporary Shoring Locations” detail available on the Work Zone Traffic Control website noted below. This detail provides design information on the temporary traffic barrier location in relation to the temporary shoring and traffic location. Notes related to Temporary Shoring are not required in the General Notes sheet for the TMP.

The NCDOT Geotechnical Engineering Unit and Work Zone Traffic Control websites contain more information on the design and use of temporary shoring. The Design-Build Team shall adhere to all additional requirements for temporary shoring located on the websites below:

https://connect.ncdot.gov/resources/Geological/Pages/default.aspx

https://connect.ncdot.gov/projects/WZTC/Pages/Design-Resources.aspx

Law Enforcement

Law enforcement officers shall be used during any rolling roadblock operation and to direct traffic when installing / removing / shifting traffic signal heads at intersections. Law enforcement officers may be used to maintain traffic through the work area and / or intersections. The use of law enforcement officers shall adhere to the following requirements:

- The Design-Build Team shall be responsible for coordinating with the law enforcement agency for the use of law enforcement officers.

- The Design-Build Team shall only utilize officers who are outfitted with law enforcement uniforms and marked vehicles equipped with proper lights mounted on top of the vehicle and agency emblems.

- The Design-Build Team shall coordinate with the Engineer where and how law enforcement officers will be used during construction.

The Design-Build Team shall address where and how law enforcement officers will be used in the Technical Proposal.

PROJECT REQUIREMENTS AND TIME RESTRICTIONS

All time restrictions and notes shall be included in the TMP General Notes, unless noted otherwise elsewhere in this RFP.

In the event any self-imposed liquidated damages are included in the Technical Proposal, an Intermediate Contract Time(s) shall be established and shall become part of the contract.

Intermediate Contract Times #2, #3, #4 and #5 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 #7 found elsewhere in this Scope of Work.

Intermediate Contract Time	Facility	Days	Time Restrictions
#2	I-95	Monday through Thursday	6:00 a.m. to 7:00 p.m.
		Friday through Sunday	6:00 a.m. to 9:00 p.m.
#3	All ramps and loops	Monday through Thursday	6:00 a.m. to 7:00 p.m.
		Friday through Sunday	6:00 a.m. to 9:00 p.m.
#4	NC 72 / NC 711 (Caton Road) NC 211 (North Roberts Avenue)	Monday through Sunday	7:00 a.m. to 8:00 p.m.
#5	All Other Roads	Monday through Friday	7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m.

In addition, the Design-Build Team shall not close or narrow a lane of traffic on the aforementioned facilities, detain, and / or alter the traffic flow on or during holidays, holiday weekends, special events, or any other time when traffic is unusually heavy. At a minimum, these requirements / restrictions shall apply to the following schedules:

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

- For New Year's between the hours of 6:00 a.m. December 31st and 8:00 p.m. January 2nd. If New Year's Day is on a Friday, Saturday, Sunday or Monday then between the hours of 6:00 a.m. December 31st and 9:00 p.m. the following Tuesday.

- For Easter, between the hours of 6:00 a.m. Thursday and 9:00 p.m. Monday.

- For Memorial Day, between the hours of 6:00 a.m. Friday and 8:00 p.m. Tuesday.

- For Independence Day, between the hours of 6:00 a.m. July 3rd and 8:00 p.m. July 5th. If Independence Day is on a Friday, Saturday, Sunday or Monday, then between the hours of 6:00 a.m. the Thursday before Independence Day and 8:00 p.m. the Tuesday after Independence Day.

- For Labor Day, between the hours of 6:00 a.m. Friday and 8:00 p.m. Tuesday.

- For Thanksgiving Day, between the hours of 6:00 a.m. Tuesday and 8:00 p.m. Monday.

- For Christmas, between the hours of 6:00 a.m. the Friday before the week of Christmas Day and 8:00 p.m. the following Tuesday after the week of Christmas Day.

Liquidated Damages for Intermediate Contract Time #2 for the above lane narrowing, lane closures, holiday and special event time restrictions on I-95 are $2,500.00 per 15-minute period or any portion thereof.

Liquidated Damages for Intermediate Contract Time #3 for the above lane narrowing, lane closures, holiday and special event time restrictions on all ramps and loops are $1,000.00 per 15-minute period or any portion thereof.

Liquidated Damages for Intermediate Contract Time #4 for the above lane narrowing, lane closures, holiday and special event time restrictions on NC 72 / NC 711 (Caton Road) and NC 211 (North Roberts Avenue) are $1,500.00 per 15-minute period or any portion thereof.

Liquidated Damages for Intermediate Contract Time #5 for the above lane narrowing, lane closures, holiday and special event time restrictions on all other roads are $500.00 per 15-minute period or any portion thereof.

Intermediate Contract Times #6, #7 and #8 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-95 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.

Intermediate Contract Time	Facility	Days	Time Restrictions
#6	I-95	Monday through Sunday	5:00 a.m. to 11:00 p.m.
#7	All ramps and loops	Monday through Sunday	5:00 a.m. to 11:00 p.m.
#8	NC 72 / NC 711 (Caton Road) NC 211 (North Roberts Avenue)	Monday through Sunday	6:00 a.m. to 10:00 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 of 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 #6 for the above road closure time restrictions for construction operations on I-95 are $5,000.00 per 15-minute period or any portion thereof.

Liquidated Damages for Intermediate Contract Time #7 for the above road closure time restrictions for construction operations on all ramps and loops are $1,000.00 per 15-minute period or any portion thereof.

Liquidated Damages for Intermediate Contract Time #8 for the above road closure time restrictions for construction operations on NC 72 / NC 711 (Caton Road) and NC 211 (North Roberts Avenue) are $2,500.00 per 15-minute period or any portion thereof.

Intermediate Contract Times #9 - #22 for Ramp Reconstruction

One road closure, with an approved offsite detour, will be permitted for the reconstruction of each ramp / loop listed below, for the maximum durations listed below. The Design-Build Team shall not concurrently close 1) multiple ramps / loops at an interchange or 2) any ramps / loops at interchanges adjacent to the interchange undergoing ramp / loop reconstruction.

Intermediate Contract Time	Interchange	Day	Duration (Per ramp or loop)	Liquidated Damages (per hour or any portion thereof)
#9	I-95 southbound exit ramp onto NC 72 / NC 711 (Caton Road)	From Friday at 9:00 p.m. until 12:00 p.m. the second Saturday	183 consecutive hours	$2,000.00
#10	I-95 southbound entrance ramp from NC 72 / NC 711 (Canton Road)	From Friday at 9:00 p.m. until 6:00 a.m. Monday	57 consecutive hours	$500.00
#11	I-95 northbound exit ramp onto NC 72 / NC 711 (Caton Road)	From Friday at 9:00 p.m. until 6:00 a.m. Monday	57 consecutive hours	$500.00
#12	I-95 northbound entrance ramp from NC 72 / NC 711 (Canton Road)	From Friday at 9:00 p.m. until 12:00 p.m. the second Saturday	183 consecutive hours	$2,000.00
#13	I-95 southbound exit ramp onto SR 1536 (Carthage Road)	From Friday at 9:00 p.m. until 6:00 a.m. the second Monday	225 consecutive hours	$500.00
#14	I-95 southbound entrance ramp from SR 1536 (Carthage Road)	From Friday at 9:00 p.m. until 6:00 a.m. the second Monday	225 consecutive hours	$500.00
#15	I-95 northbound exit ramp onto SR 1536 (Carthage Road)	From Friday at 9:00 p.m. until 6:00 a.m. the second Monday	225 consecutive hours	$500.00

Intermediate Contract Time	Interchange	Day	Duration (Per ramp or loop)	Liquidated Damages (per hour or any portion thereof)
#16	I-95 northbound entrance ramp from SR 1536 (Carthage Road)	From Friday at 9:00 p.m. until 6:00 a.m. the second Monday	225 consecutive hours	$500.00
#17	I-95 southbound exit ramp onto NC 211 (North Roberts Avenue)	From Friday at 9:00 p.m. until 6:00 a.m. the second Monday	225 consecutive hours	$1,000.00
#18	I-95 southbound entrance loop from NC 211 (North Roberts Avenue)	From Friday at 9:00 p.m. until 6:00 a.m. the second Monday	225 consecutive hours	$500.00
#19	I-95 southbound entrance ramp from NC 211 (North Roberts Avenue)	From Friday at 9:00 p.m. until 6:00 a.m. the second Monday	225 consecutive hours	$1,000.00
#20	I-95 northbound exit ramp onto NC 211 (North Roberts Avenue)	From Friday at 9:00 p.m. until 6:00 a.m. the second Monday	225 consecutive hours	$1,000.00
#21	I-95 northbound entrance loop from NC 211 (North Roberts Avenue)	From Friday at 9:00 p.m. until 6:00 a.m. the second Monday	225 consecutive hours	$500.00
#22	I-95 northbound entrance ramp from NC 211 (North Roberts Avenue)	From Friday at 9:00 p.m. until 6:00 a.m. the second Monday	225 consecutive hours	$500.00

The date of availability shall be the Friday 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 hours proposed by the Design-Build Team in the Technical Proposal, and such number of consecutive hours proposed shall not be greater than the consecutive hours noted above.

Liquidated Damages for Intermediate Contract Time #9 for the above road closure time restrictions for ramp reconstruction at the I-95 southbound exit ramp onto NC 72 / NC 711 (Caton Road) are $2,000.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #10 for the above road closure time restrictions for ramp reconstruction at the I-95 southbound entrance ramp from NC 72 / NC 711 (Caton Road) are $500.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #11 for the above road closure time restrictions for ramp reconstruction at the I-95 northbound exit ramp onto NC 72 / NC 711 (Caton Road) are $500.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #12 for the above road closure time restrictions for ramp reconstruction at the I-95 northbound entrance ramp from NC 72 / NC 711 (Caton Road) are $2,000.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #13 for the above road closure time restrictions for ramp reconstruction at the I-95 southbound exit ramp onto SR 1536 (Carthage Road) are $500.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #14 for the above road closure time restrictions for ramp reconstruction at the I-95 southbound entrance ramp from SR 1536 (Carthage Road) are $500.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #15 for the above road closure time restrictions for ramp reconstruction at the I-95 northbound exit ramp onto SR 1536 (Carthage Road) are $500.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #16 for the above road closure time restrictions for ramp reconstruction at the I-95 northbound entrance ramp from SR 1536 (Carthage Road) are $500.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #17 for the above road closure time restrictions for ramp reconstruction at the I-95 southbound exit ramp onto NC 211 (North Roberts Avenue) are $1,000.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #18 for the above road closure time restrictions for ramp reconstruction at the I-95 southbound entrance loop from NC 211 (North Roberts Avenue) are $500.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #19 for the above road closure time restrictions for ramp reconstruction at the I-95 southbound entrance ramp from NC 211 (North Roberts Avenue) are $1,000.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #20 for the above road closure time restrictions for ramp reconstruction at the I-95 northbound exit ramp onto NC 211 (North Roberts Avenue) are $1,000.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #21 for the above road closure time restrictions for ramp reconstruction at the I-95 northbound entrance loop from NC 211 (North Roberts Avenue) are $500.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #22 for the above road closure time restrictions for ramp reconstruction at the I-95 northbound entrance ramp from NC 211 (North Roberts Avenue) are $500.00 per hour or any portion thereof.

Intermediate Contract Time #23 for Interchange Closure Restrictions for DDI Traffic Shift

One interchange closure, (-Y- Line, between the interchange ramps, and all associated ramps / loops), with approved offsite detours, will be permitted to shift traffic to the diverging diamond crossover pattern for the maximum duration listed below. The Design-Build Team shall not concurrently close any ramps / loops at interchanges adjacent to the interchange being closed.

Intermediate Contract Time	Interchange	Day	Duration
#23	I-95 / NC 211 (North Roberts Avenue)	From Friday at 9:00 p.m. until 6:00 a.m. Monday	57 consecutive hours

The date of availability shall be the date the Design-Build Team elects to close the interchange. 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 hours proposed by the Design-Build Team in the Technical Proposal, and such number of consecutive hours proposed shall not be greater than the consecutive hours noted above.

Liquidated Damages for Intermediate Contract Time #23 for the above interchange closure time restrictions for the I-95 / NC 211 (North Roberts Avenue) interchange are $2,500.00 per 15-minute period or any portion thereof.

Intermediate Contract Time #24 for Bridge Removal and Reconstruction

One road closure with an approved offsite detour, will be permitted for bridge removal and reconstruction for the maximum duration listed below. Except as allowed in ICT #7, the Design-Build Team shall maintain ramp / loop access to and from I-95 / SR 1536 (Carthage Road) during this ICT duration.

Intermediate Contract Time	Interchange	Duration
#24	I-95 / SR 1536 (Carthage Road) between the ramp terminals	240 consecutive calendar days

The date of availability shall be the date the Design-Build Team elects to close the road. 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 #24 for the above road closure time restrictions for bridge removal and reconstruction at the I-95 / SR 1536 (Carthage Road) interchange are $2,000.00 per calendar day or any portion thereof.

Intermediate Contract Time #25 for Interchange Closure Restrictions for Constructing the Interchange

One interchange closure, (-Y- Line between the interchange ramps, and all associated ramps / loops), with approved offsite detours, will be permitted to construct the interchange for the maximum duration listed below. The Design-Build Team shall not concurrently close any ramps or loops at interchanges adjacent to the interchange being closed.

Intermediate Contract Time	Interchange	Duration
#25	I-95 / SR 1536 (Carthage Road)	45 consecutive calendar days

The date of availability shall be the date of completion of ICT #24. 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 #25 for the above interchange closure time restrictions for the I-95 / SR 1536 (Carthage Road) interchange are $2,000.00 per calendar day or any portion thereof.

Intermediate Contract Times #26 and #27 for Culvert and Roadway Construction

One road closure, with an approved offsite detour, will be permitted for the simultaneous construction of 1) the eastern ends of the Fivemile Branch and Meadow Branch culverts and 2) the western ends of the Fivemile Branch and Meadow Branch culverts and 3) SR 1791 (Dawn Drive) roadway construction, for the maximum durations listed below. The road closure limits along SR 1791 (Dawn Drive) shall only encompass the area between the Comfort Inn driveway (approximately +/- Station 14+30 -SR4-) and Nelson Way. The road closure limits for Wellington Road shall only encompass the SR 1791 (Dawn Drive) / Wellington Road intersection. Nelson Way shall remain open during the SR 1791 (Dawn Drive) and Wellington Road road closure. The road closure limits for SR 1792 (Khan Drive) shall only encompass the culvert construction limits and the area between the culverts. The road closure limits for Tartan Road shall only encompass

the SR 1792 (Khan Drive) / Tartan Road intersection. The remaining portions of SR 1791 (Dawn Drive), SR 1792 (Kahn Drive), and Tartan Road shall remain open to traffic during the road closure. The Design-Build Team shall provide a temporary turnaround that accommodates a S-BUS-36 at each terminus of the SR 1792 (Khan Drive) road closure. In accordance with the Pavement Management Scope of Work found elsewhere in this RFP, the Design-Build Team shall design and construct an asphalt pavement structure for all turnarounds.

The Design-Build Team shall not concurrently close SR 1791 (Dawn Drive) / Wellington Road and SR 1792 (Kahn Drive) / Tartan Road. The Design-Build Team shall concurrently close SR 1791 (Dawn Drive) and Wellington Road. The Design-Build Team shall concurrently close SR 1792 (Kahn Drive) and Tartan Road.

Intermediate Contract Time	Facility	Duration
#26	SR 1791 (Dawn Drive) and Wellington Road	90 consecutive calendar days
#27	SR 1792 (Khan Drive) and Tartan Road	90 consecutive calendar days

The date of availability shall be the date the Design-Build Team elects to close the road(s). 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 calendar days proposed by the Design-Build Team in the Technical Proposal, and such number of calendar days proposed shall not be greater than the days noted above.

Liquidated Damages for Intermediate Contract Time #26 for the above road closure time restrictions for culvert and roadway construction on SR 1791 (Dawn Drive) and Wellington Road are $1,000.00 per calendar day or any portion thereof.

Liquidated Damages for Intermediate Contract Time #27 for the above road closure time restrictions for culvert and roadway construction on SR 1792 (Kahn Drive) and Tartan Road are $1,000.00 per calendar day or any portion thereof.

Intermediate Contract Time #28 and #29 for Roadway Construction

One road closure, with an approved offsite detour, will be permitted for construction of the roadways below, for the maximum durations listed below. The road closure limits along SR 1791 (Dawn Drive) shall only encompass the area between Wellington Road and the Dawn Drive northern construction limits. The road closure limits on Nelson Way shall only encompass the SR 1791 (Dawn Drive) / Nelson Way intersection. Wellington Road shall remain open during the SR 1791 (Dawn Drive) and Nelson Way road closure period. The Design-Build Team shall not

concurrently close SR 1791 (Dawn Drive) / Nelson Way and SR 1792 (Kahn Drive) / Tartan Road. The Design-Build Team shall concurrently close SR 1791 (Dawn Drive) and Nelson Way.

Intermediate Contract Time	Facility	Duration
#28	SR 1593 (Jonathan Drive)	90 consecutive calendar days
#29	SR 1791 (Dawn Drive) and Nelson Way	30 consecutive calendar days

The date of availability for ICT #28 shall be the date the Design-Build Team elects to close SR 1593 (Jonathan Drive). The date of availability for ICT # 29 shall be the ICT #26 completion date. 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 calendar days proposed by the Design-Build Team in the Technical Proposal, and such number of calendar days proposed shall not be greater than the calendar days noted above.

Liquidated Damages for Intermediate Contract Time #28 for the above road closure time restrictions for roadway construction on SR 1593 (Jonathan Drive) are $1,000.00 per calendar day or any portion thereof.

Liquidated Damages for Intermediate Contract Time #29 for the above road closure time restrictions for roadway construction on SR 1791 (Dawn Drive) and Nelson Way are $1,000.00 per calendar day or any portion thereof.

Intermediate Contract Time #30 for Road Reconstruction

One long-term lane closure, that maintains one-lane, one-way northbound only traffic, will be permitted for reconstruction of the roadway below, for the maximum duration listed below. Within the one-lane, one-way northbound only traffic pattern limits, the minimum horizontal clear roadway width for SR 1592 (Hester Drive) shall be 14 feet.

Intermediate Contract Time	Facility	Duration
#30	SR 1592 (Hester Drive)	60 consecutive calendar days

The date of availability shall be the date the Design-Build Team elects to close 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 calendar days proposed by the Design-Build Team in the Technical Proposal, and such number of calendar days proposed shall not be greater than the calendar days noted above.

