

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

C203609

CONTRACT AND  
CONTRACT BONDS

FOR CONTRACT NO. C203609

WBS 34411.3.R7 STATE FUNDED

T.I.P NO. R-2250

COUNTY OF PITT

THIS IS THE ROADWAY CONTRACT

ROUTE NUMBER NC 11 LENGTH 12.400 MILES

LOCATION GREENVILLE SOUTHWEST BYPASS FROM SOUTH OF OLD NC-11 TO  
US-264.

CONTRACTOR BARNHILL CONTRACTING COMPANY

ADDRESS P.O. BOX 7948  
ROCKY MOUNT, NC 27804

BIDS OPENED MAY 05, 2015

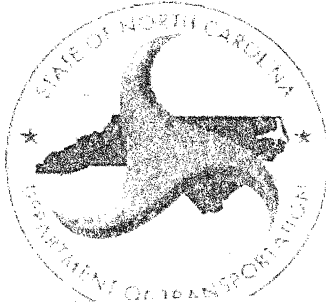
CONTRACT EXECUTION MAY 19 2015

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

**FINAL REQUEST FOR PROPOSALS**

**Includes**

**Addendum No. 1 – March 9, 2015**  
**Addendum No. 2 – March 16, 2015**  
**Addendum No. 3 – March 25, 2015**  
**Addendum No. 4 – April 20, 2015**



**DESIGN-BUILD PROJECT**

**TIP R-2250**

**April 20, 2015**



Vendor#: **3516**

**PQ**

**BARNHILL CONTRACTING COMPANY**

*DING*

P.O. Box 7948

**D**

**March 31, 2015 BY 4:00 PM**

ROCKY MOUNT NC 27804

**D**

**TECHNICAL PROPOSAL SUPPLEMENTAL INFORMATION AND PRICE PROPOSAL**  
**SUBMISSION: April 27, 2015 BY 4:00 PM**

DATE AND TIME OF PRICE PROPOSAL OPENING: **May 5, 2015** AT 2:00 PM

CONTRACT ID: C 203609

WBS ELEMENT NO. 34411.3.R7

FEDERAL-AID NO. N/A

COUNTY: Pitt

ROUTE NO. NC 11

MILES: 12.4

LOCATION: Greenville Southwest Bypass from south of Old NC 11 to US 264

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

**NOTICE:**

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

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



**PROPOSAL FORM FOR THE CONSTRUCTION OF CONTRACT NO. C203609  
IN PITT 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. C203609; 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. C203609 in Pitt 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 *2012 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 otherwise noted herein, the Department does not warrant or guarantee the sufficiency or accuracy of any information furnished by the Department.

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

Although the Department has furnished preliminary designs for this project, unless otherwise noted herein, the Design-Build Team shall assume full responsibility, including liability, for the

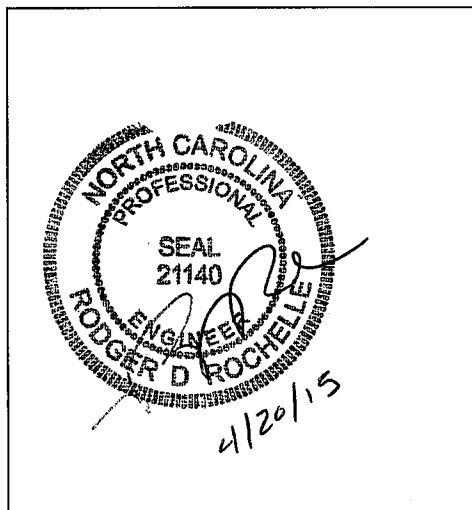
project design, including the use of portions of the Department design, modification of such design, or other designs as may be submitted by the Design-Build Team.

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.

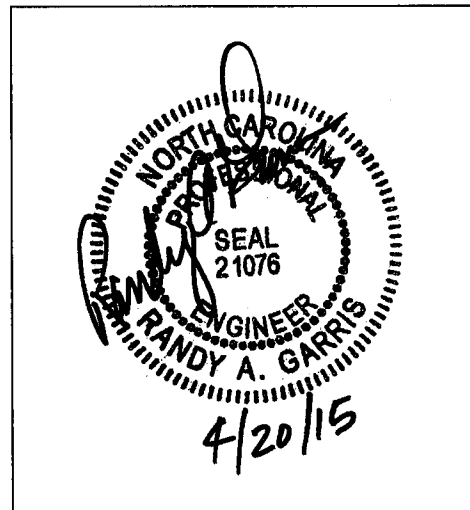
The published volume entitled *North Carolina Department of Transportation, Raleigh, Standard Specifications for Roads and Structures, January 2012*, as well as, all design manuals, policy and procedures manuals, and AASHTO publications and guidelines referenced in the Request For Proposals, with all 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 is to 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 Design-Build 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 shall fail to provide the required payment and performance bonds with the Department of Transportation, under the condition of this proposal, within 14 calendar days after the written notice of award is received by them, as provided in the Standard Specifications; otherwise said deposit will be returned to the Design-Build Team.



*Administrator of the Technical  
Services Division*



*State Contract Officer*

**TABLE OF CONTENTS****COVER SHEET****PROPOSAL SHEETS****PROJECT SPECIAL PROVISIONS***PAGE NO.*

Contract Time and Liquidated Damages .....	1
Other Liquidated Damages and Incentives .....	1
Payout Schedule .....	3
Mobilization .....	3
Substantial Completion .....	3
Submittal of Quantities, Fuel Base Index Price and Opt-Out Option .....	4
Individual Meeting with Proposers .....	5
Execution of Signature Sheets and Debarment Certification .....	6
Submission of Design-Build Proposal .....	6
Alternative Technical Concepts and Confidential Questions .....	7
Value Analysis .....	12
Schedule of Estimated Completion Progress .....	12
Minority Business Enterprise and Women Business Enterprise .....	12
Contractor's License Requirements .....	27
Resource Conservation .....	27
Subsurface Information .....	28
Domestic Steel .....	28
Bid Documentation .....	28
Twelve Month Guarantee .....	32
Outsourcing Outside the USA. ....	32
Erosion & Sediment Control / Storm Water Certification .....	33
Procedure for Monitoring Borrow Pit Discharge .....	38
**NOTE** Deleted E-Verify PSP	
Clearing and Grubbing .....	40
Burning Restrictions .....	40
Building and Appurtenance Removal / Demolition .....	40
Pipe Installation .....	41
Reinforced Concrete Pipe Design .....	41
Drainage Pipe .....	43
Cement Treated Base Course .....	43
Price Adjustments for Asphalt Binder .....	45
Price Adjustments - Asphalt Concrete Plant Mix .....	45
Field Office .....	45
Dynamic Message Sign .....	48
Digital CCTV Cameras .....	89
Local Area Network Equipment .....	92
Foundations and Anchor Rod Assemblies for Metal Poles .....	96
Overhead Sign Supports .....	102

Overhead and Dynamic Message Sign Foundations .....	109
Bridge Joint Demolition .....	111
Overlay Surface Preparation .....	112
Concrete For Deck Repair .....	118
Volumetric Mixer .....	119
Latex Modified Concrete .....	121
Sound Barrier Wall .....	124
Architectural Concrete Surface Treatment .....	127
**NOTE** Deleted Thermal Sprayed Coatings (Metallization) PSP	

<b>GENERAL</b> .....	132
----------------------	-----

## SCOPES OF WORK

Roadway .....	151
Pavement Management.....	163
Structures .....	169
Railroad Coordination .....	173
Geotechnical Engineering.....	177
Hydraulics.....	190
Environmental Permits.....	193
GeoEnvironmental .....	199
Transportation Management .....	201
Pavement Markings .....	220
Right of Way.....	222
Utilities Coordination.....	226
Signing .....	233
Traffic Signals.....	241
ITS.....	245
Erosion and Sedimentation Control .....	249
Public Information .....	264

## STANDARD SPECIAL PROVISIONS

Railroad Grade Crossing.....	266
Plant and Pest Quarantines.....	266
Gifts from Vendors and Contractors .....	267
Liability Insurance .....	267
State Highway Administrator Title Change.....	267
Subletting of Contract.....	268
Select Granular Material .....	268
Bridge Approach Fills.....	268
Preparation of Subgrade and Base .....	270
Class IV Aggregate Stabilization.....	270
Aggregate Base Course.....	271
Asphalt Pavements – Superpave.....	271

**Addendum No. 1 March 9, 2015**

C 203609 (R-2250)

Table of Contents

Pitt County

**\*\*NOTE\*\* Deleted Asphalt Paver – Fixed and Mobile String Line SSP**

Portland Cement Concrete Pavement .....	274
Asphalt Binder Content of Asphalt Plant Mixes .....	277
Asphalt Plant Mixtures .....	277
Final Surface Testing – Asphalt Pavements .....	277
Subsurface Drainage .....	278
Guardrail Anchor Units, Type M-350 .....	279
Guardrail Anchor Units, Type 350 .....	280
Impact Attenuator Units, Type 350 .....	281
Preformed Scour Hole with Level Spreader Apron .....	283
Street Signs and Markers and Route Markers.....	284
Materials .....	284
Select Material, Class III, Type 3 .....	296
Shoulder and Slope Borrow .....	296
Grout Production and Delivery. ....	297
Temporary Shoring .....	302
Truck Mounted Changeable Message Signs.....	313
On-the-Job Training.....	314
Availability of Funds – Termination of Contracts.....	317
NCDOT General Seed Specifications for Seed Quality .....	318
Errata.....	321
Minimum Wages.....	323
Division One .....	324

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

Itemized Proposal Sheet (TAN SHEET)

Fuel Usage Factor Chart and Estimate of Quantities

Listing of MBE / WBE Subcontractors

Execution of Bid, Non-Collusion Affidavit, Debarment Certification and Gift Ban  
Certification

Signature Sheet

**\*\*\* PROJECT SPECIAL PROVISIONS \*\*\*****CONTRACT TIME AND LIQUIDATED DAMAGES**

07/12/07

DB1 G04A

The date of availability for this contract is June 1, 2015, 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 15, 2019.

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, the acceptable completion of the observation period shall be a part of the work covered by the performance and payment bonds.

The liquidated damages for this contract are **Five Thousand Dollars (\$ 5,000.00)** per calendar day. As an exception to this amount, where the contract has been determined to be substantially complete as defined by the Special Provision entitled "Substantial Completion" found elsewhere in this RFP, the liquidated damages will be reduced to **One Thousand Dollars (\$ 1,000.00)** 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 **Five Thousand Dollars (\$ 5,000.00)** per calendar day will be applicable to the early date for substantial completion proposed by the bidder. Liquidated damages of **One Thousand Dollars (\$ 1,000.00)** per calendar day will be applicable to the final completion date proposed by the bidder where the Design-Build Team has proposed an earlier date for substantial completion.

**OTHER LIQUIDATED DAMAGES AND INCENTIVES**

(3/22/07) (Rev. 02/14/08)

DB1 G11

**Reference the Transportation Management Scope of Work for more information on the following time restrictions and liquidated damages:**

Liquidated Damages for Intermediate Contract Time #1 for lane narrowing, lane closure, holiday, and special event time restrictions for US 264 (including all ramps and loops) are \$500.00 per 15-minute period or any portion thereof.

Liquidated Damages for Intermediate Contract Time #2 for lane narrowing, lane closure, holiday, and special event time restrictions for NC 11, Forlines Road and US 13 / US 264 Alternate (including all ramps and loops) are \$500.00 per hour or any portion thereof.

Liquidated Damages for Intermediate Contract Time #3 for road closure time restrictions for NC 11 and US 264 (including all ramps and loops) are \$500.00 per 15-minute period, or any portion thereof.

Liquidated Damages for Intermediate Contract Time #4 for road closure time restrictions for Old Snow Hill Road (SR 1113), Abbot Farm Road (SR 1117), NC 903, and US 13 / US 264 Alternate (including all ramps and loops) are \$500.00 per 15-minute period, or any portion thereof.

Liquidated Damages for Intermediate Contract Time #5 for continuous road closure time restriction of Pocosin Road (SR 1125) are \$3000.00 per day or any portion thereof.

Liquidated Damages for Intermediate Contract Time #6 for continuous road closure time restriction of Frog Level Road (SR 1127) are \$750.00 per day or any portion thereof.

Liquidated Damages for Intermediate Contract Time #7 for road closure time restrictions for the US 13 / US 264 Alternate ramps and / or loops and the US 264 ramps and / or loops are \$1,000.00 per 15-minute period or any portion thereof.

Liquidated Damages for Intermediate Contract Time #8 for continuous road closure time restriction of Bell Arthur Road (SR 1206) are \$1500.00 per day or any portion thereof.

### **Erosion and Sedimentation Control Incentives**

The Design-Build Team will be eligible for an incentive in the amount of \$100,000.00 if construction operations have been performed in accordance with all environmental regulations and the Specifications, and the Design-Build Team does not receive any violations (ICA, CICA, NOV and / or C&D) at any time during project construction.

### **Reference the Erosion and Sedimentation Control Scope of Work found elsewhere in this RFP for additional information on the liquidated damages noted below:**

The Design-Build Team's first NOV or C&D violation shall result in the forfeiture of the entire \$100,000 incentive noted above or the remaining portion thereof. If \$25,000 is not available in the \$100,000 incentive noted above, the first NOV or C&D violation shall result in the forfeiture of the remaining portion plus Liquidated Damages in the amount necessary to equal \$25,000 when added to the remaining portion of the incentive. All subsequent NOV and C&D violations shall result in Liquidated Damages in the amount of \$25,000 per violation.

Each ICA and CICA violation shall result in a \$12,500 reduction from the monies remaining in the aforementioned incentive. If monies are not available in the \$100,000 incentive noted above, each ICA and CICA violation shall result in Liquidated Damages in the amount of \$12,500 per violation.

All Liquidated Damages shall be deducted from the lump sum amount for the project due the Design-Build Team.

**PAYOUT SCHEDULE**

(11-16-09)

DB1 G13

No later than 12:00 o'clock noon on the sixth day after the opening of the Price Proposal, 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 information 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 schedule shall include a monthly percentage breakdown (in terms of the total contract amount percentages) of the work anticipated to be completed. The schedule shall begin with the Date of Availability and end with the Actual Completion Date proposed by the Design-Build Team. If the 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.

Submit updates of the Anticipated Monthly Payout Schedule on March 15, June 15, September 15, and December 15 of each calendar year until project acceptance. Submit all updates to the Resident Engineer with a copy to the State Construction Engineer at 1 South Wilmington St, 1543 Mail Service Center, Raleigh, NC 27699-1543.