Liquidated Damages for Intermediate Contract Time #30 for the above lane closure time restrictions for road reconstruction on SR 1592 (Hester Drive) are $500 per calendar day or any portion thereof.

Intermediate Contract Time #31 for Road Reconstruction

One road closure will be permitted to construct the northbound lane of -SR8- (SR 1592 - Hester Drive) at Dunn Road for the maximum duration listed below. Along SR 1592 (Hester Drive), one-lane, one-way northbound only traffic shall be maintained south of Station 19+00 -SR8- and two-lane, two-way traffic shall be maintained north of Station 19+00 -SR8-, excluding any necessary taper to transition the one-lane, one-way northbound traffic to the two-lane, two-way traffic pattern. The driveways on Dunn Road and SR 1592 (Hester Drive) that access Dobb's Place service station shall remain open during the Dunn Road road closure period. Within the one-lane, one-way northbound only traffic pattern limits, the minimum horizontal clear roadway width for SR 1592 (Hester Drive) shall be 14 feet.

Intermediate Contract Time	Facility	Day	Duration
#31	Dunn Road	From Friday at 6:00 p.m. until 6:00 p.m. Monday	Three consecutive calendar days

The date of availability shall be the Friday the Design-Build Team elects to close Dunn Road and such Friday shall be during the Intermediate Contract Time #30 lane closure. 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 calendar days noted above.

Liquidated Damages for Intermediate Contract Time #31 for the above road closure time restrictions for road reconstruction of the SR 1592 (Hester Drive) northbound lane at Dunn Road are $250.00 per day or any portion thereof.

Hauling Restrictions

The Design-Build Team shall adhere to the hauling restrictions noted in the NCDOT *Standard Specifications for Roads and Structures*.

The Design-Build Team shall conduct all hauling operations as follows:

- The Design-Build Team shall not conduct any hauling operations against the flow of traffic of an open travelway unless an approved temporary traffic barrier or guardrail separates the traffic from the hauling operation.

- All entrances, exits and crossings for hauling to and from the work zone shall be shown on the TMP. Entrances and exits for access to and from medians shall be in accordance with the NCDOT Roadway Standard Drawings and the *Typical Median Access Areas* Project Special Provision found elsewhere in this RFP.

- Haul vehicles shall not enter and / or exit an open travel lane at speeds more than 10 mph below the posted speed limit. Haul vehicle acceleration to within 10 mph of the posted speed limit shall only occur on a paved surface.

- Signs with activated Beacons or LED flashers shall be installed and used when hauling from the median. These signs shall be activated once haul vehicles are detected to warn motorists of vehicles entering the highway from the median. (Reference the *Typical Median Access Areas* Project Special Provision found elsewhere in this RFP)

- Hauling operations that perpendicularly cross a roadway shall require Transportation Management Plans and shall be subject to the lane narrowing / lane closure time restrictions, and holiday and special event time restrictions listed in ICT #2 - ICT #5.

Excluding hauling operations that are conducted entirely behind a temporary traffic barrier or guardrail, multi-vehicle hauling shall not be allowed ingress and egress from any open travel lane during the following time restrictions:

Multi-Vehicle Hauling

Facility	Days	Time Restrictions
I-95, including all ramps and loops	Monday through Thursday	6:00 a.m. to 6:00 p.m.
	Friday through Sunday	6:00 a.m. to 7:00 p.m.

The Design-Build Team shall address how hauling will be conducted in the Technical Proposal, including hauling of any materials to and from the site and hauling material within the NCDOT right of way.

Work Zone Speed Limit Reduction and $250 Speeding Penalty

All speed limits shall be ordinance by the State Traffic Engineer in order to have a lawfully enforceable speed limit. No speed limit messages / signs shall be installed prior to receiving a signed ordinance. NCDOT has sole authority of the speed limits displayed within the work zone.

NCDOT will pursue a Variable Work Zone Speed Limit Reduction Ordinance and $250 Speeding Penalty Ordinance along the I-95 project limits. The speed reduction will range between 55 mph, 60 mph, and 65 mph based on work zone conditions.

A Work Zone Variable Speed Reduction is intended to temporarily reduce the speed within the work zone based on specific traffic control strategies needed during construction. When a Variable Work Zone Speed Limit Reduction Ordinance is in effect, all existing speed limit signs located within the active work area shall be removed or covered. The speed limit shall only be displayed using Digital Speed Limit Signs. Additionally, supplemental signing will be required to notify motorists of the increased fines throughout the ordinance area. Reference *Digital Speed Limit Signs* Project Special Provision found elsewhere in this RFP.

The Design-Build Team shall include all relevant details required of the Work Zone Speed Limit Reduction Ordinance and $250 Speeding Penalty Ordinance in the TMP. The Design-Build Team shall also include any devices or signs required to implement the Variable Work Zone Speed Limit Reduction Ordinance and $250 Speeding Penalty Ordinance in the lump sum bid for the entire project.

NCDOT Contract Towing

The NCDOT anticipates administering a Towing Contract in conjunction with this project. If a Towing Contract is administered by NCDOT, the Design-Build Team's shall be responsible for the following:

- Prior to any construction activity, excluding activities required to core PVC sleeves in the existing I-95 median barrier, the Design-Build Team shall hold a towing coordination meeting with the Design-Build 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.

- The Design-Build Team shall coordinate with the NCDOT Communications Office to ensure the towing operation information is shown on the project website and accurate. This information shall include, but not limited to vehicle tow locations, reasons for work zone towing, time frame allowed before the abandoned vehicle will be towed, how to retrieve the vehicle and any necessary phone numbers for retrieval.

- A representative of the towing service provider(s) shall be invited to regular traffic team meetings (e.g. Traffic Task Force, Maintenance of Traffic, etc.).

UTILITIES COORDINATION SCOPE OF WORK (5-25-21)

**** 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 Design-Build personnel.**

The Design-Build Team shall obtain the services of a Professional Services Firm (PSF) knowledgeable in the NCDOT Utility Coordination Process involved with utility relocation / installation and highway construction. The aforementioned PSF shall be responsible for coordinating all utility relocations, removals and / or adjustments where the Design-Build Team and utility owner, with concurrence from the Department, determine that such work is essential for highway safety and performance of the required highway construction. Coordination shall be for all utilities whether or not they are specifically identified in this Scope of Work and shall include any necessary utility agreements when applicable. NCDOT will be the approving authority for all utility agreements and approval of plans.

During the procurement phase and throughout the project duration, the Design-Build Team will only be allowed direct contact with the utility owners when the aforementioned PSF is present.

In accordance with the requirements herein, the Design-Build Team shall relocate / coordinate the relocation of all existing facilities that are 1) parallel to a roadway in full control of access, 2) in physical conflict with the construction, 3) within the existing or proposed right of way and structurally inadequate, and / or 4) within the existing or proposed right of way, consist of unacceptable material, and the project will change the grade over the facilities and / or heavy equipment is likely to be operated over the facilities. (Reference the NCDOT *Utilities Accommodation Manual*) Proposed / relocated underground facilities that are located beneath the pavement structure shall only be allowed to cross the roadway as close to perpendicular as possible.

Project Details

The Design-Build Team shall be responsible for verifying the utility locations, type of facilities, and identifying the utility owners in order to coordinate the relocation of any utilities, known and unknown, in conflict with the project. The following utilities are known to be located within the project construction limits:

Utility Owner	Utility Type	Cost Responsibility
AT&T	Telecommunications	Utility Company or NCDOT (w/ Approved Prior Rights)
CenturyLink	Telecommunications	Utility Company
Charter / TWC / Spectrum	Telecommunications	Utility Company
Duke Energy	Distribution	Utility Company or NCDOT (w/ Approved Prior Rights)
Duke Energy	Transmission	Utility Company or NCDOT (w/ Approved Prior Rights)
Lumbee River EMC	Distribution	Utility Company or NCDOT (w/ Approved Prior Rights)
Lumberton Power	Distribution	Utility Company or NCDOT (w/ Approved Prior Rights)
Lumberton Water & Sewer	Water & Sewer	Design-Build Team
PNG	Gas	Utility Company or NCDOT (w/ Approved Prior Rights)
PNG	Gas - Transmission	Utility Company or NCDOT (w/ Approved Prior Rights)
Robeson County PW	Water	Design-Build Team
Windstream	Telecommunications	Utility Company or NCDOT (w/ Approved Prior Rights)

Water and Sewer

After the Department accepts the Preliminary Roadway Plans developed by the Design-Build Team, a pre-design meeting shall take place between the utility owners and / or their representatives, the Design-Build Team, and appropriate NCDOT Utilities Unit and Design-Build Unit representatives. The Department will only review and accept water and sewer design submittals after the aforementioned pre-design meeting has been held and the 100% Hydraulic Design provided by the Design-Build Team has been accepted by the Department.

The Design-Build Team shall develop water and sewer designs; prepare all water and sewer plans required for agreements and permits; submit permits directly to the agencies and obtain approval from the agencies. The Design-Build Team shall be responsible for all permit fees.

The Design-Build Team shall provide water and sewer designs for all water and sewer facilities impacted by the project, including but not limited to all haul roads and temporary conditions

resulting from the Design-Build Team's methods of operation and / or sequence of work. **All** water and sewer designs, including all temporary relocations and / or protection of existing water and sewer facilities, shall be coordinated with the NCDOT Utilities Unit and the utility owners or their representatives.

The relocation and / or protection of all water and sewer facilities shall be done in accordance with the NCDOT policies and standards, as well as the latest water and sewer design requirements / specifications for each individual utility company that are current on the Technical Proposal submittal date or the Best and Final Offer submittal date, whichever is later. In the event of conflicting design parameters in the requirements noted above, the proposed design shall adhere to the most conservative values. The materials and appurtenances proposed by the Design-Build Team shall require approval by both NCDOT and the appropriate utility owner prior to installation.

The Design-Build Team shall design and construct water / sewer facility extensions to all parcels with access to existing water and / or sewer facilities, including parcels subdivided by the project. The aforementioned water facility extensions shall be installed completely within the right of way. The aforementioned sewer facility extensions shall be installed completely within the right of way or a recorded easement.

Excluding water and / or sewer extensions due to encroachment into wells and / or septic systems, all costs associated with the design and construction for relocation, extension, and / or protection of water and / or sewer facilities shall be the responsibility of the Design-Build Team and shall be included in the lump sum bid for the entire project. Protection of water and sewer facilities shall include, but not be limited to encasement, lining and bridging. (Reference the General Section below for requirements associated with encroachment into wells and / or septic systems)

The Design-Build Team shall concurrently submit all water and sewer design submittals to the NCDOT State Utilities Manager, via the Design-Build Unit, and the appropriate utility owner for review and acceptance. All water and sewer design submittals shall include a title sheet, plan sheets, profile sheets and special provisions, if required. All water and sewer design submittals shall include all the aforementioned information in a full-size .pdf. Excluding the Release for Construction Water and / or Sewer Plans, the Design-Build Team shall allow the utility owners 30 days to review each water and / or sewer design submittal. At a minimum, the water and / or sewer design submittals shall consist of the following:

(A) Preliminary Water and / or Sewer Plans shall be submitted after the Department accepts the 100% Hydraulic Plans.

(B) Final Water and / or Sewer Plans shall be submitted after the Department accepts the Right of Way / 60% Roadway Plans.

(C) Release for Construction Water and / or Sewer Plans shall be submitted after the Department accepts the Final Water and / or Sewer Plans.

The Design-Build Team shall provide a set of Agreement Plans that will be used in a Utility Agreement (UCA or U&O) to be prepared by NCDOT and executed with the utility owners. The

Agreement Plans shall include Release for Construction Plans, special provisions, and a construction estimate with unit quantities. The Department will send the appropriate agreement, with the Agreement Plans, to the utility owner for their review and concurrence.

Upon completion of the water and sewer relocations and protective measures, the Design-Build Team shall concurrently provide 1) lump sum construction costs for the relocations and protective measures that are separated by individual utility owner and TIP project to the Department; and 2) electronic As-Built Plans to the Department and the utility owner. At a minimum, the As-Built Plans shall include all revisions that occurred during construction, as well as all field adjustments. The As-Built Plans shall be in accordance with NCDOT requirements or the utility owner's requirements, whichever is more conservative. The As-Built Plans shall be provided in .pdf format and MicroStation format to the Department and in the CADD format required by the utility owner.

Utility Relocation Plans

Excluding water and sewer conflicts, if the Design-Build Team's design and / or construction creates a utility conflict, the Design-Build Team shall request that the utility owner submit relocation plans (Highway Construction Plans to be provided by the Design-Build Team to utility owners) that show existing utilities and proposed utility relocations for approval by the NCDOT.

In .pdf format, the Design-Build Team shall electronically submit one half-size set and one full size set of the Utility Relocation Plans to the NCDOT State Utilities Manager, via the Design-Build Unit, for review and approval. The Department shall approve the Utility Relocation Plans prior to any utility relocation work beginning. The Design-Build Team shall also be responsible for submitting the appropriate agreements to be used with the Utility Relocation Plans (See Agreements Section found elsewhere in this Scope of Work). After the review process is complete, the NCDOT Utilities Unit will submit an electronic copy of the authorization letter to the Design-Build Team. The NCDOT Utilities Unit will also submit an electronic copy of the approved Utility Relocation Plans, estimate and agreement to the Department's Resident Engineer. If the Utility Relocation Plans are approved subject to changes, it shall be the Design-Build Team's responsibility to coordinate these changes with the appropriate utility owner.

Prior Rights and Compensable Interest

The Design-Build Team shall verify / determine the prior rights and compensable interest for all utility relocations. Typically, affidavits, recorded easements or NCDOT agreements can serve as evidence of prior rights. The Design-Build Team shall provide documentation that verifies / determines the prior rights and / or compensable interest. If the verification process is not complete prior to right of way acquisition, the Design-Build Team shall provide documentation of all Utility Easement costs. A compensable interest shall be identified as follows:

(B) Existing or prior easement rights within the project limits, either by recorded right of way or adverse possession. Entities covered under *General Statute 136-27.1* and *136-27.2.* Statute requires the NCDOT to pay the non-betterment cost for certain water, sewer and gas relocations.

(C) Utilities that have a joint-use agreement that constitutes a compensable interest with entities that have existing or prior easement rights within the project limits.

Work Performed by Design-Build Team for Utility Owners

If the Design-Build Team elects to make arrangements with a utility owner for proposed utility construction not required herein, in which the utility owner shall be responsible for the costs of work to be performed by the Design-Build Team, the Design-Build Team shall be responsible for negotiating all costs associated with the proposed construction. Once the Design-Build Team and the utility owner agree on a plan and a lump sum estimated cost for the utility construction, the Design-Build Team shall electronically submit one half-size set and one full size set of the utility construction drawings, in .pdf format, to the NCDOT State Utilities Manager, via the Design-Build Unit, for further handling. Each set shall include a title sheet, plan sheets, profiles and special provisions, if required. Also, a letter from the utility owner agreeing to the plans and lump sum cost must accompany this package. The NCDOT will reimburse the Design-Build Team the estimated lump sum cost under a Supplemental Agreement. The necessary Utility Construction Agreement (UCA) to the utility owner for reimbursement shall be a two-party agreement between the NCDOT and the utility owner; and will be developed and executed by the Department.

If the Design-Build Team is requested, in writing, by a utility owner to relocate facilities not impacted by the project's construction, upgrade existing facilities and / or incorporate new facilities as part of the highway construction, designs shall be coordinated with the utility owner and NCDOT Utilities Unit. The associated design and construction costs shall be negotiated and agreed upon between the Design-Build Team and the utility owner. The Design-Build Team shall develop designs; prepare all plans for needed agreements and permits; submit permits directly to the agencies and obtain approval from the agencies. The Design-Build Team shall be responsible for all permit fees.

Cable TV

The cost in relocating CATV due to highway construction shall be the responsibility of the CATV Company; however, 1) if the CATV Company can validate a recorded easement for facilities outside the maintained NCDOT right of way, the Department will bear the relocation expense; and 2) if the adjustment is needed on existing utility poles to accommodate a proposed NCDOT Traffic Management System Fiber Optic Communication Cable Project, the Design-Build Team shall be responsible for the relocation cost.

The NCDOT will not permit CATV to place poles within the highway right of way but will allow down guys for their facilities within the highway right of way. Under most circumstances, the CATV Company will continue a joint-use attachment with the local power and telephone company. If the CATV proposed relocation places buried facilities within the highway right of way, then plans and encroachment agreements shall be required by the NCDOT.

Communication Cables / Electrical Services for ITS

Prior to establishing the location for new meter poles, the Design-Build Team shall coordinate with the local power distribution company concerning accessibility of E/C service and safety in maintenance of the meter.

Prior to installation, the Design-Build Team shall provide plans for review and approval for all service taps that require a parallel installation within the control of access (C/A).

Parallel service installation within a C/A shall be buried and located as close to the right of way line as practical. Only due to unusual circumstances will parallel aerial service installations within the C/A be allowed. The Design-Build Team shall justify the allowance of parallel aerial service installation and obtain NCDOT written approval prior to installation.

The Design-Build Team shall be responsible for all coordination activities, including deposit fees, required for the utility company to provide service taps. Prior to the Design-Build Team developing the associated design and / or instructing the utility company to proceed with providing the service taps, the Design-Build Team shall obtain written approval of the service tap locations from the NCDOT Resident Engineer.

The Design-Build Team shall be responsible for all costs associated with providing communication cables / electrical service from the service tap to the ITS devices.

Adjusting Existing Utilities due to Proposed Traffic Management Systems Fiber Optic Communications Cables

The Design-Build Team shall be responsible for all costs for coordinating and adjusting any existing utilities that are in conflict with any proposed communication cables to be installed as part of the project.

Requirements for Attachments to Existing and / or Proposed Structures

Unless required otherwise elsewhere in this RFP, the Design-Build Team shall avoid attachments to structures where feasible. Attachments shall only be considered when other alternatives are cost prohibitive and / or are not feasible due to environmental or geographical features. All utility related attachments must be evaluated and approved by the NCDOT State Utilities Manager, including any existing attachments to any structure(s) that require modification or replacement. Attachments shall be prohibited under the following conditions:

(A) No attachments shall be allowed to a bridge located parallel within the C/A carrying the freeway over streams, other roadways or railroads. (No parallel utility installations within the C/A)

(B) No attachments shall be allowed to cored-slab bridges.

(C) No attachments shall be allowed to curved bridges.

Attachments to structures, if approved by the NCDOT State Utilities Manager, shall meet the following criteria:

(A) No attachments shall be allowed below the bottom of the beams and / or girders.