**MOBILIZATION**

(9-1-11)

DB1 G15B

Revise the 2012 *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**

5 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. All signs are complete and accepted except for the signs on intersecting roadways.
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

DBI G43

##### **(A) Submittal of Quantities**

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

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

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

**(B) Base Index Price**

The Design-Build Team’s Estimate of Quantities will be used on the various partial payment estimates to determine fuel price adjustments. The Design-Build Team shall submit a payment request for quantities of work completed based on the work completed for that estimate period. The quantities requested for partial payment shall be reflective of the work actually accomplished for the specified period. The Design-Build Team shall certify that the quantities are reasonable for the specified period. The base index price for DIESEL #2 FUEL is \$1.8192 per gallon.

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

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

**(D) Change Option**

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

**(E) Failure to Submit**

Failure to submit the *completed Fuel Usage Factor Chart and Estimate of Quantities* sheet separately 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 to meet with each proposer individually to specifically address questions regarding the draft Requests for Proposals.

The Department will attempt to arrange for a meeting between each individual proposer and the affected utility owners.

The Department will afford each proposer two additional meetings (maximum two-hour time limit per each meeting) with the Department to discuss project specifics and address the proposers' 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 date of Technical and Price Proposals submission. The proposer shall request this meeting 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.

Additional individual meetings may be permitted in accordance with the *Alternative Technical Concepts and Confidential Questions* Project Special Provision found elsewhere in this RFP.

**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 Technical and 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. (12-11-12)

DB1 G55B

The Proposer's attention is directed that each Proposer's Design-Build Proposal shall comply with the following requirements in order for that Design-Build Proposal to be responsible 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 Design-Build Proposal to the place indicated, and prior to the time indicated in this Request for Proposals.
3. The Design-Build Proposal documents shall be signed by an authorized employee of the Proposer.
4. The Design-Build Proposal shall be accompanied by Bid surety in the form of a Bid Bond or Bid Deposit, dated the day of **Technical Proposal Supplemental Information** and Price Proposal submission.
5. If Minority and Women's Business Enterprise (MB/WB) goals are established for this contract, the Proposer shall complete the form Listing of MB/WB Subcontractors contained elsewhere in this RFP in accordance with the Project Special Provision entitled Minority Business Enterprise and Women Business Enterprise.
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 2012 *Standard Specifications for Roads and Structures*, or Article 102-10 of the 2012 *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**

(06-08-11)

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 defined as 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 have 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 RFP 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 the issuance of the Final RFP, Confidential Questions may be asked by requesting a meeting with the State Contract Officer. The request shall be in writing and provide sufficient detail to evaluate the magnitude of the request. Questions shall be of such magnitude as to warrant a special meeting. Minor questions will not be acknowledged or answered. After evaluation, the State Contract Officer will respond to the question in writing to the Design-Build Team 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.

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

**Alternative Technical Concepts**

The Design-Build Team may include an ATC in the Technical and Price Proposal only if the ATC has been received by the Department by no later than three weeks prior to the deadline for submitting Technical and Price Proposals and it has been approved by the Department (including conditionally approved ATCs, if all conditions are met).

The submittal deadline above applies only 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 or (2) is a Formal ATC for a Preliminary ATC that received a favorable response from the Department shall be received by the Department no later than one week prior to the deadline for submitting Technical and Price Proposals.

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) within five business days of the revised RFP distribution.

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 an advantage of an error or omission in the RFP, or other documents incorporated into the contract by reference, the RFP will be revised without regard to 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**

Each ATC submittal shall include three individually bound hard copies and an electronic pdf file of the entire submittal and shall be submitted to the State Contract Officer at the address provided elsewhere in this RFP.

### **Formal ATCs**

Each Formal ATC submittal shall include the following information:

- 1) Description. A detailed description and schematic drawings of the configuration of the ATC or other appropriate descriptive information (including, if appropriate, product details [i.e., specifications, construction tolerances, special provisions] 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 requirements of the RFP, 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 requirements of the RFP, or other documents incorporated into the contract by reference, should be allowed;
- 5) Impacts. Discussion of potential impacts on vehicular traffic, environmental impacts identified, community impact, 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; and
- 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 will result in a disqualification of that ATC.

The Department may request additional information regarding a proposed ATC at any time. 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 5 business days of receipt of all requested information.

The Department may conduct confidential one-on-one meeting(s) to discuss the Design-Build Team's ATC. 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 an order of court, 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 ATCs from more than one Design-Build Team that are deemed by the Department 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 ATC is approved;
- 2) The ATC is not approved;
- 3) The 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 Proposal without an 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 Proposal;
- 6) The 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 ATC will not be considered, and the RFP will be revised to correct the error or omission.

- 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; or
- 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. This response could also follow and supersede one of the other previously supplied responses above.

### **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 an 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.

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

Approval of an 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 benefits of said concept. The purpose of allowing such 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 10 business days of submittal and provide written comments and one of the responses noted below. The Department's response to a Preliminary ATC submittal will be either (1) that the Preliminary ATC is denied; (2) that the Preliminary ATC would be considered as a Formal ATC if the Team so elects to pursue a Formal ATC submission; (3) that an ATC is not required; (4) 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; or (5) that the ATC takes advantage of an error or omission in the RFP or other documents incorporated into the contract by reference, in which case the ATC will not be considered and the RFP will be revised to correct the error or omission. 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 a Technical Proposal.

### **VALUE ANALYSIS**

(9-1-11)

DB1 G57

Value Engineering Proposals, as specified in Article 104-12 of the 2012 *Standard Specifications for Roads and Structures* will be accepted. Only proposals, which alter the requirements of the RFP issued by the Department, will be considered as Value Engineering Proposals.

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

(9-1-11) (Rev. 3/19/14)

DB1 G58

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

<u>Fiscal Year</u>	<u>Progress (% of Dollar Value)</u>
2015 (07/01/14 – 06/30/15)	3% of Total Amount Bid
2016 (07/01/15 – 06/30/16)	29% of Total Amount Bid
2017 (07/01/16 – 06/30/17)	26% of Total Amount Bid
2018 (07/01/17 – 06/30/18)	21% of Total Amount Bid
2019 (07/01/18 – 06/30/19)	15% of Total Amount Bid
2020 (07/01/19 – 06/30/20)	6% of Total Amount Bid

The Design-Build Team shall also furnish its own progress schedule in accordance with Article 108-2 of the 2012 *Standard Specifications for Roads and Structures*. Any acceleration of the progress as shown by the Design-Build Team's progress schedule over the progress as shown above shall be subject to the approval of the Engineer.

### **MINORITY BUSINESS ENTERPRISE AND WOMEN BUSINESS ENTERPRISE**

(12/1/13)

DB1 G066

#### **Description**

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

#### **Definitions**

*Additional MBE / WBE Subcontractors* - Any MBE / WBE submitted at the time of bid that will not be used to meet either the MBE or WBE goal. No submittal of a Letter of Intent is required, unless the additional participation is used for banking purposes.

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

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

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

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

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

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

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

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

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

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

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

**Forms and Websites Referenced in this Provision**

*Payment Tracking System* - On-line system in which the Design-Build Team enters the payments made to MBE and WBE subcontractors who have performed work on the project.

**<https://apps.dot.state.nc.us/Vendor/PaymentTracking/>**

RF-1 *MBE / WBE Replacement Request Form* - Form for replacing a committed MBE or WBE.

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

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

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

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

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

*Letter of Intent* - Form signed by the Contractor and the MBE / WBE subcontractor, manufacturer or regular dealer that affirms that a portion of said contract is going to be performed by the signed MBE / WBE for the amount listed at the time of bid.

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

*Listing of MBE and WBE Subcontractors Form* - Form for entering MBE / WBE subcontractors on a project that will meet this MBE and WBE goals continued elsewhere in the RFP. This form is for paper bids only.

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

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

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

**MBE and WBE Goal**

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

(A) Minority Business Enterprises **5.0 %**

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

(B) Women Business Enterprises **7.0 %**

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

This goal is to be met through utilization of highway construction contractors and / or right of way acquisition firms. Utilization of MBE / WBE 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 MBE and WBE certified shall be used to meet the MBE and WBE goals respectively. The Directory can be found at the following link:

**<https://partner.ncdot.gov/VendorDirectory/default.html>**

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

**Listing of MBE / WBE Subcontractors**

At the time of bid, Proposers shall submit all MBE and WBE participation that they anticipate to use during the life of the contract. Only those identified to meet the MBE goal and the WBE goal

will be considered committed, even though the listing shall include both committed MBE / WBE subcontractors and additional MBE / WBE subcontractors. Any additional MBE / WBE subcontractor participation above the goal for which letters of intent are received will follow the banking guidelines found elsewhere in this provision. All other additional MBE / WBE subcontractor participation submitted at the time of bid will be used toward the Department's overall race-neutral goals. Only those firms with current MBE and WBE certification at the time of Price Proposal opening will be acceptable for listing in the Proposer's submittal of MBE and WBE participation. The Design-Build Team shall indicate the following required information:

- (1) *If either the MBE or WBE goal is more than zero,*
  - (a) Proposers, at the time the Price Proposal is submitted, shall submit a listing of MBE / WBE participation, including the names and addresses on *Listing of MBE and WBE Subcontractors* contained elsewhere in the contract documents in order for the Price Proposal to be considered responsive. Proposers shall indicate the total dollar value of the MBE and WBE participation for the contract.
  - (b) If Proposers have no MBE or WBE participation, they shall indicate this on the *Listing of MBE and WBE Subcontractors* by entering the word "None" or the number "0." This form shall be completed in its entirety. **Blank forms will not be deemed to represent zero participation.** Price Proposals submitted that do not have MBE and WBE participation indicated on the appropriate form will not be read publicly during the opening of Price Proposals. The Department will not consider these Price Proposals for award and the proposal will be rejected.
  - (c) The Proposer shall be responsible for ensuring that the MBE / WBE is certified at the time 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 MBE's or WBE's participation will not count towards achieving the corresponding goal.
- (2) *If either the MBE or WBE goal is zero,* entries on the *Listing of MBE and WBE Subcontractors* are not required for the zero goal, however any MBE or WBE participation that is achieved during the project shall be reported in accordance with requirements contained elsewhere in this special provision.

### **MBE or WBE Prime Contractor**

When a certified MBE or WBE firm proposes on a contract that contains MBE and WBE goals, the firm is responsible for meeting the goals or making good faith efforts to meet the goals, just like any other proposer. In most cases, a MBE or WBE proposer on a contract will meet one of the goals by virtue of the work it performs on the contract with its own forces. However, all the work that is performed by the MBE or WBE proposer and any other similarly certified

subcontractors will count toward the goal. The MBE or WBE proposer shall list itself along with any MBE or WBE subcontractors, if any, in order to receive credit toward the goals.

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

MBE / WBE prime contractors shall also follow Sections A and B listed under *Listing of MBE and WBE Subcontractor* just as a non-MBE / WBE proposer would.

### **Written Documentation – Letter of Intent**

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

The documentation shall be received in the office of the State Contractor Utilization Engineer or at DBE@ncdot.gov no later than 12:00 noon of 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 12:00 noon on the next official state business day.

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

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

If the Proposer fails to meet or exceed either the MBE or the WBE goal, the Proposer with the apparent adjusted low price shall submit to the Department documentation of adequate good faith efforts made to reach that specific goal(s).

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 12:00 noon of the sixth calendar day following opening of Price Proposals unless the sixth day falls on an official state

holiday. In that situation, it would be due in the office of the State Contractor Utilization Engineer the next official state business day. If the Design-Build Team cannot send the information electronically, then one complete set and 9 copies of this information shall be received under the same time constraints above.

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

### **Consideration of Good Faith Effort for Projects with MBE / WBE 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 MBE / WBE participation. Adequate good faith efforts also mean that the Proposer actively and aggressively sought MBE / WBE participation. Mere *pro forma* efforts are not considered good faith efforts.

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

- (A) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising, written notices, use of verifiable electronic means through the use of the NCDOT Directory of Transportation Firms) the interest of all certified MBEs / WBEs who have the capability to perform the work of the contract. The Proposer must solicit this interest within at least 10 days prior to the opening of the Price Proposals to allow the MBEs / WBEs to respond to the solicitation. Solicitation shall provide the opportunity to MBEs / WBEs within the Division and surrounding Divisions where the project is located. The Proposer must determine with certainty if the MBEs / WBEs are interested by taking appropriate steps to follow up initial solicitations.
- (B) Selecting portions of the work to be performed by MBEs / WBEs in order to increase the likelihood that the MBE and WBE goals will be achieved. Where appropriate, break out contract work items into economically feasible units to facilitate MBE / WBE participation, even when the prime contractor might otherwise prefer to perform these work items with its own forces. Negotiate with subcontractors to assume part of the responsibility to meet the contract MBE / WBE goals when the work to be sublet includes potential for MBE / WBE participation (2<sup>nd</sup> and 3<sup>rd</sup> tier subcontractors).
- (C) Providing interested MBEs / WBEs with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.

- (D) (1) Negotiating in good faith with interested MBEs/WBEs. It is the Proposer's responsibility to make a portion of the work available to MBE / WBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available MBE / WBE subcontractors and suppliers, so as to facilitate MBE / WBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of MBEs / WBEs that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for MBEs / WBEs to perform the work.
- (2) A Proposer using good business judgment would consider a number of factors in negotiating with subcontractors, including MBE / WBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using MBEs / WBEs is not in itself sufficient reason for a proposer's failure to meet the contract MBE or WBE goals, as long as such costs are reasonable. Also, the ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the Proposer of the responsibility to make good faith efforts. Proposing Design-Build Teams are not, however, required to accept higher quotes from MBEs / WBEs if the price difference is excessive or unreasonable.
- (E) Not rejecting MBEs / WBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The Proposer's standing within its industry, membership in specific groups, organizations, or associates and political or social affiliations (for example, union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of Price Proposals in the Proposer's efforts to meet the project goal.
- (F) Making efforts to assist interested MBEs / WBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or Proposer.
- (G) Making efforts to assist interested MBEs / WBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.
- (H) Effectively using the services of available minority / women community organizations; minority / women contractors' groups; Federal, State, and local minority / women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of MBEs / WBEs. Contact within 7 days from the opening of the Price Proposals the Business Development Manager in the Business Opportunity and Work Force Development Unit to give notification of the Proposer's inability to get MBE or WBE quotes.
- (I) Any other evidence that the Proposer submits which shows that the Proposer has made reasonable good faith efforts to meet the MBE and WBE goal.



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

- (1) Whether the Proposer's documentation reflects a clear and realistic plan for achieving the MBE and WBE goals.
- (2) The Proposers' past performance in meeting the MBE and WBE goals.
- (3) The performance of other proposers in meeting the MBE and WBE goals. For example, when the Proposer with the apparent adjusted low price fails to meet the goals, 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 goals. If the Proposer with the apparent adjusted low price fails to meet the MBE and WBE goals, but meets or exceeds the average MBE and WBE participation obtained by other proposers, the Department may view this, in conjunction with other factors, as evidence of the Proposer with the apparent adjusted low price having made a good faith effort.

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

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

The State Contractor Utilization 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 Contractual Services Engineer or at DBE@ncdot.gov. The appeal shall be made within 2 business days of notification of the determination of non-good faith.

### **Counting MBE / WBE Participation Toward Meeting MBE / WBE Goals**

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

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

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

Prior notification of joint check use shall be required when counting MBE / WBE participation for services or purchases that involves the use of a joint check.

Notification shall be through submission of Form JC-1 (*Joint Check Notification Form*) and the use of joint checks shall be in accordance with the Department's Joint Check Procedures.

(C) Subcontracts (Non-Trucking)

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

(D) Joint Venture

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

(E) Suppliers

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

(F) Manufacturers and Regular Dealers

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

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

commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on a job site (but not the cost of the materials and supplies themselves), provided the fees are determined to be reasonable and not excessive as compared with fees customarily allowed for similar services.

### **Commercially Useful Function**

#### **(A) MBE / WBE Utilization**

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

#### **(B) MBE / WBE Utilization in Trucking**

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

- (1) The MBE / WBE shall be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract, and there shall not be a contrived arrangement for the purpose of meeting the MBE or WBE goal.
- (2) The MBE / WBE shall itself own and operate at least one fully licensed, insured, and operational truck used on the contract.
- (3) The MBE / WBE receives credit for the total value of the transportation services it provides on the contract using trucks it owns, insures, and operates using drivers it employs.
- (4) The MBE may subcontract the work to another MBE firm, including an owner-operator who is certified as a MBE. The same holds true that a WBE may subcontract the work to another WBE firm, including an owner-operator who is certified as a WBE. When this occurs, the MBE or WBE who subcontracts work receives credit for the total value of the transportation services the subcontracted MBE or WBE provides on the contract. It should be noted that

every effort shall be made by MBE and WBE contractors to subcontract to the same certification (i.e., MBEs to MBEs and WBEs to WBEs), in order to fulfill the goal requirement. This, however, may not always be possible due to the limitation of firms in the area. If the MBE or WBE firm shows a good faith effort has been made to reach out to similarly certified transportation service providers and there is no interest or availability, and they can get assistance from other certified providers, the Engineer will not hold the prime liable for meeting the goal.

- (5) The MBE / WBE may also subcontract the work to a non-MBE / WBE firm, including from an owner-operator. The MBE / WBE who subcontracts the work to a non-MBE / WBE is entitled to credit for the total value of transportation services provided by the non-MBE / WBE subcontractor not to exceed the value of transportation services provided by MBE / WBE-owned trucks on the contract. Additional participation by non-MBE / WBE subcontractors receives credit only for the fee or commission it receives as a result of the subcontract arrangement. The value of services performed under subcontract agreements between the MBE / WBE and the Design-Build Team will not count towards the MBE / WBE contract requirement.
- (6) A MBE / WBE may lease truck(s) from an established equipment leasing business open to the general public. The lease must indicate that the MBE / WBE has exclusive use of and control over the truck. This requirement does not preclude the leased truck from working for others during the term of the lease with the consent of the MBE / WBE, so long as the lease gives the MBE / WBE absolute priority for use of the leased truck. This type of lease may count toward the MBE / WBE's credit as long as the driver is under the MBE / WBE's payroll.
- (7) Subcontracted/leased trucks shall display clearly on the dashboard the name of the MBE / WBE that they are subcontracted / leased to and their own company name if it is not identified on the truck itself. Magnetic door signs are not permitted.

### **Banking MBE / WBE Credit**

If the Price Proposal of the Proposer with the apparent adjusted low price exceeds \$500,000 and if the committed MBE / WBE participation submitted by Letter of Intent exceeds the algebraic sum of the MBE or WBE goal by \$1,000 or more, the excess will be placed on deposit by the Department for future use by the Proposer. Separate accounts will be maintained for MBE and WBE participation and these may accumulate for a period not to exceed 24 months.

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

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

### **MBE / WBE Replacement**

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

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

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

#### **(A) Performance Related Replacement**

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

If a replacement MBE / WBE is not found that can perform at least the same amount of work as the terminated MBE / WBE, the 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 MBEs / WBEs that their interest is solicited in contracting the work defaulted by the previous MBE / WBE or in subcontracting other items of work in the contract.

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

### **Changes in the Work**

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

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

When the Engineer makes changes that result in an alteration of plans or details of construction, and a portion or all of the work had been expected to be performed by a committed MBE / WBE,

the Design-Build Team shall seek participation by MBEs / WBEs unless otherwise approved by the Engineer.

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

### **Reports and Documentation**

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

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

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

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

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

- (A) Withholding of money due in the next partial pay estimate; or
- (B) Removal of an approved 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 MBEs / WBEs, it shall be the prime contractor's responsibility to report all monthly and final payment information in the correct reporting manner.

Failure on the part of the Design-Build Team to submit the required information in the time frame specified may result in the disqualification of that Prime Contractor and any affiliate

companies within the Design-Build Team from further bidding until the required information is submitted.

Failure on the part of any subcontractor to submit the required information in the time frame specified may result in the disqualification of that Prime Contractor and any affiliate companies within the Design-Build Team from being approved for work on future DOT projects until the required information is submitted.

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

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

The Design-Build Team shall report the accounting of payments through the Department's Payment Tracking System.

### **Failure to Meet Contract Requirements**

Failure to meet contract requirements in accordance with Subarticle 102- 15(J) of the 2012 *Standard Specifications for Roads and Structures* may be cause to disqualify the Prime Contractor or any other affiliated companies within the Design-Build Team from further bidding for a specified length of time.

### **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 will be required to 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).

### **RESOURCE CONSERVATION**

(3/27/13)

104-13

DB1 G118

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

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



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

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

### **SUBSURFACE INFORMATION**

(3-22-07)

DB1 G119

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.

### **DOMESTIC STEEL**

(3-6-13)

106

DB G 120

Revise the 2012 *Standard Specifications for Roads and Structures* as follows:

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

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

### **BID DOCUMENTATION**

(Rev. 07-31-12)

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 10 days after receipt of notice of award of contract. Such documentation shall be placed in escrow with a banking institution or other bonded document storage facility selected by the Department.

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

#### **Terms**

*Bid Documentation* – Bid Documentation shall mean all written information, working papers, computer printouts, electronic media, charts, and all other data compilations which contain or reflect information, data, and calculations used by the 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.

*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 copy of the Escrow Agreement will be mailed to the Proposer with 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 10 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](mailto:specs@ncdot.gov) or call 919.707.6900 to schedule an appointment.
- (B) Delivery - A representative of the Bidder shall deliver the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation to the Department, in a container suitable for sealing, within 10 days after the notice of award is received by him. Bid documentation will be considered a certified copy if the Bidder includes a letter to the Department from a chief officer of the company stating that the enclosed documentation is an *EXACT* copy of the original documentation. The letter 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 letter.

- (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**

In addition to the bid documentation, an affidavit signed under oath by an individual authorized by the Proposer to execute the bid shall be included. The affidavit shall 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. 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 Price Proposal for this project, and that all such bid documentation has been included.

### **Verification**

Upon delivery of the bid documentation, the Department's Contract Officer and the Proposer's representative will verify the accuracy and completeness of the bid documentation compared to the affidavit. Should a discrepancy exist, the Proposer'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 Proposer'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 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 Contractor will be notified by certified letter from the escrow agent that the bid documentation will be released to the Contractor. The 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 Contractor does not receive the documents within 30 days of the receipt of the certified letter, the Department will contact the 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 for maintenance 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 term of the manufacturer's guarantee. NCDOT would be afforded the same warranty as provided by the Manufacturer.

This guarantee provision shall be invoked only for major components of work in which the Design-Build Team would be wholly responsible for under the terms of the contract. Examples would include pavement structures, bridge components, and sign structures. This provision will not be used as a mechanism to force the 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,) 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 will be removed for a minimum of 6 months and will be reinstated only after all work has been corrected and the Design-Build Team requests reinstatement in writing.

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

**OUTSOURCING OUTSIDE THE USA**

(5-16-06)

DB1 G150

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

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

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

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

(1-16-07) (Rev 12-4-14)

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 to manage the Quality Control Program.
- (B) *Certified Foreman* – Provide a certified, trained foreman for each construction operation that increases the potential for soil erosion or the possible sedimentation and turbidity of surface waters.
- (C) *Certified Installer* – Provide a certified installer to install or direct the installation for erosion or sediment / stormwater control practices.
- (D) *Certified Designer* – Provide a certified designer for the design of the erosion and sediment control / stormwater component of reclamation plans and, if applicable, for the design of the project erosion and sediment control / stormwater plan.

#### **Roles and Responsibilities**

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

- (a) Oversee the work of subcontractors so that appropriate erosion and sediment control / stormwater preventive measures are conformed to at each stage of the work.
  - (b) Prepare the required National Pollutant Discharge Elimination System (NPDES) Inspection Record and submit to the Engineer.
  - (c) Attend all weekly or monthly construction meetings to discuss the findings of the NPDES inspection and other related issues.
  - (d) Implement the erosion and sediment control / stormwater site plans requested.
  - (e) Provide any needed erosion and sediment control / stormwater practices for the Design-Build Team's temporary work not shown on the plans developed by the Design-Build Team, such as, but not limited to work platforms, temporary construction, pumping operations, plant and storage yards, and cofferdams.
  - (f) Acquire applicable permits and comply with requirements for borrow pits, dewatering, and any temporary work conducted by the Design-Build Team in jurisdictional areas.
  - (g) Conduct all erosion and sediment control / stormwater work in a timely and workmanlike manner.
  - (h) Fully perform and install erosion and sediment control / stormwater work prior to any suspension of the work.
  - (i) Coordinate with Department, Federal, State and Local Regulatory agencies on resolution of erosion and sediment control / stormwater issues due to the Design-Build Team's operations.
  - (j) Ensure that proper cleanup occurs from vehicle tracking on paved surfaces 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 are, but are not limited to:
- (a) Control project site waste to prevent contamination of surface or ground waters of the state, i.e. from equipment 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 7 calendar days, twice weekly for construction related Federal Clean Water Act, Section 303(d) impaired streams with turbidity violations, and within 24 hours after a significant rainfall event of 0.5 inch that occurs within a 24-hour period.
  - (c) Maintain an onsite rain gauge or use the Department's Multi-Sensor Precipitation Estimate website to maintain a daily record of rainfall amounts and dates.
  - (d) Maintain erosion and sediment control / stormwater inspection records for review by Department and Regulatory personnel upon request.
  - (e) Implement approved reclamation plans on all borrow pits, waste sites and staging areas.
  - (f) Maintain a log of turbidity test results as outlined in the Department's Procedure for Monitoring Borrow Pit Discharge.
  - (g) Provide secondary containment for bulk storage of liquid materials.
  - (h) Provide training for employees concerning general erosion and sediment control / stormwater awareness, the Department's NPDES Stormwater Permit NCS000250 requirements, and the applicable requirements of the *General Permit, NCG010000*.
  - (i) Report violations of the NPDES permit to the Engineer immediately who will notify the Division of Water Quality Regional Office within 24 hours of becoming aware of the violation.
- (3) Quality Control Program - Maintain a quality control program to control erosion, prevent sedimentation and follow provisions / conditions of permits. The quality control program shall:
- (a) Follow permit requirements related to the 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 Installers and Certified Designer may be revoked or suspended with the issuance of an Immediate Corrective Action (ICA), Notice of Violation (NOV), or Cease and Desist Order for erosion and sediment control / stormwater related issues.

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

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

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

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

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

Failure to appeal within 10 calendar days will result in the proposed adverse action becoming effective on the date specified on the certified notice. Failure to appeal within the time specified will result in a waiver of all future appeal rights regarding the adverse action taken. The certificant will not be allowed to perform duties associated with the certification during the appeal process. The Chief Engineer will hear the appeal and make a decision within 7 days of hearing the appeal. The decision of the Chief Engineer will be final and will be made in writing to the certificant.

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

### **Measurement and Payment**

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

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

(1-22-13)

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 DWQ within 24 hours of any stream turbidity standard exceedances that are not brought into compliance.

During the Environmental Assessment required by Article 230-4 of the 2012 *Standard Specifications 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 will be considered an indication of possible adverse impacts on wetland use.

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

**[http://www.ncdot.gov/doh/operations/dp\\_chief\\_eng/roadside/fieldops/downloads/Files/TurbidityReductionOptionSheet.pdf](http://www.ncdot.gov/doh/operations/dp_chief_eng/roadside/fieldops/downloads/Files/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 DWQ's 401 Certifications and approval letters, Isolated Wetland Permits, Riparian Buffer Authorization or a DOT Reclamation Plan's Environmental Assessment for the specific site. Should the 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.

**\*\* NOTE \*\* Deleted *E-Verify Compliance* Project Special Provision**

### **CLEARING AND GRUBBING**

(9-1-11)

DB2 R01

With the exception of areas with Permanent Utility Easements, perform clearing on this project to the limits established by Method “III” shown on Standard No. 200.03 of the 2012 *NCDOT Roadway Standard Drawings*. In areas with Permanent Utility Easements, clearing shall extend to the Right of Way limits.

### **BURNING RESTRICTIONS**

(7-1-95)

DB2 R05

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

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

(9-1-11)

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 2012 *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.

**PIPE INSTALLATION**

09/28/12

300

DB3 R01

Revise the 2012 *Standard Specifications for Roads and Structures* as follows:

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

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

**REINFORCED CONCRETE PIPE DESIGN**

(9-1-11)

DB3 R006

**Description**

This work consists of the design and manufacture of reinforced concrete pipes which require fills greater than 40 feet and less than or equal to 80 feet.

**Materials****(A) Design**

When the design of a reinforced concrete pipe is required on the plans developed by the Design-Build Team, design the reinforced concrete pipe in accordance with the current edition of the AASHTO LRFD Bridge Design Specifications. Provide the diameter of pipe as indicated on the plans developed by the Design-Build Team and manufacture the pipe in accordance with ASTM C 1417. Provide a reinforced concrete pipe that meets the requirements of Section 1032-6, Section 1077 and any other applicable parts of the 2012 *Standard Specifications for Roads and Structures*.

The design of the reinforced concrete pipe shall be the Design-Build Team's responsibility and is subject to review, comments and approval. Submit two sets of detailed plans for review and acceptance. Include all details in the plans, including the size and spacing of the required reinforcement necessary to fabricate the reinforced concrete pipe. Include checked design calculations for the reinforced concrete pipe. Have a North Carolina Registered Professional Engineer seal the plans and design calculations. After the plans are reviewed and, if necessary, all corrections made, submit one set of reproducible tracings on 22" x 34" sheets to become part of the plans developed by the Design-Build Team.