(B) Drilling of, or attachments to, beams and / or girders shall not be allowed. Attachments shall only be allowed to the bottom of the bridge deck.

(C) For water and sewer force mains, only restrained joint ductile iron pipe shall be allowed.

(D) A minimum of 18" of clearance to beams and / or girders shall be maintained if possible.

Documentation of adverse conditions or cost estimates of all feasible alternatives shall be submitted to the NCDOT State Utilities Manager, via the Design-Build Unit, when seeking approval of a structure attachment. Cost estimates shall consider all costs involved with each alternative and impacts to the utility and the highway project as a whole.

General

The Design-Build Team shall not commence work at points where the highway construction operations are adjacent to utility facilities, until making arrangements with the utility owner to protect against damage that might result in expense, loss, disruption of service or other undue inconvenience to the public or utility owner. The Design-Build Team shall be responsible for damage to the existing or relocated utilities resulting from the Design-Build Team's operations. In the event of interruption of any utilities by the project construction, the Design-Build Team shall promptly notify the utility owner and cooperate with the utility owner in the prompt restoration of service.

The Design-Build Team shall accommodate utility adjustments, reconstruction, new installation and routine maintenance work that may be underway or take place during the progress of the contract.

If total property acquisition is unavoidable due to encroachment into wells and / or septic systems, the Design-Build Team shall investigate and determine if extending water and / or sewer lines to the affected property is cost effective. If the Department concurs with the determination that a utility extension is cost effective, the costs associated with the utility design and construction shall be paid for as extra work in accordance with Article 104-7 of the 2018 NCDOT *Standard Specifications for Roads and Structures*.

Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall be required to use the guidelines as set forth in the following:

(A) NCDOT *Utilities Accommodation Manual* posted on the following website:

https://connect.ncdot.gov/municipalities/Utilities/Pages/UtilitiesManuals.aspx

(B) *Federal Aid Policy Guide* - Subchapter G, Part 645, Subparts A & B

(C) *Federal Highway Administration's Program Guide, Utility Adjustments & Accommodations on Federal Aid Highway Projects*

(D) *NCDOT Construction Manual* - Section 105-8

(E) *NCDOT Right of Way Manual* - Chapter 16 Utility Relocations

(F) *NCDEQ Public Water Supply* - Rules governing public water supply

(G) *NCDEQ Division of Water Resources* - Title 15A - Environment and Natural Resources

Agreements

If a utility company can provide evidence of prior rights of way or a compensable interest in their facilities, the Design-Build Team shall coordinate the non-betterment utility relocation costs with the utility company and develop the Utility Relocation Agreement (URA).

The NCDOT State Utilities Manager must execute approved agreements on Design-Build projects. The URAs and Encroachment Agreements are available from the NCDOT Utilities Unit. Reference the NCDOT *Utilities Accommodation Manual* for the different types of Encroachment Agreements available for use.

The Design-Build Team shall develop a preliminary Utility Analysis and Routing Report (UARR (p)) to identify potential utility conflicts, determine preliminary alignments and schedules for the relocation of each utility, and identify any anticipated Permanent Utility Easements (PUE) and Aerial Utility Easements (AUE). The aforementioned UARR (p) shall be submitted to the NCDOT Utility Unit, via the Design-Build Unit, for review a minimum of ten days before the Right of Way Plans submittal.

The Design-Build Team shall submit all utility agreements, and all supporting documents to the NCDOT State Utilities Manager, via the Design-Build Unit, in electronic format. Prior to submittal, all agreements shall be signed electronically by an authorized representative of the utility owner. These electronic agreement packets will be reviewed, approved and signed electronically by the NCDOT State Utilities Manager, or designated representative, before being distributed to the field.

The Design-Build Team shall utilize the NCDOT Standard Utility Encroachment Agreements, as necessary, in relocating utilities. The Encroachment Agreements shall be used under the following conditions:

(A) If a utility company is not occupying a valid right of way / compensable interest and the proposed relocation will place the relocated utilities within the existing or proposed highway right of way.

(B) For **all** new utility installations, not covered under a Utility Construction Agreement and within the existing or proposed highway right of way. This includes all water, sewer and gas lines owned by entities covered under *General Statute 136-27.1* and *136-27.2.*

***** STANDARD SPECIAL PROVISIONS *****

RAILROAD GRADE CROSSING

(7-1-95) (Rev. 9-9-20) 107-9 DB1 G17R

When the use of slow moving or stopped equipment is required over at-grade railroad crossings, the Design-Build Team shall contact the appropriate track owner to gain Right of Entry. The Design-Build Team shall be responsible for ascertaining and contacting the railroad track owner.

All questions regarding the Right of Entry shall be addressed to Ms. Meredith McLamb, NCDOT Surfaces and Encroachment Manager with the NCDOT Rail Division, at (919) 707-4132.

RESTRICTIONS ON ITS EQUIPMENT AND SERVICES

(10-2-20) DB01 G090

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

PLANT AND PEST QUARANTINES

(Imported Fire Ant, Gypsy Moth, Witchweed, Emerald Ash Borer, Guave Root Knot Nematode and Other Noxious Weeds)

(8-31-13)(Rev. 4-1-19) DB1 G130

Within Quarantined Area

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

Originating in a Quarantined County

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

Contact

Contact the N.C. Department of Agriculture / United States Department of Agriculture at 1-800-206-9333, 919-707-3730, or **https://www.ncagr.gov/plantindustry/Plant/quaran/table2.htm** to determine those specific project sites located in the quarantined area or for any regulated article used on this project originating in a quarantined county.

Regulated Articles Include

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

ROCK AND BROKEN PAVEMENT FILLS

(12-29-15) (Rev. 8-31-17) 235 DB2 R85

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

Page 2-23, Article 235-2 MATERIALS, add the following after Line 15:

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.

Page 2-24, Subarticle 235-3(B) Embankment Formation, Lines 18 - 19, delete the third sentence in the seventh paragraph.

Page 2-24, Subarticle 235-3(B) Embankment Formation, **Lines 21 - 23**, replace the eighth paragraph with the following:

Before placing embankment fill material or filtration geotextiles over rock and broken pavement, fill voids in the top of rock and broken pavement fill with rip rap and No. 57 stone. Place and compact larger rip rap first followed by smaller rip rap. Then, fill any remaining voids with No. 57 stone so geotextiles are not torn, ripped or otherwise damaged when installed and covered. Compact rip rap and No. 57 stone with tracked equipment or other approved methods. Install filtration geotextiles on top of rock, broken pavement, rip rap and No. 57 stone in accordance with Article 270-3 before placing remaining embankment fill material.

Remove any rocks, debris or pavement pieces from the roadbed larger than two inches within 12" of the subgrade or finished grade, whichever is lower.

POLYPROPYLENE CULVERT PIPE

(7-1-19) 305, 310 DB3 R35

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

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

Where shown in the plans developed by the Design-Build Team, the Design-Build Team may use reinforced concrete pipe, aluminum alloy pipe, aluminized corrugated steel pipe, 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
Polypropylene Pipe	1032-9

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

Item	Section
Polypropylene Pipe	1032-9

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

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

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

Both corrugated steel and concrete pipe end sections will work on concrete pipe, corrugated steel pipe, polypropylene pipe, and HDPE smooth lined corrugated plastic pipe.

Page 10-60, add Article 1032-9:

(A) General

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

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

(B) End Treatments, Pipe Tees and Elbows

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

(C) Marking

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

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

When polypropylene pipe, end sections, tees and elbows have been inspected and accepted a sticker shall be applied to the inside of the pipe. Do no use pipe sections, flared end sections, tees or elbows which do not have this seal of approval.

BRIDGE APPROACH FILLS

(10-19-10) (Rev. 11-22-17) 422 DB4 R02A

Description

Bridge approach fills consist of backfilling behind bridge end bents with select material or aggregate to support all or portions of bridge approach slabs. Install drains to drain water from bridge approach fills and geotextiles to separate approach fills from embankment fills, ABC and natural ground as required. For bridge approach fills behind end bents with mechanically stabilized earth (MSE) abutment walls, reinforce bridge approach fills with MSE wall reinforcement connected to end bent caps. Construct bridge approach fills in accordance with the contract, accepted submittals and Roadway Standard Drawing No. 422.01, Roadway Standard Drawing No. 422.02 or Roadway Detail Drawing No. 422D10.

Define bridge approach fill types as follows:

Approach Fills - Bridge approach fills in accordance with Roadway Standard Drawing No. 422.01, Roadway Standard Drawing No. 422.02 or Roadway Detail Drawing No. 422D10

Standard Approach Fill - Type I Standard Bridge Approach Fill in accordance with Roadway Standard Drawing No. 422.01

Modified Approach Fill - Type II Modified Bridge Approach Fill in accordance with Roadway Standard Drawing No. 422.02

Reinforced Approach Fill - Type III Reinforced Bridge Approach Fill in accordance with Roadway Detail Drawing No. 422D10

Materials

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

Item	Section
Geotextiles, Type 1	1056
Portland Cement Concrete	1000
Select Materials	1016
Subsurface Drainage Materials	1044

Provide Type 1 geotextile for separation geotextiles and Class B concrete for outlet pads. Use Class V or Class VI select material for standard and modified approach fills. For an approach fill behind a bridge end bent with an MSE abutment wall, backfill the reinforced approach fill with the same aggregate type approved for the reinforced zone in the accepted MSE wall submittal. For MSE wall aggregate, reinforcement and connector materials, see the *Mechanically Stabilized Earth Retaining Walls* provision. Provide PVC pipes, fittings and outlet pipes for subsurface drainage materials. For PVC drain pipes, use pipes with perforations that meet AASHTO M 278.

Construction Methods

Excavate as necessary for approach fills in accordance with the contract. Notify the Engineer when foundation excavation is complete. Do not place separation geotextiles or aggregate until approach fill dimensions and foundation material are approved.

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

Attach separation geotextiles to end bent cap backwalls and wing walls with adhesives, tapes or other approved methods. Overlap adjacent separation geotextiles at least 18" with seams oriented parallel to the roadway centerline. Hold geotextiles in place with wire staples or anchor pins as needed. Contact the Engineer when existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with separation geotextiles or MSE wall reinforcement.

Install continuous perforated PVC drain pipes with perforations pointing down in accordance

with Roadway Standard Drawing No. 422.01 or Roadway Standard Drawing No. 422.02. Connect drain pipes to outlet pipes just beyond wing walls. Connect PVC pipes, fittings and outlet pipes with solvent cement in accordance with Article 815-3 of the 2018 *Standard Specifications for Roads and Structures* and place outlet pads in accordance with Roadway Standard Drawing No. 815.03.

Install drain pipes so water drains towards outlets. If the groundwater elevation is above drain pipe elevations, raise drains up to maintain positive drainage towards outlets. Place pipe sleeves in or under wing walls so water drains towards outlets. Use sleeves that can withstand wing wall loads.

Place select material or aggregate in eight-inch to ten-inch thick lifts. Compact fine aggregate for reinforced approach fills in accordance with Subarticle 235-3(C) of the 2018 *Standard Specifications for Roads and Structures* except compact fine aggregate to a density of at least 98%. Compact select material for standard or modified approach fills and coarse aggregate for reinforced approach fills with a vibratory compactor to the satisfaction of the Engineer. Do not displace or damage geosynthetics, MSE wall reinforcement or drains when placing and compacting select material or aggregate. End dumping directly on geosynthetics is not permitted. Do not operate heavy equipment on geosynthetics or drain pipes until they are covered with at least eight inches of select material or aggregate. Replace any damaged geosynthetics or drains to the satisfaction of the Engineer. When approach fills extend beyond bridge approach slabs, wrap separation geotextiles over select material or aggregate as shown in Roadway Standard Drawing No. 422.01 or Roadway Detail Drawing No. 422D10.

For temporary walls, use welded wire reinforcement for welded wire facing and Type 5 geotextile for reinforcement geotextiles. Use Type 5 geotextile with lengths and an ultimate tensile strength as shown in Roadway Standard Drawing No. 422.03. Provide Type 1 geotextile for separation geotextiles and Class B concrete for outlet pads. Use Class V or Class VI select material for alternate approach fills and temporary walls. Provide PVC pipes, fittings and outlet pipes for subsurface drainage materials. For PVC drain pipes, use pipes with perforations that meet AASHTO M 278.

ALTERNATE BRIDGE APPROACH FILLS FOR INTEGRAL ABUTMENTS

(11-21-17) 422 DB4 R02B

Description

At the Design-Build Team's option, use Type A Alternate Bridge Approach Fills instead of Type I or II Bridge Approach Fills to support bridge approach slabs for integral bridge abutments. An alternate bridge approach fill shall consist of constructing an approach fill with a temporary geotextile wall before placing all or a portion of the concrete for the backwall and wing walls of the integral end bent cap. The temporary geotextile wall shall be designed for a crane surcharge, shall remain in place and be aligned so the wall face functions as a form for the end bent cap backwall and wing walls. Install drains, welded wire facing and geotextiles and backfill approach fills and temporary walls with select material as required. Define "geotextiles" as separation or reinforcement geotextiles, "temporary wall" as a temporary geotextile wall and "alternate approach fill" as a Type A Alternate Bridge Approach Fill in accordance with

Roadway Standard Drawing No. 422.03.

Materials

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

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

For temporary walls, use welded wire reinforcement for welded wire facing and Type 5 geotextile for reinforcement geotextiles. Use Type 5 geotextile with lengths and an ultimate tensile strength as shown in Roadway Standard Drawing No. 422.03. Provide Type 1 geotextile for separation geotextiles and Class B concrete for outlet pads. Use Class V or Class VI select material for alternate approach fills and temporary walls. Provide PVC pipes, fittings and outlet pipes for subsurface drainage materials. For PVC drain pipes, use pipes with perforations that meet AASHTO M 278.

Construction Methods

Excavate as necessary for alternate approach fills and temporary walls in accordance with the contract. Notify the Engineer when foundation excavation is complete. Do not place geotextiles until approach fill dimensions and foundation material are approved.

Install geotextiles as shown in Roadway Standard Drawing No. 422.03. Attach separation geotextiles to end bent cap backwalls and wing walls as needed with adhesives, tapes or other approved methods. Overlap adjacent geotextiles at least 18" with seams oriented parallel to the roadway centerline. Hold geotextiles in place with wire staples or anchor pins as needed. Contact the Engineer when existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with geotextiles.

Install continuous perforated PVC drain pipes with perforations pointing down in accordance with Roadway Standard Drawing No. 422.03. Connect drain pipes to outlet pipes just beyond wing walls. Connect PVC pipes, fittings and outlet pipes with solvent cement in accordance with Article 815-3 of the 2018 *Standard Specifications for Roads and Structures* and place outlet pads in accordance with Roadway Standard Drawing No. 815.03.

Install drain pipes so water drains towards outlets. If the groundwater elevation is above drain pipe elevations, raise drains up to maintain positive drainage towards outlets. Place pipe sleeves in or under wing walls so water drains towards outlets. Use sleeves that can withstand wing wall loads.

At the Design-Build Team’s option, construct bottom portion of integral end bents before

temporary walls as shown in Roadway Standard Drawing No. 422.03. Erect and set welded wire facing so facing functions as a form for the end bent cap backwall. Place welded wire facing adjacent to each other in the horizontal and vertical directions to completely cover the temporary wall face. Stagger welded wire facing to create a running bond by centering facing over joints in the row below.

Wrap reinforcement geotextiles at the temporary wall face in accordance with Roadway Standard Drawing No. 422.03 and cover geotextiles with at least three inches of select material. Place layers of reinforcement geotextiles within three inches of locations shown in Roadway Standard Drawing No. 422.03. Before placing select material, pull reinforcement geotextiles taut so they are in tension and free of kinks, folds, wrinkles or creases. Install reinforcement geotextiles with the direction shown in Roadway Standard Drawing No. 422.03. Do not splice or overlap reinforcement geotextiles so seams are parallel to the temporary wall face.

Place select material in eight-inch to ten-inch thick lifts and compact select material with a vibratory compactor to the satisfaction of the Engineer. Do not displace or damage geotextiles or drains when placing and compacting select material. End dumping directly on geotextiles is not permitted. Do not operate heavy equipment on geotextiles or drain pipes until they are covered with at least eight inches of select material. Replace any damaged geotextiles or drains to the satisfaction of the Engineer. When alternate approach fills extend beyond bridge approach slabs, wrap separation geotextiles over select material as shown in Roadway Standard Drawing No. 422.03.

Temporary walls shall be designed for a surcharge pressure in accordance with Roadway Standard Drawing No. 422.03. If the crane surcharge will exceed the wall design, contact the Engineer before positioning the crane over reinforcement geotextiles.

AUTOMATED FINE GRADING

(9-1-11) (Rev. 9-13-17) DB5 R05

On mainline portions and ramps / loops of this project, prepare the subgrade and base beneath the pavement structure in accordance with the applicable sections of the 2018 *Standard Specifications for Roads and Structures* except use an automatically controlled fine grading machine utilizing string lines, laser controls, or other approved methods to produce final subgrade and base surfaces meeting the lines, grades, and cross sections required by the plans developed by the Design-Build Team or established by the Engineer.

AGGREGATE SUBGRADE

(3-9-18) DB05 R017A

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

Page 5-8, Article 505-1 DESCRIPTION, Lines 4 - 6, replace the paragraph with the following:

Construct aggregate subgrades in accordance with the contract. Install geotextile for soil stabilization and place Class IV subgrade stabilization at locations shown in the plans developed by the Design-Build Team and as directed.

Undercut natural soil materials if necessary to construct aggregate subgrades. Define "subbase" as the portion of the roadbed below the Class IV subgrade stabilization. For Type 2 aggregate subgrades, undercut subbases as needed. The types of aggregate subgrade with thickness and compaction requirements for each shall be as shown below.

Type 1 - A six-inch to 24-inch thick aggregate subgrade with Class IV subgrade stabilization compacted to 92% of AASHTO T 180 as modified by the Department or to the highest density that can be reasonably obtained.

Type 2 - A 12-inch thick aggregate subgrade on a proof rolled subbase with Class IV subgrade stabilization compacted to 97% of AASHTO T 180 as modified by the Department.

Page 5-8, Article 505-3 CONSTRUCTION METHODS, Line 12, insert the following after the first sentence of the first paragraph:

For Type 2 aggregate subgrades, proof roll subbases in accordance with Section 260 before installing geotextile for soil stabilization.

Page 5-8, Article 505-3 CONSTRUCTION METHODS, Lines 16 - 17, replace the last sentence of the first paragraph with the following:

Compact ABC as required for the type of aggregate subgrade constructed.