**(B) Reinforced Concrete Pipe Sections****(1) Class**

Reinforced concrete pipe sections manufactured in accordance with this Special Provision are designated by inside pipe diameter and design earth cover.

**(2) Design Criteria**

The design of the reinforced concrete pipe shall be in accordance with Article 12.10.4.2 “Direct Design Method” of the current edition of the AASHTO LRFD Bridge Design Specifications. The following assumptions shall be used in the design calculations:

<b>NCDOT Criteria for Direct Design Method</b>
Process and Material Factors Radial Tension, $F_{rp}=1.0$ Shear Strength, $F_{vp}=1.0$
Design Concrete Strength - $f'_c$ $5,000 \text{ psi} < f'_c < 7,000 \text{ psi}$
Heger Pressure Distribution - Type 2 Installation Vertical Arching Factor = 1.40 Horizontal Arching Factor = 0.40
Soil Unit Weight = $120 \text{ lb / ft}^3$
Depth of Fluid = Inside Pipe Diameter
Minimum Concrete Cover = 1.00”
Crack Control = 0.90 (maximum)

**(C) Joints**

Produce the reinforced concrete pipe sections with spigot and bell ends. Design and form the ends of the pipe section so, when the sections are laid together, they make a continuous line of pipe with a smooth interior free of appreciable irregularities in the flow line, and compatible with the permissible variations given in the 2012 *Standard Specifications for Roads and Structures* and ASTM C 1417.

**(D) Manufacture**

In addition to the requirements of the 2012 *Standard Specifications for Roads and Structures* and ASTM C 1417, devices or holes are permitted in each pipe section for the purpose of handling and placement. Submit details of handling devices or holes for approval and do not cast any concrete until approval is granted. Remove all handling devices flush with concrete surfaces as directed. Fill holes in a neat and workmanlike manner with an approved non-metallic non-shrink grout, concrete or plug.

**DRAINAGE PIPE**

(9-1-11)

DB3 R36

**Description**

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

All pipe types are subject to the maximum and minimum fill height requirements as found on Roadway Standard Drawing 300.01 - Sheet 3 of 3. The appropriate Reinforced Concrete Pipe class and the appropriate gage thickness for Corrugated Aluminum Alloy Pipe and Aluminized Corrugated Steel Pipe shall be selected based on fill height.

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

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

Transverse median drains, storm drainage system pipes, and open-ended cross drains shall be Reinforced Concrete Pipe unless the pipe slope is greater than 10%, in which case the pipe shall be either Corrugated Aluminum Alloy Pipe or Aluminized Corrugated Steel Pipe.

**CEMENT TREATED BASE COURSE**

(07/22/2013)

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 2012 *Standard Specifications for Roads and Structures*.

**Determine Required Portland Cement Rate**

The quantity of Portland cement required is 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 2012 *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 soil cement 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)

DB6 R25

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

When it is determined that the monthly selling price of asphalt binder on the first business day of the calendar month during which the last day of the partial payment period occurs varies either upward or downward from the Base Price Index, the partial payment for that period will be adjusted. The partial payment will be adjusted by adding the difference (+ or -) of the base price index subtracted from the monthly selling price multiplied by the total theoretical quantity of asphalt binder authorized for use in the plant mix placed during the partial payment period involved.

The base price index for asphalt binder for plant mix is **\$511.15 per ton**.

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

**PRICE ADJUSTMENTS - ASPHALT CONCRETE PLANT MIX**

(9-1-11) (Rev. 3-13-13)

DB6 R26

Revise the 2012 *Standard Specifications for Roads and Structures* as follows:

**Page 6-18, Article 609-11 and Page 6-35, 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 per theoretical ton. This price shall apply for all mix types.

**FIELD OFFICE**

(6-1-07)

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 be erected and functional as an initial operation. Failure to have the field office functional when work first begins on the project will 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 24 feet, and the floor-to-ceiling height that is at least 7 feet 6 inches. Provide inside walls and a ceiling that are constructed of plywood, masonite, gypsum board, or other suitable materials. Have the exterior walls, ceiling, and floor insulated.

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

<u>Number</u>	<u>Item</u>
2	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
2	Computer table having a minimum size of 48 by 30 by 29 inches
1	Plan rack for 24 by 36 inch drawings with 6 plan clamps
2	Printing calculator
2	2-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

## 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 10 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 of the light fixtures that shall be a fluorescent light situated 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 1 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 utility connections, maintain utilities, pay utility service fees and bills, and make arrangements for final disconnection of 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**

(08-27-12)

DB 08-04

## **I. General Requirements**

Conform to these Project Special Provisions, Project Plans developed by the Design-Build Team, and the 2012 *Standard Specifications for Roads and Structures*.

The first item of work on this project shall be the installation of all electrical service poles to expedite the power service connections.

## **II. Dynamic Message Signs (DMS)**

### **Description**

- Furnish and install NTCIP compliant DMS that is fully compatible with Vanguard® V4 DMS control software to ensure seamless integration of new signs with the existing central command and control system.
- Furnish and install DMS that is compliant with UL Standards 48, 50, 879 and 1433.
- Add and configure the new DMS in the system using State furnished Vanguard software and computer system. Furnish, install, test, integrate and make fully operational the new DMSs at locations shown on the project plans developed by the Design-Build Team.
- Furnish operating DMS systems consisting of, but not limited to, the following:
  1. Full Matrix, 27 pixel high and 90 pixels wide LED Dynamic Message Signs (DMS)
  2. Pedestal type DMS support structures (structure type must be approved by the engineer) and mounting hardware
  3. DMS controllers, Uninterruptible Power Supplies (UPS), cabinets and accessories with interconnect and power cabling and conduit

4. Branch circuit conductors and related equipment
  5. All other equipment and incidentals required for furnishing, installing, and testing system and system components
- Use only UL listed and approved electronic and electrical components in the DMS system.

## **Materials**

### **A. Environmental Requirements**

Construct the DMS and DMS controller-cabinet so the equipment within shall be 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 4-2005.

### **B. Full Matrix LED Dynamic Message Sign (DMS)**

Construct the DMS to display at least three lines of text that, when installed, are 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.

When displaying three lines, each line must display at least 15 equally spaced and equally sized alphanumeric individual characters. Each character must be at least 18 inches in height and composed from a luminous dot matrix. The entire LED matrix shall be at the minimum 27 pixels high and 90 pixels wide.

#### **1. DMS Enclosure**

The DMS enclosure construction shall comply with the requirements of Section 3 (Sign Mechanical Construction) of NEMA TS 4-2005 as it applies to Walk-in enclosures. The following requirements complement TS 4-2005:

- Construct the DMS with a metal walk-in enclosure excluding the face. Provide an aluminum walking platform inside the enclosure that is at least 28 inches wide. The width of the walking platform shall be free of obstructions to a height of 7 feet. Construct the enclosure of welded aluminum type 6061-T6, 5052-H38, 5052-H34, or of an Engineer approved alternate at least 1/8-inch thick. 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).

- All exterior and interior DMS enclosure surfaces shall be natural, mill-finish aluminum. All grind marks and discoloration shall be removed from the surfaces.
- All nuts, bolts, washers, and other mounting and bonding parts and components used on the exterior of the DMS enclosure shall be corrosion resistant and sealed against water intrusion.
- Provide one key lockable, hinged, gasket-sealed inspection door for service and maintenance along each side of the enclosure. Install one appropriately sized fire extinguisher within 12 inches of each maintenance door. Equip the DMS enclosure with internal fluorescent lighting controlled by timers installed close to each inspection door. No light emitted from the fluorescent tubes or any other light source inside the enclosure not comprising the display shall leak to the outside of the enclosure. Equip the door with a door-hold-open device. Install GFCI duplex utility receptacles every 6 feet along the width of the DMS in convenient locations for powered service tools.
- 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 shall be in addition to reporting power failure at the controller cabinet.
- Do not paint the stainless steel bolts on the Z-bar assembly used for mounting the enclosure.

## **2. DMS Interior Environment Control**

Design the local field controller to monitor and control the interior DMS environment. Design environmental control to maintain the internal DMS temperature within  $\pm 10^{\circ}$  F of the outdoor ambient temperature. Provide the DMS environmental control system with four primary subsystems as follows:

1. Internal Temperature Sensors – Provide the DMS with two internally mounted temperature sensors which are equipped with external thermocouples and which the Field Controller continuously monitors. Design the Field Controller to use this temperature information to determine when to activate and deactivate the environmental control systems described herein. Locate sensors on opposite ends of the upper 1/3 of the LED display matrix with their external thermocouples attached to and making contact with an LED pixel circuit board. Design the thermocouple and LED board to be easily detachable, in the event that one of the units requires removal and replacement. Provide sensors capable of measuring temperatures from

-40° F to +185° F. Design the Field Controller to automatically shut down the LED display whenever one or both sensors indicates that LED board temperature has exceeded +140° F, and to automatically restart the LED display whenever the suspect temperature falls below +130° F. Design both shutdown and re-start temperature thresholds to be user-programmable. Design the field controller to report sensor temperatures and DMS shutdown/re-start events to the DMS Control Software.

2. Housing Cooling System – Provide the DMS housing with a cooling system which circulates outside air into the DMS housing whenever the LED board temperature exceeds a user-programmable threshold. Provide this system with enough ventilation fans to exchange the internal DMS housing air volume at a minimum rate of 4 times per minute. Provide steel ball-bearing type fans. Mount fans in a line across the upper rear wall of the DMS housing to direct air out of the cabinet. Provide one filtered air intake port for each exhaust fan. Locate intake ports in a line across the lower rear wall of the DMS housing. Provide intake ports with a removable filter that will remove airborne particles measuring 500 microns in diameter and larger. Provide a filter that is of a size and style that is commercially readily available. Program the Field Controller to activate the DMS housing cooling system whenever the LED board temperature exceeds +90° F and to turn the cooling system off whenever LED board temperature falls below +85° F. On the DMS housing rear exterior wall, cover all air intake and exhaust ports on their top, front, and sides by an aluminum shroud fabricated from 0.090-inch aluminum sheeting. Taper the shrouds at the top to discourage birds from nesting in them. Securely fasten shrouds to the DMS housing, and provide gaskets at the interface to prevent water from entering the DMS. Design all air filters and fans to be removable from inside the DMS housing. Provide the DMS housing cooling system with an adjustable timer that will turn fans off after the set time has expired. Provide a timer that is adjustable to at least 4 hours, and locate it just inside the DMS housing door, within easy reach of a maintenance technician standing outside the DMS doorway.
3. LED Display Cooling System – Provide the DMS with an LED display cooling system which directs air across the LED display modules whenever LED board temperature exceeds a user-programmable threshold. Direct fan-forced air vertically across the backside of the entire LED display matrix using multiple ball-bearing fans. Program the Field Controller to activate the LED cooling fan system whenever LED board temperature exceeds +90° F and to deactivate the system whenever LED board temperature falls to +85° F. Locate cooling fans so as not to hinder removal of LED display modules and driver boards.
4. Front Face Panel Defog / Defrost System – Provide the DMS with a defog / defrost system which circulates warm, fan-forced air across the inside of the polycarbonate front face whenever LED board temperature falls below a user-programmable threshold. Provide multiple steel ball-bearing fans that



provide uniform airflow across the face panel. Program the Field Controller to activate the defog / defrost system whenever LED board temperature falls below +40° F) and to deactivate the defog / defrost system whenever LED board temperature exceeds +106° F. Mount a 100-watt pencil-style heating element in front of each defog / defrost fan to warm the air directed across the DMS face. Design heating elements to be on only when the defog / defrost fans are on.

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

### **3. Front Panel**

Protect the DMS face with contiguous, weather-tight, removable panels. Manufacture these panels of sheets of polycarbonate materials that are ultraviolet protected, have an antireflection coating, and are a minimum of 1/8- 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 270° F and 66 PSI at 288° F
- Coefficient of Thermal Expansion:  $3.9 \times 10^{-5}$  in/in/F
- Specific Heat: 0.30 BTU/lb/F
- Initial Light Transmittance: 85% minimum
- Change in Light Transmittance, 3 years exposure in a Southern latitude: 3%
- Change in Yellowness Index, 3 years exposure in a Southern latitude: less than 5%

For substitutes, submit one 12" x 12" sample of the proposed material together with a description of the material attributes to the Engineer for review and approval. Install a .09" aluminum mask on the front of the panel (facing the motorists) that contains circular openings for each LED pixel. Front side of the aluminum mask, which faces the viewing motorists, shall be primed and coated with automotive-grade flat black acrylic enamel paint or an approved equivalent. All painted surfaces shall 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 case and the front panel must not cause damage to either 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.

#### **4. Display Modules**

Manufacture each display module with a standard number of pixels, not to exceed an array of 9 x 5 that can be easily removed. Assemble the modules onto the DMS assembly contiguously to form a continuous matrix to display the required number of lines, characters, and character height.

Design display modules that are interchangeable and replaceable without using special tools. All power and communication cables connected to a display module shall be plug-in types to allow easy removal for maintenance and repair.

Construct each display module as a rectangular array of 5 horizontal pixels by 7 to 9 vertical pixels. Provide the module with an equal vertical and horizontal pitch between pixels, and columns that are perpendicular to the rows (i.e., no slant). 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.

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

#### **5. 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. Viewing cone tolerances shall be as specified in the LED manufacturer's product specifications and shall not exceed +/- 3 degrees half-power viewing angle of 30 degrees.

Provide LEDs that are untinted, non-diffused, high output solid state lamps utilizing indium gallium aluminum phosphide (InGaAlP) technology. No substitutions will be allowed. Provide T1 ¾, 0.2 inch size LEDs that emit a true

amber color at a wavelength of  $590 \pm 5$  nm. Provide identical LEDs at all locations capable of being interchanged throughout the system

Provide LEDs with a MTBF (Mean Time Before Failure) of at least 100,000 hours of permanent use at an operating point of  $140^{\circ}$  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 that have a single part number. 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. Document the procedure to be used to comply with this requirement as part of the catalog cut submittal.

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

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

Design the LED display operating range to be  $-20^{\circ}$  F to  $+14^{\circ}$  F at 95% relative humidity, non-condensing.

Supply the LED manufacturer's technical specification sheet with the catalog cuts.

## **6. 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 supplies in a redundant parallel configuration that uses multiple power supplies per display. Provide the supplies with current sharing capability that allows them to provide 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 (all pixels on at maximum brightness) and at a temperature of  $140^{\circ}$  F.

Provide power supplies to operate within a minimum input voltage range of +90 to +135 volts AC and within a temperature range of  $-22^{\circ}$  F to  $140^{\circ}$  F. Power supply output at  $140^{\circ}$  F must not deteriorate to less than 65% of its specified output at  $70^{\circ}$  F. Provide power supplies that are overload protected by means of circuit breakers, and 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. 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.