FINAL SURFACE TESTING

(4-26-16) (Rev. 9-13-17) DB6 R45

On all mainline travel lanes, including but not limited to all auxiliary lanes, and all -Y- Line travel lanes with 1) two or more layers of asphalt, 2) one mile or greater in length, and 3) a posted speed limit of 45 mph or greater, perform smoothness acceptance testing of the longitudinal profile of the finished pavement surface using an Inertial Profiler in accordance with Sections 610 and 710 of the 2018 *Standard Specifications for Roads and Structures.* The North Carolina Hearne Straightedge will not be permitted.

MILLING ASPHALT PAVEMENT

(12-17-18) 607 DB6 R59

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

Page 6-5, Article 607-2, EQUIPMENT, Lines 14 - 16, delete the seventh sentence of this Article and replace with the following:

Use either a non-contacting laser or sonar type ski system with a minimum of three referencing stations mounted on the milling machine at a length of at least 24 feet.

ASPHALT CONCRETE PLANT MIX PAVEMENTS
(12-12-18) 610, 1012 DB6 R65

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

Page 6-14, Table 609-3, LIMITS OF PRECISION FOR TEST RESULTS, replace with the following:

TABLE 609-3 LIMITS OF PRECISION FOR TEST RESULTS	
Mix Property	**Limits of Precision**
25.0 mm sieve (Base Mix)	± 10.0%
19.0 mm sieve (Base Mix)	± 10.0%
12.5 mm sieve (Intermediate & Type P-57)	± 6.0%
9.5 mm sieve (Surface Mix)	± 5.0%
4.75 mm sieve (Surface Mix)	± 5.0%
2.36 mm sieve (All Mixes, except S4.75A)	± 5.0%
1.18 mm sieve (S4.75A)	± 5.0%
0.075 mm sieve (All Mixes)	± 2.0%
Asphalt Binder Content	± 0.5%
Maximum Specific Gravity (G_{mm})	± 0.020
Bulk Specific Gravity (G_{mb})	± 0.030
TSR	± 15.0%
QA retest of prepared QC Gyratory Compacted Volumetric Specimens	± 0.015
Retest of QC Core Sample	± 1.2% (% Compaction)
Comparison QA Core Sample	± 2.0% (% Compaction)
QA Verification Core Sample	± 2.0% (% Compaction)
Density Gauge Comparison of QC Test	± 2.0% (% Compaction)
QA Density Gauge Verification Test	± 2.0% (% Compaction)

Page 6-17, Table 610-1, MIXING TEMPERATURE AT THE ASPHALT PLANT, replace with the following:

TABLE 610-1 MIXING TEMPERATURE AT THE ASPHALT PLANT	
Binder Grade	**JMF Temperature**
PG 58-28; PG 64-22	250 - 290° F
PG 76-22	300 - 325° F

Page 6-17, Subarticle 610-3(C), Job Mix Formula (JMF), Lines 38 - 39, delete the fourth paragraph.

Page 6-18, Subarticle 610-3(C), Job Mix Formula (JMF), Line 12, replace "SF9.5A" with "S9.5B".

Page 6-18, Table 610-3, MIX DESIGN CRITERIA, replace with the following:

TABLE 610-3
MIX DESIGN CRITERIA

Mix Type	Design ESALs millions [A]	Binder PG Grade [B]	Compaction Levels G_{mm} @ N_{ini}	Compaction Levels G_{mm} @ N_{des}	Max. Rut Depth (mm)	Volumetric Properties VMA % Min.	VTM %	VFA Min.-Max.	$\%G_{mm}$ @ N_{ini}
S4.75A	< 1	64 - 22	6	50	11.5	16.0	4.0 - 6.0	65 - 80	≤ 91.5
S9.5B	0 - 3	64 - 22	6	50	9.5	16.0	3.0 - 5.0	70 - 80	≤ 91.5
S9.5C	3 - 30	64 - 22	7	65	6.5	15.5	3.0 - 5.0	65 - 78	≤ 90.5
S9.5D	> 30	76 - 22	8	100	4.5	15.5	3.0 - 5.0	65 - 78	≤ 90.0
I19.0C	ALL	64 - 22	7	65	-	13.5	3.0 - 5.0	65 - 78	≤ 90.5
B25.0C	ALL	64 - 22	7	65	-	12.5	3.0 - 5.0	65 - 78	≤ 90.5
	Design Parameter					**Design Criteria**			
All Mix Types	Dust to Binder Ratio ($P_{0.075}$ / P_{be})					0.6 - 1.4 [C]			
	Tensile Strength Ratio (TSR) [D]					85% Min. [E]			

A. Based on 20-year design traffic.
B. Volumetric Properties based on specimens compacted to N_{des} as modified by the Department.
C. Dust to Binder Ratio ($P_{0.075}$ / P_{be}) for Type S4.75A is 1.0 - 2.0.
D. NCDOT-T-283 (No Freeze-Thaw cycle required).
E. TSR for Type S4.75A & B25.0C mixes is 80% minimum.

Page 6-19, Table 610-5, BINDER GRADE REQUIREMENTS (BASED ON RBR%), replace with the following:

TABLE 610-5
BINDER GRADE REQUIREMENTS (BASED ON RBR%)

Mix Type	%RBR ≤ 20%	21% ≤ %RBR ≤ 30%	%RBR > 30%
S4.75A, S9.5B, S9.5C, I19.0C, B25.0C	PG 64-22	PG 64-22[A]	PG 58-28
S9.5D, OGFC	PG 76-22[B]	n/a	n/a

A. If the mix contains any amount of RAS, the virgin binder shall be PG 58-28.
B. Maximum Recycled Binder Replacement (%RBR) is 18% for mixes using PG 76-22 binder.

Page 6-20, Table 610-6, PLACEMENT TEMPERATURES FOR ASPHALT, replace with the following:

TABLE 610-6 PLACEMENT TEMPERATURES FOR ASPHALT	
Asphalt Concrete Mix Type	**Minimum Surface and Air Temperature**
B25.0C	35° F
I19.0C	35° F
S4.75A, S9.5B, S9.5C	40° F [A]
S9.5D	50° F

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

Page 6-21, Article 610-8, SPREADING AND FINISHING, Lines 34 - 35, delete the second sentence and replace with the following:

Use an MTV for all surface mix regardless of binder grade on Interstates, US Routes, and NC Routes (primary routes) that have four or more lanes and are median divided.

Page 6-21, Article 610-8, SPREADING AND FINISHING, Lines 36 - 38, delete the fourth sentence and replace with the following:

Use MTV for all ramps, loops and -Y- Lines, that have four or more lanes and are median divided; and all full width acceleration lanes, full width deceleration lanes, and full width turn lanes that are greater than 1000 feet in length.

Page 6-23, Table 610-7, DENSITY REQUIREMENTS, replace with the following:

TABLE 610-7 DENSITY REQUIREMENTS	
Mix Type	**Minimum % G_{mm} (Maximum Specific Gravity)**
S4.75A	85.0 [A]
S9.5B	90.0
S9.5C, S9.5D, I19.0C, B25.0C	92.0

A. Compaction to the above specified density shall be required when the S4.75A mix is applied at a rate of 100 lbs/sy or higher.

Page 6-24, Article 610-13, FINAL SURFACE TESTING, Lines 35 - 36, delete the second sentence and replace with the following:

Final surface testing will not be required on ramps, loops or turn lanes.

Page 6-26, Subarticle 610-13(A)(1), Acceptance for New Construction, Lines 29 - 30, delete the second sentence and replace with the following:

Areas excluded from testing by the profiler may be tested using a ten-foot straightedge in accordance with Article 610-12.

Page 6-27, Subarticle 610-13(B), Option 2 - North Carolina Hearne Straightedge, Lines 41 - 46, delete the eighth and ninth sentence of this paragraph and replace with the following:

Take profiles over the entire length of the final surface travel lane pavement, exclusive of structures, approach slabs, paved shoulders, tapers, and other irregular shaped areas of pavement, unless otherwise approved by the Engineer. In accordance with this provision, test all mainline travel lanes, full width acceleration lanes, full width deceleration lanes and collector lanes.

Page 6-28, Subarticle 610-13(B), Option 2 - North Carolina Hearne Straightedge, Lines 1 - 2, delete these two lines.

Page 10-30, Table 1012-1, AGGREGATE CONSENSUS PROPERTIES, replace with the following:

TABLE 1012-1
AGGREGATE CONSENSUS PROPERTIES[A]

Mix Type	Coarse Aggregate Angularity[B] % Minimum	Fine Aggregate Angularity % Minimum	Sand Equivalent % Minimum	Flat and Elongated 5 : 1 Ratio % Maximum
Test Method	*ASTM D5821*	*AASHTO T 304*	*AASHTO T 176*	*ASTM D4791*
S4.75A; S9.5B	75 / -	40	40	-
S9.5C; I19.0C; B25.0C	95 / 90	45	45	10
S9.5D	100 / 100	45	50	10
OGFC	100 / 100	45	45	10
UBWC	100 / 85	45	45	10

A. Requirements apply to the design aggregate blend.
B. 95 / 90 denotes that 95% of the coarse aggregate has one fractured face and 90% has two or more fractured faces.

SUBSURFACE DRAINAGE

(9-1-11) (Rev. 9-14-17) DB8 R05

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

Page 8-11, Article 815-1, delete the first sentence and replace with the following:

The Design-Build Team shall construct subsurface drains, underdrains, blind drains and other types of drains where groundwater is within six feet of subgrade.

GUARDRAIL END UNITS, TYPE TL-3

(4-20-04) (Rev. 9-14-17) 862 DB8 R65

Description

Furnish and install guardrail end units in accordance with the details in the plans developed by the Design-Build Team, the applicable requirements of Section 862 of the 2018 *Standard Specifications for Roads and Structures*, and at locations shown in the plans developed by the Design-Build Team.

Materials

The Design-Build Team shall furnish guardrail end units listed on the NCDOT Approved Products List at **https://apps.dot.state.nc.us/vendor/approvedproducts/** or approved equal.

Prior to installation, the Design-Build Team shall submit to the Engineer:

1. FHWA acceptance letter for each guardrail end unit certifying it meets the requirements of the AASHTO Manual for Assessing Safety Hardware, Test Level 3, in accordance with Article 106-2 of the 2018 *Standard Specifications for Roads and Structures*.

2. Certified working drawings and assembling instructions from the manufacturer for each guardrail end unit in accordance with Article 105-2 of the 2018 *Standard Specifications for Roads and Structures*.

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

Construction Methods

Guardrail end delineation shall be required on all approach and trailing end sections for both temporary and permanent installations. Guardrail end delineation shall consist of yellow reflective sheeting applied to the entire end section of the guardrail in accordance with Article 1088-3 of the 2018 *Standard Specifications for Roads and Structures*.

GUARDRAIL ANCHOR UNITS AND TEMPORARY GUARDRAIL ANCHOR UNITS

(11-22-17) 862 DB8 R70

Guardrail anchor units shall be in accordance with the details in the plans developed by the Design-Build Team and the applicable requirements of Section 862 of the 2018 *Standard Specifications for Roads and Structures*.

IMPACT ATTENUATOR UNIT, TYPE TL-3

(4-20-04) (Rev. 12-12-18) DB8 R75

Description

The Design-Build Team shall furnish and install impact attenuator units and any components necessary to connect the impact attenuator units in accordance with the manufacturer's requirement, the details in the plans developed by the Design-Build Team, and at locations shown in the plans developed by the Design-Build Team.

Materials

The Design-Build Team shall furnish impact attenuator units listed on the NCDOT Approved Products List at **https://apps.dot.state.nc.us/vendor/approvedproducts/** or approved equal.

Prior to installation, the Design-Build Team shall submit to the Engineer:

1. FHWA acceptance letter for each impact attenuator unit certifying it meets the requirements of the Manual for Assessing Safety Hardware (MASH-16), Test Level 3, in accordance with Article 106-2 of the 2018 *Standard Specifications for Roads and Structures.*

2. Certified working drawings and assembling instructions from the manufacturer for each impact attenuator unit in accordance with Article 105-2 of the 2018 *Standard Specifications for Roads and Structures*.

No modifications shall be made to the impact attenuator unit without the express written permission from the manufacturer. Perform installation in accordance with the details in the plans developed by the Design-Build Team, and details and assembling instructions furnished by the manufacturer.

Construction Methods

If the median width is 40 feet or less, the Design-Build Team shall supply NON-GATING Impact Attenuator Units.

If the median width is greater than 40 feet, the Design-Build Team may use GATING or NON-GATING Impact Attenuator Units.

PORTLAND CEMENT CONCRETE PRODUCTION AND DELIVERY

(7-27-20) 1000, 1014, 1024 DB10 R01

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

Page 10-6, Table 1000-1, REQUIREMENTS FOR CONCRETE, replace with the following:

TABLE 1000-1
REQUIREMENTS FOR CONCRETE

Class of Concrete	Min. Compressive Strength at 28 days	Maximum Water-Cement Ratio				Consistency Maximum Slump		Cement Content			
		Air-Entrained Concrete		Non-Air-Entrained Concrete		Vibrated	Non-Vibrated	Vibrated		Non-Vibrated	
		Rounded Aggregate	Angular Aggregate	Rounded Aggregate	Angular Aggregate			Min.	Max.	Min.	Max.
Units	*psi*					*inch*	*inch*	*lb/cy*	*lb/cy*	*lb/cy*	*lb/cy*
AA	4500	0.381	0.426	---	---	3.5[A]	---	639	715	---	---
AA Slip Form	4500	0.381	0.426	---	---	1.5	---	639	715	---	---
Drilled Pier	4500	---	---	0.450	0.450	---	5 – 7 dry 7 - 9 wet	---	---	640	800
A	3000	0.488	0.532	0.550	0.594	3.5 [A]	4.0	564	---	602	---
B	2500	0.488	0.567	0.559	0.630	1.5 machine placed 2.5 [A] hand placed	4.0	508	---	545	---
Sand Light-weight	4500	---	0.420	---	---	4.0 [A]	---	715	---	---	---
Latex Modified	3000 (at 7 days)	0.400	0.400	---	---	6.0	---	658	---	---	---
Flowable Fill excavatable	150 max. (at 56 days)	as needed	as needed	as needed	as needed	---	Flowable	---	---	40	100
Flowable Fill non-excavatable	125	as needed	as needed	as needed	as needed	---	Flowable	---	---	100	as needed
Pavement	4500 Design, field 650 flexural, design only	0.559	0.559	---	---	1.5 slip form 3.0 hand placed	---	526	---	---	---
Precast	See Table 1077-1	as needed	as needed	---	---	6.0	as needed	as needed	as needed	as needed	as needed
Prestressed	per contract	See Table 1078-1	See Table 1078-1	---	---	8.0	---	564	as needed	---	---

A. The slump may be increased to six inches, provided the increase in slump is achieved by adding a chemical admixture conforming to Section 1024-3. In no case shall the water-cement ratio on the approved design be exceeded. Concrete exhibiting segregation and / or excessive bleeding will be rejected. Utilizing an admixture to modify slump does not relinquish the Design-Build Team's responsibility to ensure the final product quality and overall configuration meets design specifications. Caution should be taken when placing these modified mixes on steep grades to prevent unintended changes to the set slope.

MATERIALS FOR PORTLAND CEMENT CONCRETE

(8-4-20) 1000, 1024 DB10 R24

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

Page 10-52, Article 1024-4, WATER, Lines 3 - 6, delete and replace with the following:

Test water from wells at all locations. Test public water supplies from all out of state locations and in the following counties: Beaufort, Bertie, Brunswick, Camden, Carteret, Chowan, Craven, Currituck, Dare, Gates, Hyde, New Hanover, Onslow, Pamlico, Pasquotank, Pender, Perquimans, Tyrell and Washington unless the Engineer waives the testing requirements.

Page 10-52, Table 1024-2, PHYSICAL PROPERTIES OF WATER, replace with the following:

TABLE 1024-2
PHYSICAL PROPERTIES OF WATER

Property	Requirement	Test Method
Compression Strength, minimum percent of control at three and seven days	90%	ASTM C1602
Time of set, deviation from control	From 1:00 hour earlier to 1:30 hour later	ASTM C1602
pH	4.5 to 8.5	ASTM D1293 *
Chloride Ion Content, Max.	250 ppm	ASTM D512 *
Total Solids Content (Residue), Max.	1,000 ppm	SM 2540B *
Resistivity, Min.	0.500 kohm-cm	ASTM D1125 *

* Denotes an alternate method is acceptable. Test method used shall be referenced in the test report.

TEMPORARY SHORING

(2-20-07) (Rev. 11-22-17) 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 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, welded wire grid or metallic strip reinforcement.

Temporary geosynthetic walls consist of geotextile or geogrid reinforcement wrapped behind welded wire facing. Define "temporary geotextile wall" as a temporary geosynthetic wall with geotextile reinforcement and "temporary geogrid wall" as a temporary geosynthetic wall with geogrid 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 height below the grade in front of walls.

(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 2018 *Standard Specifications for Roads and Structures*.

Item	Section
Concrete Barrier Materials	1170-2
Flowable Fill, Excavatable	1000-6
Geosynthetics	1056
Neat Cement Grout	1003
Portland Cement Concrete	1000
Select Materials	1016
Steel Beam Guardrail Materials	862-2
Steel Plates	1072-2
Steel Sheet Piles and H-Piles	1084
Untreated Timber	1082-2
Welded Wire Reinforcement	1070-3

Provide Type 6 material certifications for shoring materials in accordance with Article 106-3 of the 2018 *Standard Specifications for Roads and Structures*. Use Class IV select material for temporary guardrail. Use neat cement grout for Type 2 grout for ground anchors. Use Class A concrete that meets Article 450-2 of the 2018 *Standard Specifications for Roads and Structures*

or Type 1 grout for drilled-in piles. Provide untreated timber with a thickness of at least three inches and a bending stress of at least 1,000 pounds per square inch for timber lagging. Provide steel bracing that meets ASTM A36.

(A) Shoring Backfill

Use Class II, Type 1, Class III, Class V or Class VI select material or material that meets AASHTO M 145 for soil classification A-2-4 with a maximum PI of 6 for shoring backfill except do not use A-2-4 soil for backfill around culverts.

(B) Anchors

Store anchor materials on blocking a minimum of 12 inches above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Load, transport, unload and store anchor materials so materials are kept clean and free of damage. Bent, damaged or defective materials shall be rejected.