## **7. 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 to be a maximum of 2 inches in diameter.

Pixels shall be constructed with two strings of LEDs. The number of LEDs in each string shall be determined by the manufacturer to produce the candela requirement as stated herein.

Each pixel shall produce 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. Provide the sign controller with the ability to detect the failure of any LED string and identify which LED string has failed. Submit a complete schematic of the LED power and driver circuits with the catalog cuts.

## **8. Character Display**

Design display modules to be easily removable without the use of tools. Position cooling fans so they do not prevent removal of an LED pixel board or driver board.

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.

Design the controller to automatically detect failed LED strings or drivers and initiate a report of the event to the Control Software. Design the controller to be able to read the internal temperature of the DMS enclosure and the ambient temperature outside the DMS enclosure and report these to the Control Software.

## **9. Display Capabilities**

Design the DMS with at least the following message displays:

- Static display
- Flashing display with Dynamic flash rates

- At least two alternating Static and / or Flashing sequences (multi-page messages)

#### **10. DMS Mini Controller**

Furnish and install a mini controller inside the DMS that is interconnected with the main controller using a fiber optic cable, CAT-5 cable, or an approved alternate. 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.

Alternatively, install an EIA/TIA-232E port inside the DMS enclosure to enable a maintenance technician to communicate with the DMS main controller and obtain access to and perform all functions of the main controller using a laptop computer.

#### **C. DMS Enclosure Structure Mounting**

Mount the DMS enclosure and interconnect system securely to supporting structures of the type specified in the plans developed by the Design-Build Team. Design the DMS enclosure supports and structure to allow access to the DMS enclosure inspection door.

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 / her 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 *Standard Specifications for Structural Supports for Highway Signs, Luminaires*, and the section titled "Dynamic Message Sign Assembly" of these Project Special Provisions.

#### **D. DMS / DMS Controller Interconnect**

Furnish and install all necessary cabling, conduit, and terminal blocks to connect the DMS and the DMS controller. Use approved manufacturer's specifications and project plans 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 catalog cut sheets for the interconnect centers for approval.

**E. DMS Controller and Cabinet**

Furnish and install one DMS controller with accessories per DMS in a protective cabinet. Mount the controller cabinet on the DMS support structure. Install cabinet so that the height to the middle of the cabinet is 4 feet. Ensure a minimum of 3 feet level working surface on both sides of the cabinet door 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.

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

- Power supply and distribution assembly
- 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)
- Industrial-grade dial-up modem and interface cable
- Industrial-grade telephone line surge and lightning protector
- Serial 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 near the bottom, and with air filters as described in the paragraph above.

Provide an acrylic glass rack of appropriate size at 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 10 keys 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; use no more than 75% of the useable space in the cabinet. 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 so as 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 3-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 ( $\pm 10\%$ ) GFCI duplex receptacle of the 3-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 shall utilize the GFCI receptacle. There shall be one spare non-GFCI receptacle for future addition of 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 6 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).

## **1. Wiring**

The requirements stated herein shall apply wherever electrical wiring is needed for any DMS system assemblies and subassemblies such as controller cabinet, DMS enclosure, electrical panel boards and 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 6 inches maximum to prevent separation of the individual conductors.

All conductors shall be individually and uniquely labeled. All conductor labels shall be clearly visible without moving the conductor. All terminal conductors shall connect to the terminal strip in right angles. Excess conductor shall be removed before termination of the conductor. The conductor shall be molded in such a fashion as to retain its relative position to the terminal strip if removed from the strip. No conductor shall run 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. All connectors, devices and conductors shall be installed in accordance to manufactures guidelines. All wiring shall comply with the latest NEC guideline in effect during installation. No conductor or conductor bundle shall hang loose or create a snag hazard. All conductors shall be protected from damage. All solder joints shall be completed using industry accepted practices and shall not fail due to vibration or movement. All welds must be in a manner that will not fail due to vibration. Lamps and control boards shall be protected from damage.



No splicing will be allowed for feeder conductors and communications 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.

## **2. Power Supply and Circuit Protection**

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

Blackout, brownout, hunting, 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.

## **3. 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 and accessories and for servicing DMS equipment and cabinet utilities.

## **4. 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 2 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 wave-shape	50,000 amperes
Energy Absorption	> 500 Joules
Clamp voltage	240 volts
Response time	<1 nanosecond
Minimum current for filtered output	15 amperes for 120VAC*
Temperature range	-40° F to +158° F

Capable of handling the continuous current to the equipment

## 5. Radio Interference Suppressor

Provide each controller cabinet with sufficient electrical and electronic noise suppression to enable all equipment in it to function properly. Provide one or more radio interference suppressors (RIS) connected between the stages of the power line surge suppressor that minimize interference generated in the cabinet in both the broadcast and the aircraft frequencies. Each RIS must provide a minimum attenuation of 50 decibels over a frequency range of 200 KHz to 75 MHz. Clearly label the suppressor(s) and size them at least at the rated current of the main circuit breaker but not less than 50 amperes.

Provide RIS that are hermetically sealed in a substantial metal case which is filled with a suitable insulating compound and have nickel-plated 10/24 brass stud terminals of sufficient external length to provide space to connect #8 AWG wires. Mount them so that the studs cannot be turned in the case. Properly insulate ungrounded terminals from each other, and maintain a surface linkage distance of not less than 1/4" between any exposed current conductor and any other metallic parts. The terminals must have an insulation factor of 100-200 MΩ, dependent on external circuit conditions. Use RIS designed for 120 VAC  $\pm$  10%, 60Hz, and which meet the standards of UL and the Radio Manufacturers Association.

## 6. Communications Surge Protector

Equip the cabinet with properly labeled hybrid data line surge protectors that meet the following general requirements:

Surge current occurrences at 2000 ampere, 8 x 20 microsecond waveform	> 80
Surge current occurrences at 400 ampere, 10x700 microsecond waveform	> 80
Peak surge current for 8 x 20 microsecond waveform	10,000 A (2500 A/line)
Peak surge current for 10x700 microsecond waveform	500 A/line
Response time	< 1 nanosecond
Series resistance	< 15 $\Omega$
Average capacitance	1500 pF
Temperature range	-10° F to 150° F
Clamp Voltage	As required to match equipment in application

## 7. Lightning Arrester

Protect the system with an UL-approved lightning arrester installed at the main service disconnect. It shall meet 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

## 8. 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 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 and modem. 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, IEEE 587

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

## **9. Controller Communications Interface**

The controller shall have 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

## **10. 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, and etc. Furnish a LCD display with a minimum size of 240x64 dots with LED back light.

## **11. 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.

## **12. Controller Functions**

Design the DMS controller to continuously control and monitor the DMS independent of the Control Software.

Design the controller to display on the sign a message 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.

### **13. 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 shall be uploaded to and stored in the controller's non-volatile memory using the Control Software and the controller.

**\*\* NOTE \*\*** Telephone Modem and Telephone Line Surge and Lightning Protector sections deleted

### **F. Photo-Electric 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, on the back wall and one on the front wall of the sign enclosure. Alternate design maybe accepted provided the sensor assembly is 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 elements in each Light Level Mode.

The ambient light level at which each Light Level Mode is activated.

### **G. 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 an itemized list of equipment costs.

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

## **H. 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.

## **I. 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.

## **J. Character Set Submittal**

Submit an engineering drawing of the DMS character set including 26 upper case and lower case letters, 10 numerals, an asterisk (\*), a dash, a plus sign (+), a designated lane diamond, a slash, an ampersand, and arrows at 0, 45, 90, 135, 180, 225, 270, and 315 degrees.

## **K. 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.

Complete and detailed schematic diagrams to component level shall be provided for all DMS assemblies and subassemblies such as driver boards, control boards, DMS controller, power supplies, and etc. Such schematics shall enable an electronics technician to successfully identify any component on a board or assembly and trace its incoming and outgoing signals.

## **L. 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.

#### **M. Maintenance Procedures**

Specify the recommended preventative maintenance procedures and checks at pre-operation, monthly, quarterly, semi-annual, 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.

#### **N. 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 re-assembly, 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.

#### **O. Field Trial**

At the request of the Engineer, supply a three character demonstration module with characters of the size and type specified for the project, an appropriate control device and power supply to allow character display within 30 working days of the request. Perform a field trial on this module at a time and location selected by the Engineer.

This trial will allow the Engineer or his selected representatives to test the readability of the DMS at the maximum distance required for specified character size. Test the module with the sun directly above the DMS, and near the horizon in front of and behind the DMS (washout and back-lit conditions).



## **Construction Methods**

### **A. Description**

This article establishes practices and procedures and gives minimum standards and requirements for the installation of Dynamic Message Sign 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 controllers and electric utilities that conform to NEC standards. Express wire sizes according to the American Wire Gauge (AWG).

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.

### **B. Layout**

The Engineer will establish the actual location of each Dynamic Message Sign assembly. The Design-Build Team shall be responsible for the proper elevation, offset, level, and orientation of all DMS assemblies. Make actual field measurements to place service poles, controller cabinets and conduit at the required location. Mark the proposed location of circuits and all other components for the Engineer's approval prior to installation. Submit a drawing showing all underground conduits and cables dimensioned from fixed objects or station marks.

### **C. 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 all changes made during installation.

The "as built" plans will show: the DMS, controller, and service pole locations; DMS enclosure and controller cabinet wiring layouts; and wire and conduit routing. 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.

### **D. Conduit**

Install the conduit system in accordance with Section 1715 of the 2012 *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 assembly with beam clamps or stainless steel strapping. Install strapping according to the strapping manufacturer's recommendations. 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 1.25 inches and smaller. Place fasteners no more than 3 feet from the center of bends, fittings, boxes, switches, and devices.

Locate underground conduit in a manner consistent with these Project Special Provisions.

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

#### **E. Wiring Methods**

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 (grounded neutral-WHITE, grounding-BARE or GREEN, and phase conductors RED and BLACK). 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.

Bury underground circuits at the depth shown in the plans developed by the Design-Build Team and surround with at least 3 inches of sand or earth back-fill free of rocks and debris. Compact backfill in 6-inch layers. Do not splice underground circuits unless specifically noted in the plans developed by the Design-Build Team and approved by the Department.

#### **F. 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 one key-operated, pin tumbler, dead bolt padlock, with brass or bronze shackle and case, conforming to Military Specification MIL-P-17802E (Grade I, Class 2, Size 2,

Style A) for each electrical panel and switch on the project. Key all padlocks alike, and provide 10 keys to the Engineer.

Provide cabinets with all mounting plates, anchor bolts, and any other necessary mounting hardware in accordance with these Project Special Provisions and the project 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 level concrete technician pad measuring a minimum of 4 inches thick, 24 inches wide and 36 inches long at the front and rear doors of the DMS equipment cabinet.

#### **G. Cabinet and System Grounding**

Ground the controller cabinet, DMS enclosure, DMS structure, and service entrance equipment per Sections 1098 and 1700 of the 2012 *Standard Specifications for Roads and Structures*, applicable addenda, typical drawings, the plans developed by the Design-Build Team and these Project Special Provisions. Provide grounding circuits that are permanent and electrically continuous with a current carrying capacity high enough and an impedance low enough to limit the potential above ground to a safe level.

Run the power company neutral, conduit grounds, and all equipment grounds directly and independently of the ground bus. Use ground clamps, grounding and bonding bushings, lock nuts, and grounding electrodes that comply with UL Standard Electric Grounding and Bonding Equipment. Use ground rods of 5/8 inch minimum diameter, 10 feet long, and made of copper-clad steel.

Make connections between ground electrodes and the ground wire using an exothermic welding process, cadweld or equivalent.

Ensure completed cabinet grounds have a resistance to ground of not more than 25 Ohms.

#### **H. 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.

### **III. NTCIP Requirements**

This portion of the specification defines the detailed NTCIP requirements for the Dynamic Message Signs.

For compatibility with VG software, implement all objects found on the attached MIB file except for the objects that are exclusively applicable to proprietary hardware features found in VG DMSs.

## References

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.

**Table 1: NTCIP Standards**

<b>Abbreviated Number</b>	<b>Full Number</b>	<b>Title</b>
NTCIP 1101	<b>NTCIP 1101:1997</b>	<i>Simple Transportation Management Framework</i>
NTCIP 1201	<b>NTCIP 1201:1997</b>	<i>Global Object Definitions</i>
NTCIP 1203	<b>NTCIP 1203:1997</b>	<i>Object Definitions for Dynamic Message Signs</i>
NTCIP 2001	<b>NTCIP 2001:1997</b>	<i>Class B Profile</i>
NTCIP 2101	<b>NTCIP 2101</b>	<i>SP-PMPP/232 Subnet Profile for PMPP over RS-232</i>
NTCIP 2102	<b>NTCIP 2102</b>	<i>SP-PMPP/FSK Subnet Profile for PMPP over FSK Modem</i>
NTCIP 2103	<b>NTCIP 2103</b>	<i>SP-PPP/232 Subnetwork Profile for PPP over RS232 (Dial Up)</i>
NTCIP 2104	<b>NTCIP 2104</b>	<i>SP-Ethernet Subnet Profile for Ethernet</i>
NTCIP 2201	<b>NTCIP 2201</b>	<i>TP-Null Transport Profile</i>

NTCIP 2202	<b>NTCIP 2202</b>	<i>TP-Internet</i> <i>Internet Transport Profile (TCP/IP and UDP/IP)</i>
NTCIP 2301	<b>NTCIP 2301</b>	AP-STMF AP for Simple Transportation Management Framework

## General Requirements

### 1. Subnet Level

Ensure each serial port on each NTCIP Component supports NTCIP 2103 over a dial-up connection with a contractor provided external modem with data rates of 28.8 kbps, 19.2 kbps, 14.4 kbps, 9600 bps, 4800 bps, 2400 bps, 1200 bps, 600 bps, and 300 bps. Enable the NTCIP Component to make outgoing and receive incoming calls as necessary and support the following modem command sets:

- Hayes AT - Command Set
- MNP5
- MNP10
- V.42bis

Ensure each serial port on each NTCIP Component supports NTCIP 2103 over a null-modem connection with data rates of 19.2 kbps, 14.4 kbps, 9600 bps, 4800 bps, 2400 bps, 1200 bps, 600 bps, and 300 bps.

Ensure each serial port on each NTCIP Component supports NTCIP 2101 with data rates of 9600 bps, 4800 bps, 2400 bps, 1200 bps, 600 bps, and 300 bps.

Additionally, NTCIP components shall support NTCIP 2102 and NTCIP 2104.

NTCIP Components may support additional Subnet Profiles at the manufacturer's option. At any one time, only one Subnet Profile shall be active on a given serial port of the NTCIP Component. Ensure the NTCIP Component can be configured to allow the field technician to activate the desired Subnet Profile and provide a visual indication of the currently selected Subnet Profile.