(1) Ground Anchors

Use high-strength deformed steel bars that meet AASHTO M 275 or seven-wire strands that meet ASTM A886 or Article 1070-5 of the 2018 *Standard Specifications for Roads and Structures*. Splice bars in accordance with Article 1070-9 of the 2018 *Standard Specifications for Roads and Structures*. Do not splice strands. Use bondbreakers, spacers and centralizers that meet Article 6.3.5 of the AASHTO *LRFD Bridge Construction Specifications*.

(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 Reinforcement

Use geogrids with a roll width of at least four feet and an "approved" or "approved for provisional use" status code. The list of approved geogrids is available from:

connect.ncdot.gov/resources/Materials/Pages/Materials-Manual-by-Material.aspx

Provide geogrids for geogrid reinforcement with design strengths in accordance with the accepted submittals. Geogrids are typically approved for ultimate tensile strengths in the machine direction (MD) and cross-machine direction (CD) or short-term design strengths for a three-year design life in the MD based on material type. Define material type from the website above for shoring backfill as follows:

Material Type	Shoring Backfill
Borrow	A-2-4 Soil
Fine Aggregate	Class II, Type 1 or Class III Select Material
Coarse Aggregate	Class V or VI Select Material

(4) Welded Wire Grid and Metallic Strip Reinforcement

Provide welded wire grid and metallic strip reinforcement supplied by the Wire Wall Vendor or a manufacturer approved or licensed by the vendor. Use welded wire grid reinforcement ("mesh", "mats" and "ladders") that meet Article 1070-3 of the 2018 *Standard Specifications for Roads and Structures* and metallic strip reinforcement ("straps") that meet ASTM A572 or A1011.

Preconstruction Requirements

(A) Concrete Barrier

Define "clear distance" behind concrete barrier as the horizontal distance between the barrier and edge of pavement. The minimum required clear distance for concrete barrier is shown in the plans developed by the Design-Build Team. At the Design-Build Team's option or if the minimum required clear distance is not available, set concrete barrier next to and up against traffic side of temporary shoring except for barrier above temporary

walls. Concrete barrier with the minimum required clear distance shall be required above temporary walls.

(B) Temporary Guardrail

Define "clear distance" behind temporary guardrail as the horizontal distance between guardrail posts and temporary shoring. At the Design-Build Team's option or if clear distance for cantilever, braced and anchored shoring is less than four feet, attach guardrail to traffic side of shoring as shown in the plans developed by the Design-Build Team. Place ABC in clear distance and around guardrail posts instead of pavement. Do not use temporary guardrail above temporary walls.

(C) Temporary Shoring Designs

Before beginning temporary shoring design, survey existing ground elevations in the vicinity of shoring locations to determine actual design heights (H). Submit .pdf files of working drawings and design calculations for temporary shoring designs in accordance with Article 105-2 of the 2018 *Standard Specifications for Roads and Structures*. Submit working drawings showing plan views, shoring profiles, typical sections and details of temporary shoring design and construction sequence. Do not begin shoring construction until a design submittal is accepted.

Have cantilever and braced shoring designed, detailed and sealed by an engineer licensed in the state of North Carolina. Use a prequalified Anchored Wall Design Consultant to design anchored shoring. Provide anchored shoring designs sealed by a Design Engineer approved as a Geotechnical Engineer (key person) for an Anchored Wall Design Consultant. Include details in anchored shoring working drawings of anchor locations and lock-off loads, unit grout / ground bond strengths for ground anchors or minimum installation torque and torsional strength rating for helical anchors and if necessary, obstructions extending through shoring or interfering with anchors. Include details in the anchored shoring construction sequence of pile and anchor installation, excavation and anchor testing.

Provide temporary wall designs sealed by an 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 elevations shown in the plans developed by the Design-Build Team. Assume the following soil parameters for shoring backfill:

(a) Unit weight (γ) = 120 pcf;

(b)

Friction Angle (ϕ)	Shoring Backfill
30°	A-2-4 Soil
34°	Class II, Type 1 or Class III Select Material
38°	Class V or VI Select Material

(c) Cohesion (c) = 0 psf.

(2) Traffic Surcharge

Design temporary shoring for a traffic surcharge of 250 pounds per square foot if traffic will be above and within H of shoring. This traffic surcharge shall not apply to construction traffic. Design temporary shoring for any construction surcharge if construction traffic will be above and within H of shoring. For LRFD shoring designs, apply traffic (live load) surcharge in accordance with Figure C11.5.5-3 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 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. For anchored shoring designs, apply traffic impact load as horizontal load (P_{H1}) in accordance with Figure 3.11.6.3-2(a) of the AASHTO LRFD specifications.

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 are required between shoring backfill and backfill, natural ground or culverts along the sides of the reinforced zone perpendicular to the wall face. For Class V or VI select material in the reinforced zone, separation geotextiles are also required between shoring backfill and backfill or natural ground on top of and at the back of the reinforced zone.

Design temporary walls in accordance with the plans 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 reinforcement, use approved geogrid properties available from the website shown elsewhere in this provision. If the website does not list a short-term design strength for an approved geogrid, use a short-term design strength equal to the ultimate tensile strength divided by 3.5 for the geogrid reinforcement. 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 geotextile or geogrid 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.

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 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, Bridge or Roadway Construction Engineer, Geotechnical Operations Engineer, Design-Build Team and Shoring Contractor Superintendent will attend preconstruction meetings.

Construction Methods

Control drainage during construction in the vicinity of shoring. Direct run off away from shoring and shoring backfill. Contain and maintain backfill and protect material from erosion.

Install positive protection in accordance with the contract and accepted submittals. Use PCB in accordance with Section 1170 of the 2018 *Standard Specifications for Roads and Structures* and Roadway Standard Drawing No. 1170.01. Use temporary guardrail in accordance with Section 862 of the 2018 *Standard Specifications for Roads and Structures* 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 2018 *Standard Specifications for Roads and Structures* except that a pile driving equipment data form is not required. Piles may be installed with a vibratory hammer as approved by the Engineer.

Do not splice sheet piles. Use pile excavation to install drilled-in H-piles. After filling holes with concrete or 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) 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 is based in part on the following criteria.

(i) For ground and helical anchors, total movement is less than 0.04 inch between the one and ten minute readings or less than 0.08 inch between the six and 60 minute readings.

(ii) For ground anchors, total movement at maximum test load exceeds 80% of the theoretical elastic elongation of the unbonded length.

(b) Anchor Test Results

Submit .pdf files of anchor test records including movement versus load plots for each load increment within 24 hours of completing each row of anchors. The Engineer will review the test records to determine if the anchors are acceptable.

If the Engineer determines an anchor is unacceptable, revise the anchor design or installation methods. Submit a revised anchored shoring design for acceptance and provide an acceptable anchor with the revised design

or installation methods. If required, replace the anchor or provide additional anchors with the revised design or installation methods.

(C) Temporary Wall Installation

Excavate as necessary for temporary walls in accordance with the plans developed by the Design-Build Team and accepted submittals. If applicable, install foundations located in the reinforced zone before placing shoring backfill or reinforcement unless otherwise approved. Notify the Engineer when foundation excavation is complete. Do not place shoring backfill or reinforcement until excavation dimensions and foundation material are approved.

Erect welded wire facing so the wall position is as shown in the plans developed by the Design-Build Team and accepted submittals. Set welded wire facing adjacent to each other in the horizontal and vertical direction to completely cover the wall face with facing. Stagger welded wire facing to create a running bond by centering facing over joints in the row below.

Wrap geotextile reinforcement and retention geotextiles behind welded wire facing as shown in the plans developed by the Design-Build Team and accepted submittals, and 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 reinforcement taut so it is in tension and free of kinks, folds, wrinkles or creases. Install reinforcement with the direction shown in the plans developed by the Design-Build Team and accepted submittals. For temporary wire walls with separate reinforcement and facing components, attach welded wire grid or metallic strip reinforcement to welded wire facing as shown in the accepted submittals. Do not splice or overlap reinforcement so seams are parallel to the wall face. Contact the Engineer when unanticipated existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with reinforcement.

Place shoring backfill in the reinforced zone in eight-inch to ten-inch thick lifts. Compact A-2-4 soil and Class II, Type 1 and Class III select material in accordance with Subarticle 235-3(C) of the 2018 *Standard Specifications for Roads and Structures*. Use only hand operated compaction equipment to compact backfill within three feet of welded wire facing. At a distance greater than three feet, compact shoring backfill with at least four passes of an eight-ton to ten-ton vibratory roller in a direction parallel to the wall face. Smooth wheeled or rubber tired rollers are also acceptable for compacting backfill. Do not use sheepsfoot, grid rollers or other types of compaction equipment with feet. Do not displace or damage reinforcement when placing and compacting shoring backfill. End dumping directly on geotextile or geogrid reinforcement shall not be

permitted. Do not operate heavy equipment on reinforcement until it is covered with at least eight inches of shoring backfill. Replace any damaged reinforcement to the satisfaction of the Engineer.

Backfill for temporary walls outside the reinforced zone in accordance with Article 410-8 of the 2018 *Standard Specifications for Roads and Structures*. Bench temporary walls into the sides of excavations where applicable. For temporary geosynthetic walls with top of wall within five feet of finished grade, remove top facing and incorporate top reinforcement layer into fill when placing fill in front of wall. Temporary walls remain in place permanently unless otherwise required.

**** NOTE **** Deleted *Polyurea Pavement Marking Material - Type 2 Typical Certified Mill Test Report* Project Special Provision

SNOWPLOWABLE PAVEMENT MARKERS

(1-16-19) SP

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

Pages 10-177 and 10-178, Article 1086-3 SNOWPLOWABLE PAVEMENT MARKERS, delete items (A), (B) and (C)(1) and replace with the following:

(A) General

Use snowplowable pavement markers evaluated by NTPEP. The snowplowable pavement marker shall consist of a housing with one or more glass or plastic face lens type reflective lenses to provide the required color designation. Shape the housing to deflect a snowplow blade upward in both directions without being damaged. Plastic lens faces shall use an abrasion resistant coating.

Use recycled snowplowable pavement markers that meet all the requirements of new snowplowable pavement markers except Subarticle 1086-3(B)(1). Recycled snowplowable pavement markers with minimal variation in dimensions are acceptable only when the reflector fits in the housing of the recycled snowplowable pavement marker as originally designed.

(B) Housings

1. Dimensions

   The dimension, slope and minimum area of reflecting surface shall conform to dimensions as shown in the plans developed by the Design-Build Team. The minimum area of each reflecting surface shall be 1.44 square inch.

2. Materials

   Use snowplowable pavement markers that are on the NCDOT Approved Products List.

3. Surface

   The surface of the housing shall be free of scale, dirt, rust, oil, grease or any other contaminant which might reduce its bond to the epoxy adhesive.

4. Identification

   Mark the housing with the manufacturer's name and model number of marker.

(C) Reflectors

1. General

   Laminate the reflector to an elastomeric pad and attach with adhesive to the housing. The thickness of the elastomeric pad shall be 0.04 inch.

Pages 12-14, Subarticle 1250-3(C) Removal of Existing Pavement Markers, Lines 19 - 29, delete and replace with the following:

Remove the existing raised pavement markers and / or the snowplowable pavement markers including the housings, before overlaying an existing roadway with pavement. Repair the pavement by filling holes as directed by the Engineer.

When traffic patterns are changed in work zones due to construction or reconstruction, remove all raised pavement markers and / or snowplowable markers including housings that conflict with the new traffic pattern before switching traffic to the new traffic pattern. Lens removal in lieu of total housing removal is not an acceptable practice for snowplowable markers.

Properly dispose of the removed pavement markers.

Pages 12-16 and 12-17, Subarticle 1253-3 CONSTRUCTION METHODS, delete items (A), (B) and (C) and replace with the following:

(A) General

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

Install snowplowable pavement marker housings into slots sawcut into the pavement. Make slots in the pavement to exactly duplicate the shape of the housing of the snowplowable pavement markers.

Promptly remove all debris resulting from the saw cutting operation from the pavement surface. Install the marker housings within seven calendar days after saw cutting slots in

the pavement. Remove and dispose of loose material from the slots by brushing, blow cleaning or vacuuming. Dry the slots before applying the epoxy adhesive. Fill the cleaned slots totally with epoxy adhesive flush with the surface of the existing pavement. Install snowplowable pavement markers according to the manufacturer's recommendations.

Protect the snowplowable pavement markers until the epoxy has initially cured and is track free.

(B) Reflector Replacement

In the event that a reflector is damaged, replace the damaged reflector by using adhesives and methods recommended by the manufacturer of the markers and approved by the Engineer.

Missing housings shall be replaced. Broken housings shall be removed and replaced. In both cases the slot for the housings shall be properly prepared prior to installing the new housing.

(C) Recycled Snowplowable Pavement Marker Housings

Use properly refurbished snowplowable pavement marker housings as approved by the Engineer such that approved new reflectors can be installed inside the housings.

THERMOPLASTIC PAVEMENT MARKING MATERIAL - COLOR TESTING

(1-16-19) SP

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

Pages 10-183 and 10-184, Subarticle 1087-7(D)(1)(b) Yellow, Lines 9 - 11, delete and replace with the following:

Obtain Color Values Y, x, y per ASTM E1349 using C/2° illuminant / observer.

Results shall be Y ≥ 45%, and x, y shall fall within PR#1 chart chromaticity limits.

EXTRUDED THERMOPLASTIC PAVEMENT MARKING THICKNESS

(1-16-19) SP

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

Page 12-6, Subarticle 1205-4(A)(1) General, Lines 5 - 8, delete the second sentence and replace with the following:

Use application equipment that provides multiple width settings ranging from four inches to 12 inches and multiple thickness settings to achieve a minimum pavement marking thickness of 0.090-inch above the surface of the pavement.

Page 12-7, Table 1205-3, THICKNESS REQUIREMENTS FOR THERMOPLASTIC, replace with the following:

TABLE 1205-3 MINIMUM THICKNESS REQUIREMENTS FOR THERMOPLASTIC	
Thickness	**Location**
240 mils	In-lane and shoulder-transverse pavement markings (rumble strips). May be placed in two passes.
90 mils	Center lines, skip lines, transverse bands, mini-skip lines, characters, bike lane symbols, crosswalk lines, edge lines, gore lines, diagonals, and arrow symbols

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 subcontract. However, only the Contractor will receive credit towards the annual goal for the trainee.

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

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

Records and Reports

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

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

Trainee Interviews

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

Trainee Wages

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

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

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

Achieving or Failing to Meet Training Goals

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

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

Measurement and Payment

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

STANDARD SPECIAL PROVISION

AVAILABILITY OF FUNDS – TERMINATION OF CONTRACTS

(9-1-11) Z-2

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

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

Payment will be made on any contract terminated pursuant to the special provision in accordance with Subarticle 108-13(D), of the North Carolina Department of Transportation *Standard Specifications for Roads and Structures*, dated January 2018 and as amended by the Standard Special Provision, Division One found elsewhere in this RFP.

***** STANDARD SPECIAL PROVISIONS *****

NCDOT GENERAL SEED SPECIFICATIONS FOR SEED QUALITY

(5-7-11) Z-3

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

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

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

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

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

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

Seed of Pensacola Bahiagrass shall not contain more than 7% inert matter, Kentucky Bluegrass, Centipede and Fine or Hard Fescue shall not contain more than 5% inert matter whereas a maximum of 2% inert matter will be allowed on all other kinds of seed. In addition, all seed shall not contain more than 2% other crop seed nor more than 1% total weed seed. The germination rate as tested by the North Carolina Department of Agriculture shall not fall below 70%, which includes both dormant and hard seed. Seed shall be labeled with not more than 7%, 5% or 2% inert matter (according to above specifications), 2% other crop seed and 1% total weed seed.

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

FURTHER SPECIFICATIONS FOR EACH SEED GROUP ARE GIVEN BELOW:

Minimum 85% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 83% pure live seed will not be approved.

Sericea Lespedeza
Oats (seeds)

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

Tall Fescue (all approved varieties)
Kobe Lespedeza
Korean Lespedeza
Weeping Lovegrass
Carpetgrass
Bermudagrass
Browntop Millet
German Millet - Strain R
Clover - Red / White / Crimson

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

Common or Sweet Sundangrass

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

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

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

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

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

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

STANDARD SPECIAL PROVISION

ERRATA

(10-16-18) (Rev. 12-12-18) Z-4

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

Division 6

Page 6-7, Article 609-1 DESCRIPTION, Line 29, replace article number "609-10" with "609-9".

Division 10

Page 10-78, Article 1056-4 GEOTEXTILES, TABLE 1056-1, Permittivity, Type 2, replace "Table 6[D]" with "Table 7[D]" and **Permittivity, Type 3[B],** replace "Table 7[D]" with "Table 8[D]".

Page 10-121, Article 1076-7, REPAIR OF GALVANIZING, Line 8, replace article number "1080-9" with "1080-7".

Page 10-162, Article 1080-50 PAINT FOR VERTICAL MARKERS, Line 1, replace article number "1080-50" with "1080-10".

Page 10-162, Article 1080-61 EPOXY RESIN FOR REINFORCING STEEL, Line 5, replace article number "1080-61" with "1080-11".

Page 10-162, Article 1080-72 ABRASIVE MATERIALS FOR BLAST CLEANING STEEL, Line 22, replace article number "1080-72" with "1080-12".

Page 10-163, Article 1080-83 FIELD PERFORMANCE AND SERVICES, Line 25, replace article number "1080-83" with "1080-13".

***** STANDARD SPECIAL PROVISIONS *****

TITLE VI AND NONDISCRIMINATION

(6-28-77) (Rev 5-2-18) Z-6

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

Replace Subarticle 103-4(B) with the following:

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

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

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

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

(a) Compliance with Regulations

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

(b) Nondiscrimination

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

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

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

(d) Information and Reports

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

(e) Sanctions for Noncompliance:

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

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

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

(f) Incorporation of Provisions

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

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

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

(a) During the performance of this contract or agreement, contractors (e.g. subcontractors, consultants, vendors, prime contractors) shall be responsible for

complying with NCDOT's Title VI Program. Contractors are not required to prepare or submit Title VI Programs. To comply with this section, the prime contractor shall:

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

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

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

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

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

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

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

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

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

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

1. Applicability

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

2. Eligibility

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

3. Time Limits and Filing Options

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

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

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

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

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

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

4. Format for Complaints

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

5. Discrimination Complaint Form

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

6. Complaint Basis

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

TABLE 103-1 COMPLAINT BASIS			
Protected Categories	**Definition**	**Examples**	**Applicable Nondiscrimination Authorities**
Race and Ethnicity	An individual belonging to one of the accepted racial groups; or the perception, based usually on physical characteristics that a person is a member of a racial group	Black / African American, Hispanic / Latino, Asian, American Indian / Alaska Native, Native Hawaiian / Pacific Islander, White	Title VI of the Civil Rights Act of 1964; 49 CFR Part 21; 23 CFR 200; 49 U.S.C. 5332(b); 49 U.S.C. 47123. *(Executive Order 13166)*
Color	Color of skin, including shade of skin within a racial group	Black, White, Brown, Yellow, etc.	
National Origin *(Limited English Proficiency)*	Place of birth. Citizenship is not a factor. (*Discrimination based on language or a person's accent is also covered)*	Mexican, Cuban, Japanese, Vietnamese, Chinese	
Sex	Gender. The sex of an individual. *Note:* Sex under this program does not include sexual orientation.	Women and Men	1973 Federal-Aid Highway Act; 49 U.S.C. 5332(b); 49 U.S.C. 47123.
Age	Persons of any age	21-year-old person	Age Discrimination Act of 1975 49 U.S.C. 5332(b); 49 U.S.C. 47123.
Disability	Physical or mental impairment, permanent or temporary, or perceived.	Blind, alcoholic, para-amputee, epileptic, diabetic, arthritic	Section 504 of the Rehabilitation Act of 1973; Americans with Disabilities Act of 1990
Religion (in the context of employment) *(Religion / Creed in all aspects of any aviation or transit-related construction)*	An individual belonging to a religious group; or the perception, based on distinguishable characteristics that a person is a member of a religious group. In practice, actions taken as a result of the moral and ethical beliefs as to what is right and wrong, which are sincerely held with the strength of traditional religious views. ***Note:*** Does not have to be associated with a recognized religious group or church; if an individual sincerely holds to the belief, it is a protected religious practice.	Muslim, Christian, Sikh, Hindu, etc.	Title VII of the Civil Rights Act of 1964; 23 CFR 230; FHWA-1273 Required Contract Provisions. *(49 U.S.C. 5332(b);* *49 U.S.C. 47123)*

(3) **Pertinent Nondiscrimination Authorities**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(4) **Additional Title VI Assurances**

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

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

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

NOW, THEREFORE, the U.S. Department of Transportation as authorized by law and upon the condition that the North Carolina Department of Transportation (NCDOT) will accept title to the lands and maintain the project constructed thereon in accordance with the North Carolina General Assembly, the Regulations for the Administration of the Federal-Aid Highway Program, and the policies and procedures prescribed by the Federal Highway Administration of the U.S. Department of Transportation in accordance and in compliance with all requirements imposed by Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Nondiscrimination in Federally-assisted programs of the U.S Department of Transportation pertaining to and effectuating the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252; 42 U.S.C. § 2000d to 2000d-4), does hereby remise, release, quitclaim and convey unto the NCDOT all the right, title and interest of the U.S. Department of Transportation in and to said lands described in Exhibit A attached hereto and made a part hereof.

(HABENDUM CLAUSE)

TO HAVE AND TO HOLD said lands and interests therein unto the North Carolina Department of Transportation (NCDOT) and its successors forever, subject, however, to the covenants, conditions, restrictions and reservations herein contained as follows, which will remain in effect for the period during which the real property or structures are used for a purpose for which Federal financial assistance is extended or for another purpose involving the provision of similar services or benefits and will be binding on the NCDOT, its successors and assigns.

The NCDOT, in consideration of the conveyance of said lands and interests in lands, does hereby covenant and agree as a covenant running with the land for itself, its successors and assigns, that (1) no person will on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination with regard to any facility located wholly or in part on, over, or under such lands hereby conveyed [,] [and]* (2) that the NCDOT will use the lands and interests in lands and interests in lands so conveyed, in compliance with all requirements imposed by or pursuant to Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, Effectuation of Title VI of the Civil Rights Act of 1964, and as said Regulations and Acts may be amended [, and (3) that in the event of breach of any of the above-mentioned nondiscrimination conditions, the Department will have a right to enter or re-enter said lands and facilities on said land, and that above described land and facilities will thereon revert to and vest in and become the absolute property of the U.S. Department of Transportation and its assigns as such interest existed prior to this instruction].*

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary in order to make clear the purpose of Title VI.)

(b) Clauses for Transfer of Real Property Acquired or Improved Under the Activity, Facility, or Program (1050.2A, Appendix C)

The following clauses shall be included in deeds, licenses, leases, permits, or similar instruments entered into by the North Carolina Department of Transportation (NCDOT) pursuant to the provisions of Assurance 7(a):

1. The (grantee, lessee, permittee, etc. as appropriate) for himself / herself, his / her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree [in the case of deeds and leases add "as a covenant running with the land"] that:

   (i.) In the event facilities are constructed, maintained, or otherwise operated on the property described in this (deed, license, lease, permit, etc.) for a purpose for which a U.S. Department of Transportation activity, facility, or program is extended or for another purpose involving the provision of similar services or benefits, the (grantee, licensee, lessee, permittee, etc.) will maintain and operate such facilities and services in compliance with all requirements imposed by the Acts and Regulations (as may be amended) such that no person on the grounds of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities.

2. With respect to licenses, leases, permits, etc., in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will have the right to terminate the (lease, license, permit, etc.) and to enter, re-enter, and repossess said lands and facilities thereon, and hold the same as if the (lease, license, permit, etc.) had never been made or issued. *

3. With respect to a deed, in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will have the right to enter or re-enter the lands and facilities thereon, and the above described lands and facilities will there upon revert to and vest in and become the absolute property of the NCDOT and its assigns. *

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)

(c) Clauses for Construction / Use / Access to Real Property Acquired Under the Activity, Facility or Program (1050.2A, Appendix D)

The following clauses shall be included in deeds, licenses, permits, or similar instruments / agreements entered into by the North Carolina Department of Transportation (NCDOT) pursuant to the provisions of Assurance 7(b):

1. The (grantee, licensee, permittee, etc., as appropriate) for himself / herself, his / her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree (in the case of deeds and leases add, "as a covenant running with the land") that (1) no person on the grounds of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities, (2) that in the construction of any improvements on, over, or under such land, and the furnishing of services thereon, no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination, (3) that the (grantee, licensee, lessee, permittee, etc.) will use the premises in compliance with all other requirements imposed by or pursuant to the Acts and Regulations, as amended, set forth in this Assurance.

2. With respect to (licenses, leases, permits, etc.), in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will have the right to terminate the (license, permit, etc., as appropriate) and to enter or re-enter and repossess said land and the facilities thereon, and hold the same as if said (license, permit, etc., as appropriate) had never been made or issued. *

3. With respect to deeds, in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will there upon revert to and vest in and become the absolute property of the NCDOT and its assigns. *

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)

***** 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 or 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 Electronic Version - May 1, 2012 Z-8

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 (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).

   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.

   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). 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 bid proposal or request for proposal 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).
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.
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. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 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 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, 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 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, 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 230, 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 (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 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 35 and 29 CFR 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.
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, 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 who 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.
   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, national origin, age or disability. The following procedures shall be followed:
   a. The contractor will conduct periodic inspections of project sites to insure 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. 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, 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, 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 there under. 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, 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 and 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. **Assurance Required by 49 CFR 26.13(b):**
   a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.
   b. The contractor 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 contracting agency deems appropriate.
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 $10,000 or more.

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, 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). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

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**
   a. All laborers and mechanics employed or working upon the site of the work, 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 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.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. 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 shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). 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 classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH–1321) shall 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. (1) The contracting officer shall 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 shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore 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 utilized 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) 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 shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. 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.

   (3) 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 shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour 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.

   (4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall 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.

c. 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 shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. 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, 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.

2. **Withholding.** The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, 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.

3. **Payrolls and basic records**

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, 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 section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) 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 section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall 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. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g. the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH–347 is available

for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/esa/whd/forms/ wh347instr.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency.

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed 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 Regulations, 29 CFR part 3;

(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 of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH–347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, 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 may be grounds for debarment action pursuant to 29 CFR 5.12.

4. **Apprentices and trainees**

a. Apprentices (programs of the USDOL). Apprentices will be permitted to work at less than the predetermined rate for the work they performed 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 Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall 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 the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall 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, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL). Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.
d. 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. 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.
6. **Subcontracts.** The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 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.
9. **Disputes concerning labor standards.** 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 he or she) 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 section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
    b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
    c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

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 watchmen 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.
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. 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 watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of $10 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.
3. **Withholding for unpaid wages and liquidated damages.** The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or 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, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.
4. **Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

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" 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:
    (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.

2. 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. 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.
5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

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 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.
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 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).
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 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 1, 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

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.
2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

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.

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.
   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.
   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.
   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 and 1200. “First Tier Covered Transactions” refers to any covered transaction between a grantee or subgrantee 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 grantee or subgrantee 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.
   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.
   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. 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 Excluded Parties List System website **(https://www.epls.gov/)**, which is compiled by the General Services Administration.
   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. **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) 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;
      (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; 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.
   b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. **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)
   a. By signing and submitting this proposal, the prospective lower tier 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.
   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 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 grantee or subgrantee 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 grantee or subgrantee 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.

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.

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 Excluded Parties List System website (https://www.epls.gov/), which is compiled by the General Services Administration.

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.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.
2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall 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 20).

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.

STANDARD SPECIAL PROVISION
MINIMUM WAGES
GENERAL DECISION NC20210091 01/01/2021 NC91

Z-091

Date: January 1, 2021

General Decision Number: NC20210091 01/01/2021 NC91

Superseded General Decision Numbers: NC20200091
State: North Carolina

Construction Type: HIGHWAY

COUNTIES

Beaufort	Dare	Jones	Sampson
Bertie	Duplin	Lenoir	Scotland
Bladen	Gates	Martin	Tyrrell
Camden	Granville	Northampton	Vance
Carteret	Halifax	Pamlico	Warren
Chowan	Harnett	Pasquotank	Washington
Columbus	Hertford	Perquimans	Wilson
Craven	Hyde	Robeson	

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: Under Executive Order (EO) 13658, an hourly minimum wage of $10.95 for calendar year 2021 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, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.95 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract for calendar year 2021. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the Design-Build Team must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2) – (60). Additional information on contractor requirements and worker protections under the EO is available at **www.dol.gov/whd/govcontracts**.

Modification Number	**Publication Date**
0	01/01/2021

SUNC2014-006 11/17/2014

	Rates	Fringes
BLASTER	21.85	
CARPENTER	13.72	
CEMENT MASON / CONCRETE FINISHER	14.26	
ELECTRICIAN		
Electrician	18.69	2.66
Telecommunications Technician	14.72	1.67
IRONWORKER	16.32	
LABORER		
Asphalt Raker and Spreader	12.42	
Asphalt Screed / Jackman	13.48	
Carpenter Tender	10.85	
Cement Mason / Concrete Finisher Tender	11.35	
Common or General	10.12	
Guardrail / Fence Installer	13.39	
Pipelayer	13.31	
Traffic Signal / Lighting Installer	16.88	
PAINTER		
Bridge	19.62	
POWER EQUIPMENT OPERATORS		
Asphalt Broom Tractor	13.28	
Bulldozer Fine	18.46	
Bulldozer Rough	14.09	
Concrete Grinder / Groover	24.66	
Crane Boom Trucks	17.25	
Crane Other	21.48	
Crane Rough / All-Terrain	19.00	
Drill Operator Rock	15.43	1.61
Drill Operator Structure	19.12	
Excavator Fine	17.61	
Excavator Rough	12.99	
Grader / Blade Fine	16.73	
Grader / Blade Rough	15.28	
Loader 2 Cubic Yards or Less	10.28	
Loader Greater Than 2 Cubic Yards	13.58	
Material Transfer Vehicle (Shuttle Buggy)	17.39	
Mechanic	18.63	
Milling Machine	14.38	
Off-Road Hauler / Water Tanker	9.30	
Oiler / Greaser	13.45	
Pavement Marking Equipment	11.87	
Paver Asphalt	15.53	
Roller Asphalt Breakdown	12.13	
Roller Asphalt Finish	13.65	
Roller Other	10.48	
Scraper Finish	13.98	
Scraper Rough	10.17	
Slip Form Machine	19.29	
Tack Truck / Distributor Operator	14.56	

	Rates	Fringes
TRUCK DRIVER		
GVWR of 26,000 Lbs or Less	10.35	
GVWR of 26,001 Lbs or Greater	12.04	

Welders - Receive rate prescribed for craft performing operation to which welding is incidental.

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 **www.dol.gov/whd/govcontracts**.

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)(ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four-letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which 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. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate

includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 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. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated / CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write 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 the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write 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 by 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

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

***** STANDARD SPECIAL PROVISIONS *****

(10-23-17)

DIVISION ONE OF STANDARD SPECIFICATIONS

Division One of the 2018 NCDOT *Standard Specifications for Roads and Structures* (*Standard Specifications*) shall apply except as follows:

Definitions: Throughout Division One of the 2018 *Standard Specifications for Roads and Structures*, the term "Contractor" is replaced with "Design-Build Team", the term "Bidder" is replaced with "Proposer," the term "Bid" is replaced with "Price Proposal," and the phrase "lowest Responsible Bidder" is replaced with "responsible Proposer with the lowest adjusted price." The replacement of "Contractor" with "Design-Build Team" does not apply to Article 102-2. The replacement of the above terms also does not apply when the terms are part of a phrase (e.g. bid bond, prime contractor, total amount bid, etc.)

Deletions: Articles 102-3(B), 102-4, 102-8(B), 102-9(C)(2), 103-2(B), and 103-4(C) of the 2018 *Standard Specifications for Roads and Structures* are deleted from Design-Build Contracts.

Modifications: The remainder of this Standard Special Provision includes modifications to Division One of the 2018 *Standard Specifications for Roads and Structures*.

SECTION 101
DEFINITION OF TERMS

Page 1-3, Article 101-3, replace and add certain definitions as follows:

ADDITIONAL WORK

Additional work is that which results from a change or alteration to the contract and for which there are contract unit prices in the original contract or an executed supplemental agreement.

ADVERTISEMENT

The public advertisement inviting Statements of Qualifications for the design and construction of specific projects.

AWARD

The decision of the Department of Transportation to accept the Technical and Price Proposals of the selected Design-Build Team for work which is subject to the furnishing of payment and performance bonds, and such other conditions as may be otherwise provided by law, the Request for Proposals, and the 2018 *Standard Specifications for Roads and Structures*.

CONTRACT

The executed agreement between the Department and the successful Proposer, covering the performance of, and compensation for, the work. The term contract is all inclusive with reference to all written agreements affecting a contractual relationship and all documents referred to therein. The contract shall include, but not be limited to, the Request for Proposals, the Technical Proposal, the Price Proposal, the printed contract form and attachments, contract bonds, plans and associated special provisions prepared by the Design-Build Team, standard specifications and supplemental specifications, standard special provisions and project special provisions contained in the Request for Proposals or as developed by the Design-Build Team and accepted by the Department, and all executed supplemental agreements. The contract shall constitute one instrument.

DATE OF AVAILABILITY

That date, established as set forth in the Request for Proposals, by which it is anticipated that the Contract will be executed and sufficient design efforts or work sites within the project limits will be available for the Design-Build Team to begin the controlling operations or design.

DESIGN-BUILD

A form of contracting in which the successful Proposer undertakes responsibility for both the design and construction of a project.

DESIGN-BUILD TEAM

An individual, partnership, joint venture, corporation or other legal entity that furnishes the necessary design and construction services, whether by itself or through subcontracts.

DESIGN-BUILD PROPOSAL

A proposal to contract consisting of a separately sealed Technical Proposal and a separately sealed Price Proposal submitted in response to a Request for Proposals on a Design-Build project.

PLANS

The project plans, Standard Drawings, working drawings and supplemental drawings, or reproductions thereof, accepted by the Engineer, which show the location, character, dimensions and details of the work to be performed. Unless noted otherwise within the Request for Proposals, the term “plans” refers to plans as developed by the Design-Build Team and accepted by the Department.

(A) Standard Drawings

Drawings approved for repetitive use, showing details to be used where appropriate. All Standard Drawings approved by the Department plus subsequent revisions and additions. Standard Drawings are available for purchase from:

State Contract Officer
1591 Mail Service Center
Raleigh, NC 27699-1591

(B) Preliminary Plans

Department-furnished drawings distributed in concert with a Request for Proposals, or as developed by the Design-Build Team.

(C) Project Plans

Construction drawings prepared, sealed and completed by the Design-Build Team, or as provided by the Department, that contain specific details and dimensions peculiar to the work.

(D) Working Drawings and Supplemental Drawings

Supplemental design sheets, shop drawings, or similar data which the Design-Build Team is required to submit to the Engineer.

(E) As-Constructed Drawings

Red-lined mark-up of the latest Released for Construction (RFC) Plans containing the information listed under As-Constructed Plans in the Records and Reports Section of the NCDOT Construction Manual.

(F) As-Built Plans

Coordinately correct plans documenting the details, dimensions and locations of the completed work.

PRICE PROPOSAL

The offer of a Proposer, submitted on the prescribed forms, to perform the work and furnish the labor and materials at the price quoted.

PROPOSER

An individual, partnership, firm, corporation, LLC, or joint venture formally submitting a Technical Proposal and Price Proposal in response to a Request for Proposals.

REQUEST FOR PROPOSALS

The paper document provided by the Department that the Proposer uses to develop his paper offer to perform the work at designated bid prices.

RIGHT OF WAY

The land area shown on the plans as right of way within which the project is to be constructed.

SCHEDULE OF VALUES

A schedule of work items necessary to complete work, along with the progress of each work item, primarily for the purpose of partial payments.

TABLE OF QUANTITIES

A listing of work items (corresponding to the items in the Trns*port pay item list) that contributes to a project completion. The table shall include estimated quantities for each work item.

TECHNICAL PROPOSAL

A submittal from a Proposer, in accordance with the Request for Proposals requirements, for the purpose of final selection. The Technical Proposal is defined to also include any supplemental information requested by the Department from a Proposer prior to opening bids.

SECTION 102
PROPOSAL REQUIREMENTS AND CONDITIONS

Page 1-9, delete Article 102-1 and replace with the following:

102-1 INVITATION TO BID

After the advertisement has been made, an Invitation to Bid will be made available to known prequalified contractors and any other contracting firms, material suppliers and other interested parties who have requested they be placed on the Invitation to Bid mailing list, informing them that Statements of Qualifications and Design-Build Proposals will be received for the design and construction of specific projects. Such invitation will indicate the contract identification number, length, locations and descriptions; a general summary of the scope of work to be performed; and information on how to receive a Request for Qualifications.