### 2. Transport Level

Ensure each NTCIP Component complies with NTCIP 2201 and 2202.

NTCIP Components may support additional Transport Profiles at the manufacturer's option. Ensure Response datagrams use the same Transport Profile

used in the request. Ensure each NTCIP Component supports the receipt of datagrams conforming to any of the identified Transport Profiles at any time.

### 3. Application Level

Ensure each NTCIP Component complies with NTCIP 1101 and 2301 and meets the requirements for Conformance Level 1 (NOTE - See Amendment to standard).

Ensure each NTCIP Component supports SNMP traps. An NTCIP Component may support additional Application Profiles at the manufacturer's option. Ensure Responses use the same Application Profile used by the request. Ensure each NTCIP Component supports the receipt of Application data packets at any time allowed by the subject standards.

### 4. Information Level

Each NTCIP Component shall provide Full, Standardized Object Range Support of all objects required by these procurement specifications unless otherwise indicated below. The maximum Response Time for any object or group of objects shall be 200 milliseconds.

Design the DMS to support all mandatory objects of all mandatory Conformance Groups as defined in NTCIP 1201 and NTCIP 1203. Table 2 indicates the modified object requirements for these mandatory objects.

**Table 2: Modified Object Ranges for Mandatory Objects**

Object	Reference	Project Requirement
ModuleTableEntry	NTCIP 1201 Clause 2.2.3	Contains 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 modelVersion indicates the model version number of the component.
MaxGroupAddresses	NTCIP 1201 Clause 2.7.1	At least 1
CommunityNamesMax	NTCIP 1201 Clause 2.8.2	At least 3
DmsNumPermanentMsg	NTCIP 1203 Clause 2.6.1.1.1.1	At least 1*

DmsMaxChangeableMsg	NTCIP 1203 Clause 2.6.1.1.1.3	At least 21
DmsFreeChangeableMemory	NTCIP 1203 Clause 2.6.1.1.1.4	At least 20 when no messages are stored.
DmsMessageMultiString	NTCIP 1203 Clause 2.6.1.1.1.8.3	The DMS supports any valid MULTI string containing any subset of those MULTI tags listed in Table 4
DmsControlMode	NTCIP 1203 Clause 2.7.1.1.1.1	Support at least the following modes:  Local  External central  Central Override

**\* Ensure the Permanent Messages display the content shown in Table 3.**

Ensure the sign blanks if a command to display a message contains an invalid Message CRC value for the desired message.

**Table 3: Content of Permanent Messages**

Permanent Message Number	Description
1	Permanent Message # 1 blanks the display (i.e. consists of an empty MULTI string). It has a run-time priority of one (1)

**Table 4: Required 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.

The NTCIP Component implements all mandatory and optional objects of the following optional conformance groups with FSORS.

### Test Heading

#### a. Time Management

As defined in NTCIP 1201

#### b. Timebase Event Schedule

As defined in NTCIP 1201. The following list indicates the modified object requirements for this conformance group.

**Table 5: Modified Object Ranges for the Timebase Event Schedule Conformance Group**

Object	Reference	Project Requirement
MaxTimeBaseScheduleEntries	NTCIP 1201 Clause 2.4.3.1	At least 28
maxDayPlans	NTCIP 1201 Clause 2.4.4.1	At least 14
maxDayPlanEvents	NTCIP 1201 Clause 2.4.4.2	At least 10



**c. Report**

As defined in NTCIP 1201. The following list indicates the modified object requirements for this conformance group.

**Table 6: Modified Object Ranges for the Report Conformance Group**

<b>Object</b>	<b>Reference</b>	<b>Project Requirement</b>
maxEventLogConfigs	NTCIP 1201 Clause 2.5.1	At least 50
eventConfigurationMode	NTCIP 1201 Clause 2.4.3.1	The NTCIP Component supports the following Event Configuration Modes: onChange greaterThanValue smallerThanValue
MaxEventLogSize	NTCIP 1201 Clause 2.5.3	At least 200
MaxEventClasses	NTCIP 1201 Clause 2.5.5	At least 16

**d. PMPP****e. Font Configuration**

As defined in NTCIP 1203. The following list indicates the modified object requirements for this conformance group.

**Table 7: Modified Object Ranges for the Font Configuration Conformance Group**

<b>Object</b>	<b>Reference</b>	<b>Project Requirement</b>
NumFonts	NTCIP 1203 Clause 2.4.1.1.1.1	At least 4*
MaxFontCharacters	NTCIP 1203 Clause 2.4.1.1.1.3	At least 127**

\* Upon delivery, the first font is a standard 18" font. The second font is a double-stroke 18" font. The third font is a 28" font. The fourth font is empty.

\*\* Upon delivery, the first three font sets are configured in accordance with the ASCII character set for the following characters:

- "A" thru "Z"- All upper case letters.
- "0" thru "9"- All decimal digits.
- Space (i.e., ASCII code 0x20).

- Punctuation marks shown in brackets [ . , ! ? - ‘ ’ “ ” / ( ) ]
- Special characters shown in brackets [ # & \* + < > ]

**f. DMS Configuration**

As defined in NTCIP 1203.

**g. MULTI Configuration**

As defined in NTCIP 1203. The following list indicates the modified object requirements for this conformance group.

**Table 8: Modified Object Ranges for the MULTI Configuration Conformance Group**

Object	Reference	Project Requirement
DefaultBackgroundColor	NTCIP 1203 Clause 2.5.1.1.1.1	The DMS supports the following background colors: black
DefaultForegroundColor	NTCIP 1203 Clause 2.5.1.1.1.2	The DMS supports the following foreground colors: amber
DefaultJustificationLine	NTCIP 1203 Clause 2.5.1.1.1.6	The DMS supports the following forms of line justification: left center right full
defaultJustificationPage	NTCIP 1203 Clause 2.5.1.1.1.7	The DMS supports the following forms of page justification: top middle bottom
defaultPageOnTime	NTCIP 1203 Clause 2.5.1.1.1.8	The DMS supports the full range of these objects with step sizes no larger than 0.5 seconds
defaultPageOffTime	NTCIP 1203 Clause 2.5.1.1.1.9	The DMS supports the full range of these objects with step sizes no larger than 0.5 seconds

defaultCharacterSet	NTCIP 1203 Clause 2.5.1.1.1.10	The DMS supports the following character sets: eightBit
---------------------	-----------------------------------	--

**h. Default Message Control** as defined in NTCIP 1203

**i. Pixel Service Control** as defined in NTCIP 1203

**j. MULTI Error Control** as defined in NTCIP 1203

**k. Illumination / Brightness Control**

As defined in NTCIP 1203. The following list indicates the modified object requirements for this conformance group.

**Table 9: Modified Object Ranges for the Illumination/Brightness Control Conformance Group**

Object	Reference	Project Requirement
dmsIllumControl	NTCIP 1203 Clause 2.8.1.1.1.1	The DMS supports the following illumination control modes: photocell timer manual
dmsIllumNumBrightLevels	NTCIP 1203 Clause 2.8.1.1.1.4	At least 16

**l. Auxiliary I/O**

**m. Scheduling**

As defined in NTCIP 1203. The following list indicates the modified object requirements for this conformance group.

**Table 10: Modified Object Ranges for the Scheduling Conformance Group**

Object	Reference	Project Requirement
NumActionTableEntries	NTCIP 1203 Clause 2.9.1.1.1.1	At least 21

- n. Sign Status** as defined in NTCIP 1203
- o. Status Error** as defined in NTCIP 1203
- p. Pixel Error Status** as defined in NTCIP 1203
- q. Fan Error Status** as defined in NTCIP 1203
- r. Power Status** as defined in NTCIP 1203
- s. Temperature Status** as defined in NTCIP 1203

Install necessary hardware for the support of items q, r and s above.

**Table 11: Some Optional Object Requirements**

<b>Object</b>	<b>Reference</b>	<b>Project Requirement</b>
DefaultFlashOn	NTCIP 1203 Clause 2.5.1.1.1.3	The DMS supports the full range of these objects with step sizes no larger than 0.5 seconds
DefaultFlashOff	NTCIP 1203 Clause 2.5.1.1.1.4	The DMS supports the full range of these objects with step sizes no larger than 0.5 seconds
DmsMultiOtherErrorDescription	NTCIP 1203 Clause 2.7.1.1.1.20	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.

## **5. Documentation**

Supply software with full documentation, including a CD-ROM containing ASCII versions of the following Management Information Base (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 Procuring Agency for systems integration purposes at any time initially or in the future, regardless of what parties are involved in the systems integration effort.

### **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 10 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 at 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.

## **IV. DMS Testing Requirements**

### **General Test Procedure**

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

Provide 4 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, showing a test 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. The Engineer will reject all equipment not tested according to these requirements. It is the Design-Build Team's responsibility to ensure the DMS system functions properly even after the Engineer accepts the DMS test results.

Provide 4 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.

### **Design Approval Tests**

The Design Approval Tests consists of all tests described in Section 2.2 "DMS Equipment Tests" of NEMA TS 4-2005 (Hardware Standards for Dynamic Message Signs with NTCIP Requirements). Perform all tests and submit certified results for review and approval.

PROTOTYPE – Manufacture a prototype Dynamic Message Sign and controller of the type and size described in the project special provisions. Test the prototype according to the Design Approval and Operational Tests. When all corrections and changes (if any) have been made, the Department may accept the prototype DMS and controller as the physical and functional standard for the system furnished under this contract. The Design-Build Team may use the prototype units on this project if, after inspection and rework (if necessary), they meet all physical and functional specifications. In the case of standard product line equipment, if the Design-Build Team can provide test results certified by an independent testing facility as evidence of prior completion of successful design approval tests, then the Engineer may choose to waive these tests.

In each Design Approval Test, successfully perform the Functional Tests described below. Apply the extreme conditions to all associated equipment unless stated otherwise in these Project Special Provisions (PSP).

### **Operational Field Test (On-Site Commissioning)**

Conduct an Operational Field Test of the DMS system installed on the project to exercise the normal operational functions of the equipment. The Operational Field Test will consist of the following tests as a minimum:

**A. Physical Examination**

Examine each piece of equipment to verify that the materials, design, construction, markings, and workmanship comply with the mechanical, dimensional, and assembly requirements of these Project Special Provisions.

Perform the following tests as a minimum:

- Verify that all surfaces are free of dents, scratches, weld burns, or abrasions. Round sharp edges and corners.
- Verify bend radius of cables is not excessive or could potentially cause damage.
- Verify all modules, lamps, and components are properly secured.
- Verify that there are no exposed live terminals.

**B. Continuity Tests**

Check the wiring to assure it conforms to the requirements of the appropriate paragraphs of this Specification.

**C. Functional Tests**

Perform the following functional tests:

- Start-up and operation of the DMS locally using a laptop computer.
- Use automatic (photo-electric sensor controlled), DMS Control Software to switch between “dim”, “normal”, and “bright” light levels.
- Operation of the DMS with all display elements flashing continuously for 10 minutes at the maximum flash rate.
- Exercise the DMS by displaying static messages, flashing messages, and alternating static and flashing message sequences.
- Automatic polling of the DMS by the Control Software at various intervals and verification of data received by Control Software from DMS.
- Downloading and editing messages using Control Software.
- Execute status request on the DMS controller.
- Normal operations during uploading and downloading.
- Selection of messages from the sign controller’s local user interface.
- Test sequence activation at chosen intervals.
- Display and verification of all stored messages.
- Resumption of standard operation upon interruption of electrical power.
- Demonstration of the Failure Detection and Response functions.

- Demonstrate proper operation of the Failure Log.
- Set controller clock using the Control Software.
- Execute system shutdown using first the Control Software and local user interface.
- Detection of power failure in the DMS enclosure and reporting of such failure to the Control Software.

Approval of Operational Field Test results does not relieve the Design-Build Team to conform to the specifications 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.

### **30-Day Observation Period**

The 30-Day Observation Period is part of work to be completed by the project completion date. Upon completion of all project work, the successful completion of the component tests and the System Test, and the correction of all deficiencies, including minor construction items, a 30-day Observation Period shall commence. This observation shall consist of a 30-day period of normal operations of the new field equipment in operation with the new central equipment without any failure. The 30-day Observation Period shall be warranted by the payment and performance bond. The purpose of this period is to ensure that all components of the system function in accordance with the plans developed by the Design-Build Team and this Request for Proposals over an extended length of time.

All training shall have been completed at least thirty (30) calendar days prior to the start of the 30-Day Observation Period.

Respond to system or component failures (or reported failures) that occur during the 30-day Observation Period within twenty-four (24) hours. Correct said failures within forty-eight (48) hours. Failures that affect any of the major system components defined below for more than forty-eight (48) hours shall suspend the timing of the 30-day Observation Period beginning at the time when the failure occurred. After the cause of such failures has been corrected, timing of the 30-day Observation Period shall resume. System or components failures that necessitate a redesign of any component and failures in any of the major system components exceeding a total of three (3) occurrences, shall terminate the 30-day Observation Period and shall cause the 30-day Observation Period to be restarted from zero when the redesigned components have been installed and/or the failures corrected. The major system components are:

- DMS Field Controller
- DMS Display Module
- DMS Workstation software



## V. DMS Pedestal Structure

### Description

This section includes all design, fabrication, furnishing, and erection of the DMS pedestal structures; ladders and access platforms to the DMS inspection door; and attachment of the DMS enclosure to the structure in accordance with the requirements of the plans developed by the Design-Build Team and the provisions of this specification. Fabricate the supporting DMS assembly from tubular steel. Singular (monotube) horizontal members shall not be allowed for DMS signs. Cantilevered DMS signs shall not be allowed. The DMS assembly shall be a pedestal type structure as shown on the plans developed by the Design-Build Team and as approved by the Engineer.

The pedestal structure shall provide a minimum of 25 feet clearance from the high point of the road to the bottom of the DMS enclosure.

Design the DMS assembly including footings and submit shop drawings for approval.

Where the Standard Specifications or plans developed by the Design-Build Team require the design of a DMS assembly, including footings, submit design computations and shop drawings to the Engineer for acceptance. 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 apply to all work covered by this section.

The Design-Build Team shall furnish DMS S-dimension elevation drawings to the Engineer for approval.

### Material

Use materials that meet the following requirements of the NCDOT 2012 *Standard Specifications for Roads and Structures*:

Structural Steel	Section 1072
Overhead Structures	Section 1096
Signing Materials	Section 1092
Organic-Zinc Repair Paint	Article 1080-9
Reinforcing Steel	Sub-article 1070
Direct Tension Indicators	Sections 440 and 1072

### Construction Methods

#### A. General

Fabricate the DMS assemblies in accordance with the details shown in the approved shop drawings and the requirements of these specifications.