All projects will be advertised in daily newspapers throughout the state before the Price Proposal opening.

Page 1-12, delete Article 102-3 and replace with the following:

102-3 CONTENTS OF REQUEST FOR PROPOSALS

A Request for Proposals will be furnished by the Department to the selected Proposers from among the respondents to the Request for Qualifications. Each Request for Proposals will be marked on the front cover by the Department with an identifier of the Proposer to whom it is being furnished. This Request for Proposals will state the location of the project and will show a schedule of contract items for which Technical and Price Proposals are invited. It will set forth the dates and times Technical and Price Proposals are to be submitted and when the Price Proposals will be opened. The Request for Proposals will also include special provisions or requirements that vary from or are not contained in any preliminary design information or standard specifications.

The Request for Proposals will also include the printed contract forms and signature sheets for execution by both parties to the contract. In the event the Proposer is awarded the contract, execution of the Request for Proposals by the Proposer is considered the same as execution of the contract.

Standard specifications, sealed plans specifically identified as the Department's responsibility and other documents designated in the Request for Proposals shall be considered a part of the Request for Proposals whether or not they are attached thereto. All papers bound to the Request for Proposals are necessary parts thereof and shall not be detached, taken apart, or altered.

The names and identity of each prospective Proposer that receives a copy of the Request for Qualifications for the purposes of submitting a Statement of Qualifications shall be made public, except that a potential Proposer who obtains a Request for Qualifications may, at the time of ordering, request that his name remain confidential.

One copy of the Final Request for Proposals will be furnished to each prospective Proposer. Additional copies may be purchased for the sum of $25 each. The copy of the Final Request for Proposals marked with the Proposer's name and prequalification number shall be returned to the Department as the Proposer's Price Proposal.

Page 1-14, Article 102-7, 4th paragraph, delete the first two sentences and replace with the following:

Details shown in the subsurface investigation report are preliminary only. The subsurface investigation and subsurface report, if provided, is done so for information purposes only.

Pages 1-14, delete Article 102-8 and replace with the following:

102-8 PREPARATION AND SUBMISSION OF BIDS

All Price Proposals shall be prepared and submitted in accordance with the following requirements:

1. The Request for Proposals provided by the Department shall be used and shall not be taken apart or altered. The Price Proposal shall be submitted on the same form, which has been furnished to the Proposer by the Department as identified by the Proposer's name marked on the front cover by the Department.

2. All entries including signatures shall be written in ink.

3. The Proposer shall submit a lump sum or unit price for every item in the Request for Proposals. The lump sum or unit prices bid for the various contract items shall be written in figures.

4. An amount bid shall be entered in the Request for Proposals for every item and the price shall be written in figures in the "Amount Bid" column in the Request for Proposals.

5. An amount bid shall be entered in the Request for Proposals for every item on which a unit price has been submitted. The amount bid for each item other than lump sum items shall be determined by multiplying each unit bid price by the quantity for that item and shall be written in figures in the Amount Bid column in the Request for Proposals.

6. The total amount bid shall be written in figures in the proper place in the Request for Proposals. The total amount bid shall be determined by adding the amounts bid for each lump sum item.

7. Changes in any entry shall be made by marking through the entry in ink and making the correct entry adjacent thereto in ink. A representative of the Proposer shall initial the change in ink.

8. The Price Proposal shall be properly executed. To constitute proper execution, the Price Proposal shall be executed in strict compliance with the following:

    a. If a Price Proposal is by an individual, it shall show the name of the individual and shall be signed by the individual with the word "Individually" appearing under the signature. If the individual operates under a firm name, the Price Proposal shall be signed in the name of the individual doing business under the firm name.

    b. If the Price Proposal is by a corporation, it shall be executed in the name of the corporation by the President, Vice President, or Assistant Vice President. It shall be attested by the Secretary or Assistant Secretary. The seal of the corporation shall be affixed. If the Price Proposal is executed on behalf of a corporation in any other manner than as above, a certified copy of the minutes of the Board of Directors of said corporation authorizing the manner and style of execution and the authority of the person executing shall be attached to the Price Proposal or shall be on file with the Department.

c. If the Price Proposal is made by a partnership, it shall be executed in the name of the partnership by one of the general partners.

d. If the Price Proposal is made by a limited liability company, it shall be signed by the manager, member, or authorized agent.

e. If the Price Proposal is made by a joint venture, it shall be executed by each of the joint venturers in the appropriate manner set out above. In addition, the execution by the joint venturers shall appear below their names.

9. The Price Proposal shall not contain any unauthorized additions, deletions, or conditional bids.

10. The Proposer shall not add any provision reserving the right to accept or reject an award or to enter into a contract pursuant to an award.

11. The Price Proposal shall be accompanied by a bid bond on the form furnished by the Department or by a bid deposit. The bid bond shall be completely and properly executed in accordance with the requirements of Article 102-10 and as modified herein. The bid deposit shall be a certified check or cashier check in accordance with Article 102-10 and as modified herein.

12. The Price Proposal shall be placed in a sealed package and shall have been delivered to, and received by, the Department prior to the time specified in the Request for Proposals.

Page 1-17, Article 102-10, 3rd 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 6th paragraph.

Pages 1-18, delete Article 102-12 and replace with the following:

102-12 WITHDRAWAL OR REVISION OF BIDS

A Design-Build Team will not be permitted to withdraw its Technical Proposal and / or Price Proposal after they have been submitted to the Department, unless allowed under Article 103-3 or unless otherwise approved by the Chief Engineer.

Page 1-19, delete Article 102-13 and replace with the following:

102-13 RECEIPT AND OPENING OF BIDS

Price Proposals from short-listed Proposers will be opened and read publicly on the date and time indicated in the Request for Proposals. The Technical Scores of the previously conducted evaluation of the Technical Proposals will also be read publicly in accordance with the procedures outlined in the Request for Proposals. Proposers, their authorized agents, and other interested parties are invited to be present.

Page 1-19, Article 102-14, replace the 1st paragraph with the following:

102-14 REJECTION OF BIDS

Any Price Proposal submitted which fails to comply with any of the requirements of Articles 102-8, 102-9 or 102-10, or with the requirements of the project scope and specifications shall be considered irregular and may be rejected. A Price Proposal that does not contain costs for all items in the Request for Proposals shall be considered irregular and may be rejected.

SECTION 103
AWARD AND EXECUTION OF CONTRACT

Page 1-21, delete Article 103-1 and replace with the following:

103-1 CONSIDERATION OF PRICE PROPOSALS

After the Price Proposals are opened and read, they will be tabulated. The Price Proposal and Technical Score of the Technical Proposal will be made available in accordance with procedures outlined in the Request for Proposals. In the event of errors, omissions, or discrepancies in the Price Proposal, corrections to the Price Proposal will be made in accordance with the provisions of Article 103-2. Such corrected bid prices will be used to determine the lowest adjusted price.

After the reading of the Price Proposals and Technical Scores, the Department will calculate the lowest adjusted price as described in the Request for Proposals.

The right is reserved to reject any or all Price Proposals, to waive technicalities, to request the Proposer with the lowest adjusted price to submit an up-to-date financial and operating statement, to advertise for new Price Proposals, or to proceed to do the work otherwise, if in the judgment of the Department, the best interests of the State will be promoted thereby.

Page 1-21, Subarticle 103-2(A), add items (6) and (7) as follows:

(6) Discrepancy in the "Total Amount Bid" and the addition of the "Amount Bid" for each line Item

In the case of the Total Amount Bid does not equal the summation of each Amount Bid for the line items, the summation of each Amount Bid for the line items shall be deemed to be the correct Total Amount Bid for the entire project.

(7) Omitted Total Amount Bid –Amount Bid Completed

If the Total Amount Bid is not completed and the Amount Bid for all line items is completed the Total Amount Bid shall be the summation of the Amount Bid for all the line items.

Page 1-23, Subarticle 103-4(A), first paragraph, replace the 3rd and 4th sentences with the following:

Where award is to be made, the notice of award will be issued within 75 days after the submittal of Price Proposals, except with the consent of the responsible Proposer with the lowest adjusted price the decision to award the contract to such bidder may be delayed for as long a time as may be agreed upon by the Department and such Proposer. In the absence of such agreement, the Proposer may withdraw his Price Proposal at the expiration of the 75 days without penalty if no notice of award has been issued.

Page 1-29, Article 103-6, delete the 1st and 2nd paragraphs and replace with the following:

Checks that have been furnished as a bid deposit will be retained until after the contract bonds have been furnished by the successful Proposer, at which time the checks that were furnished as a bid deposit will be returned.

SECTION 104
SCOPE OF WORK

Page 1-30, delete Article 104-1 and replace with the following:

104-1 INTENT OF CONTRACT

The intent of the contract is to prescribe the work or improvements that the Design-Build Team undertakes to perform, in full compliance with the contract documents. In case the method of construction or character of any part of the work is not covered by the contract, this section shall apply. The Design-Build Team shall perform all work in accordance with the contract or as may be modified by written orders, and shall do such additional, extra, and incidental work as may be considered necessary to complete the work to the full intent of the contract. Unless otherwise provided elsewhere in the contract, the Design-Build Team shall furnish all implements,

machinery, equipment, tools, materials, supplies, transportation, and labor necessary for the design, prosecution and completion of the work.

Page 1-30, Article 104-3, replace "plans or details of construction" with "contract" in all instances within this Article.

Page 1-39, delete Article 104-10 and replace with the following:

104-10 MAINTENANCE OF THE PROJECT

The Design-Build Team shall maintain the project from the date of beginning construction on the project until the project is finally accepted. For sections of facilities impacted by utility construction / relocation performed by the Design-Build Team prior to beginning construction on the roadway project, maintenance of the impacted sections of facilities shall be performed by the Design-Build Team beginning concurrently with the impact. This maintenance shall be continuous and effective and shall be prosecuted with adequate equipment and forces to the end that all work covered by the contract is kept in satisfactory and acceptable conditions at all times.

All existing and constructed guardrail / guiderail within the project limits shall be included in this maintenance. The Design-Build Team shall perform weekly inspections of all guardrail and guiderail and shall report damages to the Engineer on the same day of the weekly inspection. Where damaged guardrail or guiderail is repaired or replaced as a result of maintaining the project in accordance with this Article, such repair or replacement shall be performed within seven consecutive calendar days of such inspection report.

The Design-Build Team shall maintain all existing drainage facilities, except where the work consists of resurfacing only, such that they are in the same condition upon acceptance of the project as they were when the project was made available to the Design-Build Team. In the event that the Design-Build Team's work is suspended for any reason, the Design-Build Team shall maintain the work covered by the contract, as provided herein. When a portion of the project is accepted as provided in Article 105-17, immediately after such acceptance, the Design-Build Team will not be required to maintain the accepted portion. Should latent defects be discovered or become evident in an accepted portion of the project, the Design-Build Team shall repair or replace the defective work at no cost to the Department.

Where an observation period(s) is required that extends beyond the final acceptance date, the Design-Build Team shall perform any work required by the observation period until satisfactory completion of the observation period.

With the exception of the maintenance of existing and constructed guardrail / guiderail, the Design-Build Team will not be directly compensated for any maintenance operations. The Design-Build Team will not be compensated for the performance of weekly inspections of guardrail / guiderail, and the damage reports required as described above. Authorized maintenance activities for existing and constructed guardrail / guiderail within the project limits will be paid for as extra work in accordance with Articles 104-7 and 104-8 of the NCDOT *Standard Specifications for Roads and Structures*.

SECTION 105
CONTROL OF WORK

Pages 1-44, delete Article 105-2 and replace with the following:

105-2 PLANS AND WORKING DRAWINGS

All plans shall be supplemented by such approved working drawings as are necessary to adequately control the work. Working drawings furnished by the Design-Build Team and approved by the Engineer shall consist of such detailed drawings as may be required to adequately control the work. They may include stress sheets, shop drawings, erection drawings, falsework drawings, cofferdam drawings, bending diagrams for reinforcing steel, catalog cuts, or any other supplementary drawings or similar data required of the Design-Build Team. When working drawings are approved by the Engineer, such approval shall not operate to relieve the Design-Build Team of any of his responsibility under the contract for the successful completion of the work.

Changes on shop drawings after approval and / or distribution shall be subject to the approval of the Engineer and he shall be furnished a record of such changes.

Page 1-45, Article 105-3, add the following after the 3rd paragraph:

The Design-Build Team shall bear all the costs of providing the burden of proof that the nonconforming work is reasonable and adequately addresses the design purpose. The Design-Build Team shall bear all risk for continuing with nonconforming work in question until it is accepted.

The Engineer may impose conditions for acceptance of the nonconforming work. The Design-Build Team shall bear all costs for fulfilling the conditions.

The decisions whether the product satisfies the design purpose, whether the nonconforming work is reasonably acceptable and the conditions for acceptance are at the sole discretion of the Engineer.

Pages 1-45, delete Article 105-4 and replace with the following:

105-4 COORDINATION OF PLANS, SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS, AND SPECIAL PROVISIONS

The Request for Proposals, all construction Plans, the Standard Specifications, Supplemental Specifications and Special Provisions and all supplementary documents are essential parts of the contract and a requirement occurring in one is as binding as though occurring in all. They are complementary and describe and provide the complete contract.

In case of discrepancy or conflict, the order in which they govern shall be as follows:

(A) Request for Proposals, in which Project Special Provisions govern Standard Special Provisions

(B) Technical Proposal from the Design-Build Team

(C) Accepted Plans and Details from the Design-Build Team, or sealed plans provided by the Department, as applicable

(D) Standard Drawings

(E) Standard Specifications

Where dimensions on the plans are given or can be computed from other given dimensions they shall govern over scaled dimensions.

The Design-Build Team shall take no advantage of any error or omission in the plans, estimated quantities, or specifications. In the event the Design-Build Team discovers an error or omission, he shall immediately notify the Engineer.

Page 1-48, delete Article 105-9 and replace with the following:

105-9 CONTRUCTION STAKES, LINES, AND GRADES

The Design-Build Team shall be responsible for all surveying, construction staking and layout required in the performance of the work. The Design-Build Team shall be responsible for the accuracy of lines, slopes, grades and other engineering work which the Design-Build Team provides under this contract.

SECTION 106
CONTROL OF MATERIAL

Page 1-53, Article 106-2, add the following after the second paragraph:

Prior to beginning construction, the Design-Build Team shall provide a Table of Quantities as described in Article 101-3 of these specifications.

The Table of Quantities Work Items shall correspond to Pay Items as defined in the Standard Specifications. These Work Items have associated Materials and Conversion Factors. For non-standard Work Items, a Generic Work Item with the correct Unit of Measure and in an appropriate category will be used. For example, “GENERIC TRAFFIC CONTROL ITEM - EA” or “GENERIC RETAINING WALL ITEM - LF”. For these Generic Work Items, Materials must be defined and appropriate conversion factors submitted.

An initial Table of Quantities shall be submitted no later than 30 calendar days after the date of award. The Table of Quantities shall be updated and resubmitted within 14 days of when a set of Plans is sealed as Release for Construction (RFC) Plans, and whenever there are substantial changes to the Quantities on previously incorporated RFC Plans.

A Certified Table of Quantities shall be submitted with each pay request. All Certified Tables of Quantities shall indicate that the information accurately represents the materials used for the work performed for which payment is requested, and be notarized by a Design-Build Team representative.

Page 1-55, Article 106-6, add the following after the last paragraph:

For items normally pretested by the Department, the Design-Build Team shall provide a minimum of 30 days notice prior to the beginning of production of the items for this project along with final approved shop drawings.

SECTION 107
LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC

Page 1-65, delete Article 107-18 and replace with the following:

107-18 FURNISHING RIGHT OF WAY

The responsibility for coordinating the securing of all necessary rights of way is as outlined in the Request for Proposals.

SECTION 108
PROSECUTION AND PROGRESS

Page 1-68, Article 108-2, replace the 2nd paragraph with the following:

The Design-Build Team shall submit a Progress Schedule for review within thirty (30) calendar days of receiving Notice of Award. The Department will review the Progress Schedule within twenty-one (21) calendar days of receipt. The Design-Build Team shall make any necessary corrections and adjustments to the Progress Schedule as necessitated by the Department's review within seven (7) calendar days. The Department will review the revised Progress Schedule within seven (7) calendar days of receipt.

Page 1-68, Subarticle 108-2(A)(1), add the following:

(k) Utility relocation and construction

Page 1-69, Subarticle 108-2(A)(2), add the following:

(h) Critical design submittal dates

(i) Critical permitting dates

(j) Completion of right of way acquisition

(k) Completion of utility relocation and construction

Page 1-69, Article 108-2, add the following:

(D) The Design-Build Team shall provide a written narrative each month detailing the work and percentage of work completed, anticipated sequence of upcoming work (two-month forecast), controlling operation(s), intermediate completion dates, and milestones. If any milestones are exceeded or will not be achieved, the Design-Build Team shall provide in the written narrative details of the delay; controlling operation affected, impacts to other operations, revisions to future intermediate completion dates and milestones, and remedial action necessary to get the project back to the original completion date.

Page 1-69, delete Article 108-3 and replace with the following:

108-3 PRECONSTRUCTION AND PRE-DESIGN CONFERENCES

The selected Design-Build Team shall meet with the Engineer for a pre-design conference concerning the design phase of the work. This conference shall be held prior to the commencement of work, as it is determined according to Article 108-1, and will be scheduled by the Engineer. At the predesign conference, the Design-Build Team shall furnish authorized signature forms and a list of all proposed subcontractors associated with the project design.

A preconstruction conference shall be held at least ten working days before construction activity begins. This second conference, concerning the construction phase, shall also be scheduled by the Engineer. The Design-Build Team shall give the Engineer a minimum of 45 days written notice before the Design-Build Team plans to begin construction activities. This will allow the Engineer time for any environmental agency representatives involved in the permitting process, as well as any other pertinent entities, to be scheduled to attend the preconstruction conference. If the Design-Build Team is responsible for utilities in accordance with Article 105-8 and the Request for Proposals, the Design-Build Team shall be responsible for coordinating with the Engineer in scheduling the utility owners attendance and for notifying the utility owners. The Design-Build Team shall also be responsible for coordinating with the Engineer in scheduling the attendance of subcontractors and others deemed appropriate, and for notifying them.

At the preconstruction conference, a list of any proposed subcontractors and major material suppliers associated with the construction of the project will be submitted.

If the contract has a DBE or WBE / MBE requirement, the Design-Build Team shall submit copies of completed and signed DBE or WBE / MBE subcontracts, purchase orders, or invoices to the Department.

In accordance with Article 1101-1 and the Request for Proposals, the Design-Build Team shall submit Transportation Management Plans, including but not limited to Temporary Traffic Control Plans. The Design-Build Team shall designate an employee who is competent and experienced in transportation management to implement and monitor the Transportation Management Plans. The qualifications of the designated employee must be satisfactory to the Engineer.

The Design-Build Team shall submit a Safety Plan and designate an employee as the Safety Supervisor.

Both plans shall be submitted at the preconstruction conference and must be satisfactory to the Engineer. Should the design plan include activities that would place personnel on the work site, Temporary Traffic Control Plans and a Safety Plan for those activities shall be submitted at the predesign conference.

During the preconstruction conference, the Engineer will designate a Department employee or employees who will be responsible to see that the Transportation Management Plans, including but not limited to the Temporary Traffic Control Plans, and any alterations thereto are implemented and monitored to the end that traffic is carried through the work in an effective manner. If approved by the Engineer, the Design-Build Team may designate one employee to be responsible for both the Temporary Traffic Control Plans and the Safety Plan. The Design-Build Team shall not designate its superintendent as the responsible person for either the Temporary Traffic Control Plans or the Safety Plan, unless approved by the Engineer.

If the project requires the Design-Build Team or State personnel work from falsework, within shoring, or in any other hazardous area, the Design-Build Team shall submit, as part of the Design-Build Team's Safety Plan, specific measures that will be used to ensure worker safety.

The Design-Build Team shall also submit a program for erosion control and pollution prevention on all projects involving clearing and grubbing, earthwork, structural work, or other construction, when such work is likely to create erosion or pollution problems.

If the Design-Build Team fails to provide the required submissions, the Engineer may order the preconstruction conference suspended until such time as they are furnished. Work shall not begin until the preconstruction conference has been concluded and the Safety Plan has been approved, unless authorized by the Engineer. The Design-Build Team shall not be entitled to additional compensation or an extension of contract time resulting from any delays due to such a suspension.

The Design-Build Team shall designate a qualified employee as Quality Control Manager. The Quality Control Manager shall be responsible for implementing and monitoring the quality control requirements of the project.

Page 1-69, Article 108-4, add the following sentence to the end of this article:

The Design-Build Team shall record the proceedings of these conferences and distribute the final minutes of the conferences to all attendees.

Page 1-70, Article 108-6, replace "40%" with "30%" in the 1st paragraph.

Page 1-71, Article 108-6, replace "35%" with "25%" in the 2nd paragraph.

Pages 1-72, delete Article 108-8 and replace with the following:

108-8 FAILURE TO MAINTAIN SATISFACTORY PROGRESS

The Engineer will check the Design-Build Team's progress at the time each partial pay request is received. The Design-Build Team's progress may be considered as unsatisfactory if, according to the Progress Schedule, the projected finish date for all work exceeds the scheduled finish date by more than 10%.

When the Design-Build Team's progress is found to be unsatisfactory as described above, the Engineer may make written demand of the Design-Build Team to state in writing the reason for the unsatisfactory progress and produce such supporting data as the Engineer may require or the Design-Build Team may desire to submit. The Engineer will consider the justifications submitted by the Design-Build Team and extensions of the completion date that have or may be allowed in accordance with Subarticle 108-10(B) and as modified herein.

When the Design-Build Team cannot satisfactorily justify the unsatisfactory progress the Engineer may invoke one or more of the following sanctions:

1. Withhold anticipated liquidated damages from amounts currently due or which become due.

2. Remove the Design-Build Team and individual managing firms of the Design-Build Team and / or prequalified design firms from the Department's Prequalified Bidders List.

When any of the above sanctions have been invoked, they shall remain in effect until rescinded by the Engineer.

Page 1-75, Subarticle 108-10(B), add the following as the first paragraph:

Only delays to activities which affect the completion date or intermediate contract date will be considered for an extension of contract time. No extensions will be granted until a delay occurs which impacts the project's critical path and extends the work beyond the contract completion date or intermediate completion date. Any extension to the completion date or intermediate contract date will be based on the number of calendar days the completion date or intermediate completion date is impacted as determined by the Engineer's analysis.

Pages 1-75, delete Subarticle 108-10(B)(1) in its entirety.

Page 1-78, delete Subarticle 108-13(D)(2) in its entirety.

SECTION 109
MEASUREMENT AND PAYMENT

Page 1-80, Article 109-2, delete the last sentence of the 1st paragraph and replace with the following:

Payment to the Design-Build Team will be made only for the work completed, certified and accepted in accordance with the terms of the contract.

Pages 1-85, delete Subarticle 109-4(A) and replace with the following:

109-4 PARTIAL PAYMENTS

(A) General

Partial payments will be based upon progress estimates prepared by the Engineer at least once each month on the date established by the Engineer. Partial payments may be made twice each month if in the judgment of the Engineer the amount of work performed is sufficient to warrant such payment. No partial payment will be made when the total value of work performed since the last partial payment amounts to less than $10,000.00. Partial payments will be approximate only and will be subject to correction in the final estimate and payment.

When the contract includes one lump sum price for the entire work required by the contract, partial payments for the lump sum Design-Build price shall be based on a certified Schedule of Values submitted by the successful Design-Build Team and approved by the Engineer. The certification shall indicate the Design-Build Team has reviewed the information submitted and the information accurately represents the work performed for which payment is requested. The certified Schedule of Values shall be submitted no later than 30 calendar days after the date of award. Each item on the certified Schedule of Values shall be assigned a cost and quantity and shall be identified as an activity on the Progress Schedule. A revised certified Schedule of Values shall be submitted with each update of the Progress Schedule as described in Article 108-2, and as modified herein, or when requested by the Engineer. A certified copy of the Table of Quantities shall also be submitted with each payment request. The certification of the Table of Quantities shall indicate the Design-Build Team has reviewed the information submitted and the information accurately represents the materials for the work performed for which payment is requested.

When the contract includes lump sum items for portions of the work required by the contract, and the applicable section of the Specifications or Request for Proposals specify the means by which the total amount bid be included in the partial pay estimates, the

Engineer will determine amounts due on the partial pay estimate in accordance with the applicable portion of the Specifications or Request for Proposals.

The Engineer will withhold an amount sufficient to cover anticipated liquidated damages as determined by the Engineer.

Page 1-86, Subarticle 109-5(D), delete the 4th and 5th paragraphs and replace with the following:

Partial payments will not be made on seed or any living or perishable plant materials.

Partial payment requests shall not be submitted by the Design-Build Team until those items requested have corresponding signed and sealed RFC Plans accepted by the Department.

Pages 1-88, Article 109-10, add the following as bullets (E) and (F) under the 1st paragraph.

(E) As-Constructed Drawings, As-Built Plans and other documents required elsewhere in this RFP.

(F) Documents or guarantees to support any warranty provided by the Design Build Team.

County : Robeson

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
			ROADWAY ITEMS			
0001	0000900000-N	SP	GENERIC MISCELLANEOUS ITEM DESIGN AND CONSTRUCTION I-6064A	Lump Sum	L.S.	
0002	0000900000-N	SP	GENERIC MISCELLANEOUS ITEM DESIGN AND CONSTRUCTION I-6064B	Lump Sum	L.S.	
0003	0000900000-N	SP	GENERIC MISCELLANEOUS ITEM DESIGN AND CONSTRUCTION I-6064C / I-5879	Lump Sum	L.S.	

1502/Mar04/Q3.0/D2700000/E3 **Total Amount Of Bid For Entire Project :**

FUEL USAGE FACTOR CHART AND ESTIMATE OF QUANTITIES FOR I-6064A

Description of Work	Units	Fuel Usage Factor Diesel #2	Estimate of Quantities
Unclassified Excavation	Gal / CY	0.29	_____ CY
Borrow Excavation	Gal / CY	0.29	_____ CY
Class IV Subgrade Stabilization Aggregate Base Course Sub-Ballast 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
Portland Cement Concrete Pavement Through Lanes and Shoulders (> 11") Through Lanes and Shoulders (9" to 11") Through Lanes and Shoulders (< 9")	Gal / SY	 0.327 0.272 0.245	 _____ SY _____ SY _____ SY
** Structural Concrete (Cast-in-Place Only)	Gal / CY	0.98	_____ CY

* Select 0.90 **OR** 2.90

** Structural Concrete shall be defined as cast-in-place Class A or Class AA concrete used in the construction of major structures for various work items identified in Division 4 of the 2018 *Standard Specifications for Roads and Structures*.

☐ The above quantities represent a reasonable estimate of the total quantities anticipated, for each item, as pertaining to fuel price adjustments, and is representative of the design proposed in the Technical Proposal submitted under separate cover.

Or

☐ The Design-Build Team elects not to pursue reimbursement for Fuel Price Adjustments on this project.

The information submitted on this sheet is claimed as a "Trade Secret" in accordance with the requirements of G.S. 66-152(3) until such time as the Price Proposal is opened.

_____ _____

Signature, Title Dated

_____

Print Name, Title

(Submit a copy of this sheet in a separate sealed package with the outer wrapping clearly marked "Fuel Price Adjustment" and deliver with the Technical Proposal submittal.)

FUEL USAGE FACTOR CHART AND ESTIMATE OF QUANTITIES FOR I-6064B

Description of Work	Units	Fuel Usage Factor Diesel #2	Estimate of Quantities
Unclassified Excavation	Gal / CY	0.29	_____ CY
Borrow Excavation	Gal / CY	0.29	_____ CY
Class IV Subgrade Stabilization Aggregate Base Course Sub-Ballast 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
Portland Cement Concrete Pavement Through Lanes and Shoulders (> 11") Through Lanes and Shoulders (9" to 11") Through Lanes and Shoulders (< 9")	Gal / SY	 0.327 0.272 0.245	 _____ SY _____ SY _____ SY
** Structural Concrete (Cast-in-Place Only)	Gal / CY	0.98	_____ CY

* Select 0.90 **OR** 2.90

** Structural Concrete shall be defined as cast-in-place Class A or Class AA concrete used in the construction of major structures for various work items identified in Division 4 of the 2018 *Standard Specifications for Roads and Structures*.

☐ The above quantities represent a reasonable estimate of the total quantities anticipated, for each item, as pertaining to fuel price adjustments, and is representative of the design proposed in the Technical Proposal submitted under separate cover.

Or

☐ The Design-Build Team elects not to pursue reimbursement for Fuel Price Adjustments on this project.

The information submitted on this sheet is claimed as a "Trade Secret" in accordance with the requirements of G.S. 66-152(3) until such time as the Price Proposal is opened.

_____ _____

Signature, Title Dated

_____

Print Name, Title

(Submit a copy of this sheet in a separate sealed package with the outer wrapping clearly marked "Fuel Price Adjustment" and deliver with the Technical Proposal submittal.)

FUEL USAGE FACTOR CHART AND ESTIMATE OF QUANTITIES FOR I-6064C / I-5879

Description of Work	Units	Fuel Usage Factor Diesel #2	Estimate of Quantities
Unclassified Excavation	Gal / CY	0.29	_____ CY
Borrow Excavation	Gal / CY	0.29	_____ CY
Class IV Subgrade Stabilization Aggregate Base Course Sub-Ballast 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
Portland Cement Concrete Pavement Through Lanes and Shoulders (> 11") Through Lanes and Shoulders (9" to 11") Through Lanes and Shoulders (< 9")	Gal / SY	 0.327 0.272 0.245	 _____ SY _____ SY _____ SY
** Structural Concrete (Cast-in-Place Only)	Gal / CY	0.98	_____ CY

* Select 0.90 **OR** 2.90

** Structural Concrete shall be defined as cast-in-place Class A or Class AA concrete used in the construction of major structures for various work items identified in Division 4 of the 2018 *Standard Specifications for Roads and Structures*.

☐ The above quantities represent a reasonable estimate of the total quantities anticipated, for each item, as pertaining to fuel price adjustments, and is representative of the design proposed in the Technical Proposal submitted under separate cover.

Or

☐ The Design-Build Team elects not to pursue reimbursement for Fuel Price Adjustments on this project.

The information submitted on this sheet is claimed as a "Trade Secret" in accordance with the requirements of G.S. 66-152(3) until such time as the Price Proposal is opened.

_____ _____

Signature, Title Dated

_____

Print Name, Title

(Submit a copy of this sheet in a separate sealed package with the outer wrapping clearly marked "Fuel Price Adjustment" and deliver with the Technical Proposal submittal.)

LISTING OF DBE SUBCONTRACTORS

Sheet _____ of _____

Firm Name and Address	Item No.	Item Description	* Agreed upon Unit Price	** Dollar Volume of Item
Name Address				
Name Address				
Name Address				
Name Address				
Name Address				
Name Address				
Name 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*.

LISTING OF DBE SUBCONTRACTORS

Sheet _____ of _____

Firm Name and Address	Item No.	Item Description	* Agreed upon Unit Price	** Dollar Volume of Item
Name Address				
Name Address				
Name Address				
Name Address				
Name Address				
Name Address				
Name 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*.

LISTING OF DBE SUBCONTRACTORS

Sheet _____ of _____

Firm Name and Address	Item No.	Item Description	* Agreed upon Unit Price	** Dollar Volume of Item
Name Address				
Name Address				
Name Address				
Name Address				
Name Address				
Name Address				
Name 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*.

LISTING OF DBE SUBCONTRACTORS

Sheet _____ of _____

Firm Name and Address	Item No.	Item Description	* Agreed upon Unit Price	** Dollar Volume of Item
Name Address				
Name Address				
Name Address				
Name 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*.

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

CORPORATION

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the Bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the Bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF CONTRACTOR

_____
Full name of Corporation

_____
Address as prequalified

Attest _____ By _____

Secretary / Assistant Secretary
Select appropriate title

President / Vice President / Assistant Vice President
Select appropriate title

_____
Print or type Signer's name

_____
Print or type Signer's name

CORPORATE SEAL

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

PARTNERSHIP

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

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SIGNATURE OF CONTRACTOR

_____
Full Name of Partnership

_____
Address as Prequalified

_____ By _____
Signature of Witness Signature of Partner

_____ _____
Print or type Signer's name Print or type Signer's name

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

LIMITED LIABILITY COMPANY

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF CONTRACTOR

_____
Full Name of Firm

_____
Address as Prequalified

_____	_____
Signature of Witness	Signature of Member / Manager / Authorized Agent *Select appropriate title*
_____	_____
Print or type Signer's name	Print or type Signer's Name

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

JOINT VENTURE (2) or (3)

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating N.C.G.S. § 133-24 within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF CONTRACTORS

Instructions: **2 Joint Venturers** Fill in lines (1), (2) and (3) and execute. **3 Joint Venturers** Fill in lines (1), (2), (3) and (4) and execute. On Line (1), fill in the name of the Joint Venture Company. On Line (2), fill in the name of one of the joint venturers and execute below in the appropriate manner. On Line (3), print or type the name of the other joint venturer and execute below in the appropriate manner. On Line (4), fill in the name of the third joint venturer, if applicable and execute below in the appropriate manner.

(1) _____
Name of Joint Venture

(2) _____
Name of Contractor

_____
Address as prequalified

_____		_____
Signature of Witness or Attest	By	Signature of Contractor
_____		_____
Print or type Signer's name		Print or type Signer's name

If Corporation, affix Corporate Seal and

(3) _____
Name of Contractor

_____
Address as prequalified

_____		_____
Signature of Witness or Attest	By	Signature of Contractor
_____		_____
Print or type Signer's name		Print or type Signer's name

If Corporation, affix Corporate Seal and

(4) _____
Name of Contractor *(for 3 Joint Venture only)*

_____
Address as prequalified

_____		_____
Signature of Witness or Attest	By	Signature of Contractor
_____		_____
Print or type Signer's name		Print or type Signer's name

If Corporation, affix Corporate Seal

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

INDIVIDUAL DOING BUSINESS UNDER A FIRM NAME

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF CONTRACTOR

Name of Contractor _____
Individual name

Trading and doing business as _____
Full name of Firm

_____
Address as Prequalified

_____ _____
Signature of Witness Signature of Contractor, Individually

_____ _____
Print or type Signer's name Print or type Signer's name

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

INDIVIDUAL DOING BUSINESS IN HIS OWN NAME

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF CONTRACTOR

Name of Contractor _____

Print or type Individual name

_____

Address as Prequalified

_____

Signature of Contractor, Individually

_____

Print or type Signer's Name

_____

Signature of Witness

_____

Print or type Signer's name

DEBARMENT CERTIFICATION

Conditions for certification:

1. The prequalified bidder shall provide immediate written notice to the Department if at any time the bidder learns that his certification was erroneous when he submitted his debarment certification or explanation that is file with the Department, or has become erroneous because of changed circumstances.

2. The terms *covered transaction, debarred, suspended, ineligible, lower tier covered transaction, participant, person, primary covered transaction, principal, proposal,* and *voluntarily excluded,* as used in this provision, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. A copy of the Federal Rules requiring this certification and detailing the definitions and coverages may be obtained from the Contract Officer of the Department.

3. The prequalified bidder agrees by submitting this form, that he will not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in NCDOT contracts, unless authorized by the Department.

4. For Federal Aid projects, the prequalified bidder further agrees that by submitting this form he will include the Federal-Aid Provision titled *Required Contract Provisions Federal-Aid Construction Contract (Form FHWA PR* 1273) provided by the Department, without subsequent modification, in all lower tier covered transactions.

5. The prequalified bidder may rely upon a certification of a participant in a lower tier covered transaction that he is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless he knows that the certification is erroneous. The bidder may decide the method and frequency by which he will determine the eligibility of his subcontractors.

6. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this provision. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

7. Except as authorized in paragraph 6 herein, the Department may terminate any contract if the bidder knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available by the Federal Government.

DEBARMENT CERTIFICATION

The prequalified bidder certifies to the best of his knowledge and belief, that he and his principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records; making false statements; or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph b. of this certification; and

d. Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

e. Will submit a revised Debarment Certification immediately if his status changes and will show in his bid proposal an explanation for the change in status.

If the prequalified bidder cannot certify that he is not debarred, he shall provide an explanation with this submittal. An explanation will not necessarily result in denial of participation in a contract.

Failure to submit a non-collusion affidavit and debarment certification will result in the prequalified bidder's bid being considered non-responsive.

☐ Check here if an explanation is attached to this certification.

Contract No.: **C204596**

County: **Robeson County**

ACCEPTED BY THE
DEPARTMENT OF TRANSPORTATION

_____
Contract Officer

_____
Date

Execution of Contract and Bonds
Approved as to Form:

_____
Attorney General