No welding, cutting, or drilling in any manner will be permitted in the field, unless approved by the Engineer.

Drill bolt holes and slots to finished size. Holes may also be punched to finished size, provided the diameter of the punched holes is at least twice the thickness of the metal being punched. Flame cutting of bolt holes and slots will not be permitted.

Erect the DMS in accordance with the requirements indicated on the plans developed by the Design-Build Team and in these Project Special Provisions. Field drill two holes per connection in the Z bars for attaching the DMS to the structure. Use two bolts at each connection. Provide two (2) U-bolts at each U-bolt connections such as 1) each truss chord to sign hanger, or 2) each truss chord to platform support. Provide two (2) U-bolts at each U-bolt connection where ends of truss chords are supported. Minimum diameter of all U-bolts shall be ½ inch.

Use two coats of a zinc-rich paint to touch up minor scars on all galvanized materials (Refer to Section 1076-6 of the 2012 *Standard Specifications for Roads and Structures*).

For high strength bolted connections, provide direct tension indicator washers.

## **B. Shop Drawing**

Submit to the Engineer for approval a complete design for the DMS assemblies, (including footings), access ladders, DMS assembly hardware, brackets for supporting the DMS and the access platform. Base the design on the line drawings and correct wind speed in accordance with the 2009 AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals* 5<sup>th</sup> Edition, including the latest interim specifications.

The manufacturer of the DMS assembly must ensure that design of the assembly is totally compatible with the DMS for mounting and attachment.

Submit six copies of completely detailed shop drawings and one copy of the design computations for the DMS assembly to the Engineer for approval prior to fabrication. Show in the shop drawings complete design and fabrication details including foundations, provisions for attaching the DMS and access platform to supporting structures, ladders and attachments, applicable material specifications, and any other information necessary for procuring and replacing any part of the complete Dynamic message sign assembly.

Allow a minimum of 15 working days for shop drawing approval after the Engineer receives them. If revised drawings are necessary, allow an additional 15 working days for review and approval of final shop drawings.

Approval of shop drawings by the Engineer will not relieve the Design-Build Team of their responsibility for the correctness of drawings, or for the fit of all shop and field connections and anchors.

## **C. Design and Fabrication**

For additional design and fabrication requirements, reference the *Overhead Sign Supports* Project Special Provision found elsewhere in this RFP.

## 1. Dynamic Message Sign Assemblies

Fabricate the supporting structures using tubular members of either aluminum or steel, using only one type of material throughout the project.

Horizontal components of the supporting structures for overhead DMS shall be of a truss design to support the DMS. Truss centerline shall coincide with the centerline of the DMS design area shown on the structure line drawing developed by the Design-Build Team. Provide permanent camber in addition to dead load camber in accordance with the 2009 AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*, 5<sup>th</sup> Edition, including the latest interim specifications. Indicate on the shop drawings the amount of camber provided and the method employed in the fabrication of the support to obtain the camber.

For all U-bolt connections of hanger beams to overhead assembly truss chords, provide U-bolts with a flat washer, a lock washer and double nuts at each end of the U-bolts. All double nuts that are on any U-bolt shall be the same thickness and weight. When assembled, the double nuts shall be brought tight against each other by the use of two wrenches.

Fabricate the attachment assembly for mounting DMS in a manner that will ensure easy removal the DMS.

## 2. Access Platform

Provide an access platform, a minimum of three feet wide with open skid-resistant surface and safety railing, on the DMS assembly for access to the DMS inspection door. Provide platforms with fixed safety railings along both sides from the beginning of the platform to the inspection door.

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

1. The top of the platform grading surface is vertically aligned with the bottom of the DMS door. Ensure the platform extends from the DMS enclosure to the access ladder.
2. The DMS door will open 90-degrees from its closed position without any obstruction from the platform or safety handrails.
3. The platform is rigidly and directly connected to the walkway brackets and there is no uneven surface between sections.
4. 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.

5. Ensure the platform design allows full access to the DMS enclosure inspection door with no interference or obstructions.

### **3. DMS Access Ladder**

Provide a fixed ladder, of the same material as the DMS structures, leading to and ending at the access platform. Equip the ladder with a security cover (ladder guard) and lock to prohibit access by unauthorized persons. Furnish locks to operate with a Corbin #2 key and furnish two keys per lock. Design the rungs on 12-inch center to center typical spacing. The first ladder rung shall be no more than 18 inches above the landing pad. Attach the security cover approximately 6 feet above the concrete landing. 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 4 inches deep, 24 inches wide, and 36 inches long to serve 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.

### **4. Anchor Rod Nut Tightening Requirements**

For nut tightening requirements, reference the *Foundations and Anchor Rod Assemblies for Metal Poles* Project Special Provision found elsewhere in this RFP.

## **VI. DMS Foundation**

The work covered by this provision consists of the design and construction of DMS foundations in accordance with the submitted approved plans developed by the Design-Build Team and the *Overhead and Dynamic Message Sign Foundations* Project Special Provision found elsewhere in this RFP.

## **VII. Documents and Submittals**

### **General**

The submittals listed below complement requirements stated throughout these Project Special Provisions and do not replace them.

Provide all drawings on 24" X 36" sheet of paper unless approved by the Engineer otherwise. The drawing must fill the entire sheet of paper excluding a 2" border all around.

Supplement each drawing by catalog cut sheets and parts list. Provide parts list in the following format:

Part ID	Source	Part number	Alternate source	Alternate Part number	Description

### **Drawings and Documents' Certification**

Provide the following drawings, documents, plans and calculations approved by a Professional Engineer registered in the state of North Carolina that bears his / her signature, seal, and date of acceptance:

- Plans for the DMS enclosure, mounting description, and shop drawings.
- Plans for overhead sign assembly, footings, design computations and shop drawings.
- Electrical power distribution drawings and power consumption calculations.

### **Mechanical**

This set of submittals shall include, but not be limited to, material specifications, catalog cut sheets, parts list, and fabrication drawings for DMS controller cabinet(s), DMS enclosure, character assemblies, DMS overhead assembly, DMS to DMS overhead assembly mounting, and etc. Engineering calculations must accompany drawings as needed and applicable.

### **Electrical**

This set of submittals shall include, but not be limited to, material specifications, catalog cut sheets, parts list, and wiring diagrams within the DMS controller cabinet, DMS enclosure, DMS controller cabinet / enclosure, service entrance cabinet / panels, and etc. This set of submittals also includes power consumption calculations, wire and conduit size calculations, voltage drop calculation, and etc. The DMS electrical system: wires, conduits, breakers, panel-boards, and etc. must meet the latest edition of NEC requirements and must be sealed and signed by a Professional Engineer registered in the state of North Carolina.

### **Electronics**

This set of submittals shall include, but not be limited to, material specifications, catalog cut sheets, parts list, and schematic diagrams for all electronics assemblies and sub-assemblies used in the system.

### **Block Diagrams**

A block diagram shall be provided for the following:

- DMS System
- DMS Controller Cabinet
- DMS Enclosure

- DMS Controller
- DMS Display Boards
- DMS Driver Board(s)
- DMS Lighting Control Board(s)
- Interface Board(s)
- And other system's boards / assemblies that help in understanding, troubleshooting, and repairing the system and / or system's components.

## **LEDs**

This set of submittals shall include LED data / specification sheets and the LED selection procedure as required by Discrete LEDs found elsewhere in this Project Special Provision.

## **DIGITAL CCTV CAMERAS**

(7/11/12)

### **1. New Digital CCTV Cameras**

The Design-Build Team shall provide and install the new digital CCTV equipment on wood poles at the locations approved by the Engineer. All new digital CCTV equipment furnished and installed by the Design-Build Team shall be fully compatible with the existing *VideoPro* video management software currently in use by the NCDOT in this Region.

Coordinate with the Engineer to confirm all digital CCTV locations prior to beginning construction.

The Design-Build Team shall furnish and install the following equipment at the minimum:

Digital CCTV Camera Assembly shall consist of:

- Automatic gain control charged-coupled device Color Cameras shall meet or exceed the following requirements:
  1. One dome CCTV color digital signal processing camera unit with zoom lens, filter, control circuit, and accessories in a single enclosed unit
  2. Built-in video encoder capable of H.264 compression for video transmission using IP protocols
  3. Motorized pan, tilt, and zoom
  4. Pole-mount camera attachment assembly
  5. All necessary cable, connectors and incidental hardware to make a complete and operable system
  6. A lightning arrestor installed in-line between the digital CCTV camera and the equipment cabinet components
  7. A NEMA-rated enclosure constructed of aluminum with a clear acrylic dome or approved equal Camera Unit housing

- 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 or exceed the following optical requirements:

1. Focal length: 0.16" – 3.45", 35X optical zoom, 12X electronic zoom
2. 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.

- Dome style enclosure Camera Housing

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

- Pan and Tilt Units

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

1. Pan: continuous 360 Degrees
2. Tilt: up / down 180 degrees minimum
3. Input voltage: 24 VAC 50/60Hz
4. Motors: Two-phase induction type, continuous duty, instantaneous reversing
5. Preset Positioning: 64 PTZ presets per camera

- Control Receiver / Drivers

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 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. The control receiver / drivers shall provide the following functions:

1. Zoom in / out
2. Automatic focus with manual override
3. Tilt up / down
4. Automatic iris with manual override
5. Minimum 64 preset positions for pan, tilt, and zoom

- Surge Suppression

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

Protect the electrical and Ethernet cables from the digital 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 transmission and automatically reset.

- Equipment Cabinets

The Design-Build Team shall furnish and install 336 stretch cabinets to house digital CCTV control and transmission equipment and fiber optic interconnect centers for terminating, splicing, and cross-connecting fiber optic cables. The 336 stretch digital CCTV 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 shall have the following:

1. Shelf Drawer
2. Cabinet Light
3. Thermostatically Controlled Ventilation Fans
4. Surge Protection for System Equipment
5. Fiber Optic Interconnect Center
6. Ground Bus

- Cabling

Furnish an 18/2 electrical cable to power the digital CCTV units. Furnish shielded CAT6 twisted pair cable for Ethernet communications to the digital CCTV units. All cables shall be rated for outdoor use meeting outdoor temperature, water blocking, ultraviolet and insulation characteristics.



The Design-Build Team shall perform System Test on the newly integrated digital CCTV Cameras.

**Digital CCTV Camera Pole (60')**

The Design-Build Team shall furnish and install Class III wood poles that comply with the 2012 *Standard Specifications for Roads and Structures*.

The Design-Build Team shall determine digital CCTV pole locations and obtain written approval from the Department prior to installation.

The Design-Build Team shall install the digital CCTV Camera Wood Pole at a depth of 10 feet. Mount the digital CCTV camera units with stainless steel banding at a height of 45 feet above ground level and position the digital CCTV to adequately view traffic in all directions. The Design-Build Team shall mount the digital CCTV camera units such that a minimum 5-foot of clearance is maintained between the camera and the top of the pole. The Design-Build Team shall mount the digital CCTV camera on side of pole nearest intended field of view and avoid occluding the view with the pole. The Design-Build Team shall obtain written approval of camera orientation from the Department prior to installation.

The Design-Build Team shall furnish and install poles with ½-inch x 36-inch copper-clad air terminal (Class II), with ½-inch diameter, 28-strand (minimum) Class II, bare copper down-conductor. Electrical Service details for the digital CCTV camera installations must be approved by the Engineer prior to installation.

**LOCAL AREA NETWORK EQUIPMENT****DESCRIPTION**

Furnish and install new local area network (LAN) equipment as called for in this Request for Proposals.

**GENERAL**

Furnish equipment for the LAN that complies with IEEE Standard 802. Furnish Ethernet Switches that comply with the following electrical safety requirements: UL60950 or CSA C22.2 No. 60950 (safety requirements for IT equipment) and FCC Part15 Class A for EMI emissions.

**Field Ethernet Switch**

Furnish Field Ethernet switches fabricated for use in field equipment cabinets that are ruggedized to meet or exceed NEMA TS-2 requirements for temperature, shock, humidity, and vibration.

Furnish Field Ethernet Switches that are DIN rail mounted and come equipped with hardware to permit mounting in an EIA 19" equipment rack.

Furnish Field Ethernet Switches that weigh no more than 15 lbs. and are no more than 250 cubic inches in volume.

Furnish Field Ethernet Switches with the following minimum characteristics and features:

Six (6) 10BASE-T/100BASE-TX ports

Minimum of two (2) 1,000 BaseX Optical uplink ports that utilize small form-factor pluggable (SFP) connectors

Furnish SFP modules rated to service the Field Ethernet to Field Ethernet optical uplinks and Field Ethernet to Core Ethernet rated for optical attenuation required to service the link. Use SFP modules that are LX and are matched and compatible with the SFP module it is mated with. Furnish attenuators if required to service link without saturation receiving optics

Furnish SFP modules rated for use with the existing optical cable integrated under this project

Furnish SFP modules with LC connectors

SFP modules shall be considered incidental to the field Ethernet switch

Management console port

Furnish Field Ethernet switches with the following features:

- 10/100BaseTX ports
- RJ45 connectors
- Category 5e, unshielded twisted pair cable
- Segment Length: 100m
- Auto-negotiation support (10/100Mbps)
- Auto MDIX crossover capability
- Full Duplex operation (IEEE 802.3x)
- TVS (transient voltage suppression) between Line +/-, Line +/-ground, and Line -ground to protect the circuitry

Furnish Field Ethernet switches with the following networking requirements:

The switch shall support automatic address learning of up to 8192 MAC addresses.

The switch shall support the following advanced layer 2 functions:

- IEEE 802.1Q VLAN, with support for up to 4096 VLANs
- IEEE 802.1p priority queuing
- IEEE 802.1w rapid spanning tree
- IEEE 802.1s multiple spanning tree
- IEEE802.1AD link aggregation
- IEEE 802.3x flow control

- IGMPv2 with 256 IGMP groups
- Port Rate Limiting
- Configuration via test file which can be modified through standard text editor
- Forwarding / filtering rate shall be 14,880 packets per second (PPS) for 10Mbps, 148,800 for 100Mbps, 1,488,000 for 1000Mbps
- DHCP Option 82

Furnish Field Ethernet switches with the following network management functionality requirements:

SNMPv2, SNMPv3

RMON

GVRP

Port Mirroring

802.1x port security

Radius Server

TACACS+ Server

SSL – Secure Socket Layer

SSH – Secure Shell

TFTP

Network Time Protocol (NTP)

Simple Network Time Protocol (SNTP)

Management via web or Telnet

## **CONSTRUCTION METHODS**

Furnish media access control (MAC) addresses for all equipment utilized as part of this project. Affix MAC Address label to each device utilized. Furnish IP addresses for all equipment utilized as part of this project. Affix final IP address each device utilized. Use labels that do not smear or fade.

In field equipment cabinets, fully integrate new Ethernet switches.

Fully integrate LAN to accomplish local device failover and fault tolerance.

Fully integrate LAN equipment to provide virus protection, user authentication, and security functions to prevent unauthorized users and data from entering the LAN.

- **Requirements Definition Document**

Prior to commencing work, the Design-Build Team shall develop a Requirements Definition Document (RDD) that shall form the basis for the overall network architecture and design that at a minimum includes the following:

- Complete description of the proposed implementation of the access, distribution and core layers for the network as described in the plans developed by the Design-Build Team and this Request for Proposals

- Development of an IP Design Scheme with ranges assigned to each node to be integrated by the Design-Build Team (address ranges, geographic distribution, standards for addresses within each cabinet)

- Proposed IP subnet definition and addressing including any and all masks

- Proposed IP multicast configuration including multicast routing (i.e., PIM sparse or dense) and Rendezvous Point (RP) designation as necessary

- Proposed recommendations for failover and redundancy including network device power, supervisor cards, and network ports

- Proposed configuration and guidelines for L3 routing (OSPF, VRRP, EIGRP, RIP, etc.)

- Proposed configuration and guidelines for Virtual LAN assignments including management VLANs, device VLANs and routing VLANs

- Proposed configuration and guidelines for L2 broadcast storm prevention, loop prevention and fault tolerance mechanisms. (Spanning Tree diagram with designated, blocking and forwarding ports indicated. Root bridge and backup root bridge must also be specified.) Incorporation of Multiple Spanning Tree Protocol

- Proposed configuration and guidelines to mitigate common security threats such as denial of service, man in the middle, MAC/IP spoofing and brute force dictionary attacks

- Proposed configuration and guidelines for 802.1p Class of Service (COS) queue assignments

- Proposed configuration and guidelines for specific port assignments on each of the L2 and L3 devices

The RDD shall be prepared and signed by a qualified networking professional (minimum CCNA or a manufacturer-approved equivalent based on the approved hardware vendor) and shall be approved by the Engineer. The qualified networking professional shall be present during the installation and testing of the local area network as well as during system testing.

- **Field Ethernet Switch**

Install and integrate all field Ethernet switches in the digital CCTV field equipment cabinets. Integrate with equipment cabinet hardware. Provide inline surge protection for all Ethernet connections in field cabinets.

**FOUNDATIONS AND ANCHOR ROD ASSEMBLIES FOR METAL POLES**

3/26/13

DB9 R05

**Description**

Foundations for metal poles include foundations for signals, cameras, overhead and dynamic message signs (DMS) and high mount and low level 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 materials and anchor rod assemblies for standard foundations for low level light standards. See Section 1405 of the 2012 *Standard Specifications for Roads and Structures* and *Roadway Standard Drawings* No. 1405.01 for materials and anchor rod assemblies for standard foundations. For construction of standard foundations for low level light standards, standard foundations are considered footings in this provision. This provision does not apply to foundations for signal pedestals; see Section 1743 of the 2012 *Standard Specifications for Roads and Structures* and *Roadway Standard Drawings* No. 1743.01.

**Materials**

Refer to the 2012 *Standard Specifications for Roads and Structures*.

<b>Item</b>	<b>Section</b>
Conduit	1091-3
Grout, Nonshrink	1003
Polymer Slurry	411-2(B)
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 2012 *Standard Specifications for Roads and Structures* for conduit, rollers, chairs and anchor rod assemblies. Store steel materials on blocking at least 12" above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Load, transport, unload and store foundation and anchor rod assembly materials so materials are kept clean and free of damage. Bent, damaged or defective materials will be rejected.

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

**[connect.ncdot.gov/resources/Geological/Pages/Products.aspx](http://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 nominal thickness of at least 1/4". Galvanize anchor rods and exposed nuts and washers in accordance with Article 1076-4 of the 2012 *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 accepted plans developed by the Design-Build Team and accepted submittals. Construct top of piers, footings, pedestals, grade beams and wings flat, level and within 1" of elevations shown in the accepted plans or approved by the Engineer. Provide an Ordinary Surface finish in accordance with Subarticle 825-6(B) of the 2012 *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, Contractor and Drilled Pier Contractor Superintendent will attend this predrill meeting.

Do not excavate holes, install piles or allow equipment wheel loads or vibrations within 20 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 accepted plans

developed by the Design-Build Team. Install piers with tip elevations no higher than shown in the plans or approved by the Engineer.

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

Contain and dispose of drilling spoils and waste concrete as directed and in accordance with Section 802 of the 2012 *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 should be installed against undisturbed material. Unless otherwise approved, do not leave temporary casings in place for mast arm poles and cantilever signs. The Engineer will determine if casings may remain in place. If the Design-Build Team proposes leaving temporary casings in place, do not begin drilling until a casing installation method is approved.

Use polymer slurry and additives to stabilize holes in accordance with the slurry manufacturer's recommendations. Provide mixing water and equipment suitable for polymer slurry. Maintain polymer slurry at all times so slurry meets Table 411-3 of the 2012 *Standard Specifications for Roads and Structures* except for sand content.

Define a "sample set" as slurry samples collected from mid-height and within 2 feet of the bottom of holes. Take sample sets from excavations to test polymer slurry immediately after filling holes with slurry, at least every 4 hours thereafter and immediately before placing concrete. Do not place Drilled Pier concrete until both slurry samples from an excavation meet the required polymer slurry properties. If any slurry test results do not meet the requirements, the Engineer may suspend drilling until both samples from a sample set meet the required 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 2012 *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 a concrete placement procedure is approved. If applicable, temporary casings and fluids may be removed when concrete placement is paused or stopped in accordance with the exceptions above provided holes are stable. Remove contaminated concrete from exposed Drilled Pier concrete after removing casings and fluids. If holes are unstable, do not remove temporary casings until a procedure for placing anchor rod assemblies and conduit or constructing grade beams or wings is approved.

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

If drilled piers are questionable, pile integrity testing (PIT) and further investigation may be required in accordance with Article 411-5 of the 2012 *Standard Specifications for Roads and Structures*. A drilled pier will be considered defective in accordance with Subarticle 411-5(D) of the 2012 *Standard Specifications for Roads and Structures* and drilled pier acceptance is based in part on the criteria in Article 411-6 of the 2012 *Standard Specifications for Roads and Structures* except for the top of pier tolerances in Subarticle 411-6(C) of the 2012 *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 is required in accordance with Article 411-6 of the 2012 *Standard Specifications for Roads and Structures*. No extension of completion date or time will be allowed for remediation of unacceptable drilled piers or post repair testing.

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

**(B) Footings, Pedestals, Grade Beams and Wings**

Excavate as necessary for footings, grade beams and wings in accordance with the plans, accepted submittals and Section 410 of the 2012 *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.

Construct cast-in-place reinforced concrete footings, pedestals, grade beams and wings with the dimensions shown in the plans and in accordance with Section 825 of the 2012 *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 3/4" horizontal width for pedestal and grade beam edges exposed above finished grade.



Backfill and fill in accordance with Article 410-8 of the 2012 *Standard Specifications for Roads and Structures*. Proper compaction around footings and wings is critical for foundations to resist uplift and torsion forces. Place concrete against undisturbed soil and do not use forms for standard foundations for low level light standards.

**(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 and the following:

- (1) Protrusion of 3 to 5 anchor rod threads above top nuts after tightening and
- (2) Distance of one nut thickness between top of foundations and bottom of leveling nuts.

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

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

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

- (1) Turn leveling nuts onto anchor rods to a distance of one nut thickness between the top of foundation and bottom of leveling nuts. Place washers over anchor rods on top of leveling nuts.
- (2) Determine if nuts are level using a flat rigid template on top of washers. If necessary, lower leveling nuts to level the template in all directions or if applicable, lower nuts to tilt the template so the metal pole or upright truss will lean as shown in the plans. If leveling nuts and washers are not in full contact with the template, replace washers with galvanized beveled washers.
- (3) Verify the distance between the foundation and leveling nuts is no more than one nut thickness.
- (4) Place base plate with metal pole or upright truss over anchor rods on top of washers. High mount luminaires may be attached before erecting metal poles but do not attach cables, mast arms or trusses to metal poles or upright trusses at this time.

- (5) Place washers over anchor rods on top of base plate. Lubricate top nut bearing surfaces and exposed anchor rod threads above washers with beeswax, paraffin or other approved lubricants.
- (6) Turn top nuts onto anchor rods. If nuts are not in full contact with washers or washers are not in full contact with the base plate, replace washers with galvanized beveled washers.
- (7) Tighten top nuts to snug-tight with the full effort of one workman using a 12" wrench. Do not tighten any nut all at once. Turn top nuts in increments. Follow a star pattern cycling through each nut at least twice.
- (8) Repeat (7) for leveling nuts.
- (9) Replace washers above and below the base plate with galvanized beveled washers if the slope of any base plate face exceeds 1:20 (5%), any washer is not in firm contact with the base plate or any nut is not in firm contact with a washer. If any washers are replaced, repeat (7) and (8).
- (10) With top and leveling nuts snug-tight, mark each top nut on a corner at the intersection of 2 flats and a corresponding reference mark on the base plate. Mark top nuts and base plate with ink or paint that is not water-soluble. Use the turn-of-nut method for pretensioning. Do not pretension any nut all at once. Turn top nuts in increments for a total turn that meets the following nut rotation requirements:

<b>NUT ROTATION REQUIREMENTS (Turn-of-Nut Pretensioning Method)</b>	
<b>Anchor Rod Diameter, inch</b>	<b>Requirement</b>
$\leq 1 \frac{1}{2}$	1/3 turn (2 flats)
$> 1 \frac{1}{2}$	1/6 turn (1 flat)

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

- (11) Ensure nuts, washers and base plates are in firm contact with each other for each anchor rod. Cables, mast arms and trusses may now be attached to metal poles and upright trusses.
- (12) Between 4 and 14 days after pretensioning top nuts, use a torque wrench calibrated within the last 12 months to check nuts in the presence of the Engineer. Completely erect mast arm poles and cantilever signs and attach any hardware before checking top nuts for these structures. Check that top nuts meet the following torque requirements:

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

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

- (13) Do not grout under base plate.

## **OVERHEAD SIGN SUPPORTS**

(8-27-12)

DB11 R012

### **Description**

Design, fabricate, furnish and erect various types of overhead sign assemblies. Fabricate supporting structures using tubular members of either aluminum or steel. The types of overhead sign assemblies included in this specification are span structures and cantilever structures.

### **Materials**

Structural Steel.....Section 1072  
 Overhead Sign Structures.....Section 1096  
 Signing Materials.....Section 1092  
 Organic Zinc Repair Paint .....Article 1080-9  
 Reinforcing Steel .....Section 1070  
 Direct Tension Indicators..... Sections 440 and 1072

### **Construction Methods**

#### **A. General**

Fabricate overhead sign assemblies in accordance with the details shown in the approved working drawings and the requirements of these specifications.

No welding, cutting or drilling will be permitted in the field, unless approved by the Engineer.

Drill bolt holes and slots to finished size. Holes may also be punched to finished size, provided the diameter of the punched holes is at least twice the thickness of the metal being punched. Flame cutting of bolt holes and slots is not permitted.

Erect sign panels in accordance with the requirements for Type A or B signs as indicated in the plans or Roadway Standard Drawings. Field drill two holes per connection in the Z bars for attaching signs to overhead structures. Provide two U-bolts at each U-bolt connection such as each truss chord to sign hanger and each truss chord to walkway support or light support. Provide two U-bolts at each U-bolt connection where ends of truss chords are supported. The minimum diameter of all U-bolts is ½ inch.

For all U-bolt connections of hanger beams to overhead assembly truss chords, provide all U-bolts with a flat washer and double nuts at each end of the U-bolts. All double nuts that are on any U-bolt shall be the same thickness and weight. When assembled, the double nuts shall be brought tight against each other by the use of two wrenches.

Use two coats of a zinc-rich paint to touch up minor scars on all galvanized materials.

For high strength bolted connections, use direct tension indicators. Galvanize bolts, nuts and washers in accordance with the 2012 *Standard Specifications for Roads and Structures*.

## **B. Shop Drawings**

Design the overhead sign supports, including foundations, prior to fabrication. Submit design calculations and working drawings of the designs to the Engineer for review and acceptance.

Have a professional engineer registered in the State of North Carolina perform the computations and render a set of sealed, signed and dated drawings detailing the construction of each structure.

Submit to the Engineer for review and acceptance complete design and fabrication details for each overhead sign assembly, including foundations and brackets for supporting the signs, and maintenance walkways, if applicable, electrical control boxes, and lighting luminaires. Base design upon the revised structure line drawings, wind load area and the wind speed shown in the plans, and in accordance with the 2009 AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*, 5th Edition, and the 2010 and 2011 Interim Revisions.

Submit thirteen (13) copies of completely detailed working drawings and one copy of the design calculations including all design assumptions for each overhead sign assembly to the Engineer for approval prior to fabrication. Working drawings shall include complete design and fabrication details (including foundations); provisions for attaching signs, maintenance walkways (when applicable), lighting luminaires to supporting structures, applicable material specifications, and any other information necessary for procuring and replacing any part of the complete overhead sign assembly.

Allow 15 days for initial working drawing review after the Engineer receives them. If revisions to working drawings are required, an additional 15 days shall be required for review and approval of the final working drawings.

Approval of working drawings by the Engineer shall not relieve the Design-Build Team of responsibility for the correctness of the drawings, or for the fit of all shop and field connections and anchors.

### **C. Design and Fabrication**

The following criteria govern the design of overhead sign assemblies:

Design shall be in accordance with the 2009 AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 5th Edition*, and the 2010 and 2011 Interim Revisions.

Within this Specification, there are several design criteria that are owner specified. They include:

- Overhead cantilever sign structures shall include galloping loads (exclude four-chord horizontal trusses).
- The natural wind gust speed in North Carolina shall be assumed to be 11.6 mph.
- The fatigue importance category used in the design, for each type of structure, shall be for:
  - Cantilever structures with span greater than 50 feet – Fatigue Category I
  - Cantilever structures with span less than or equal to 50 feet – Fatigue Category II
  - Non-cantilever structures – Fatigue Category II

The following Specification interpretations or criteria shall be used in the design of overhead sign assemblies:

- For design of supporting upright posts or columns, the effective length factor for columns “K”, as provided for in Appendix B, Section B.5, shall be taken as the following, unless otherwise approved by the Engineer:

Case 1      For a single upright post of cantilever or span type overhead sign structure, the effective column length factor, “K”, shall be taken as 2.0.

Case 2 For twin post truss-type upright post with the post connected to one chord of a horizontal truss, the effective column length factor for that column shall be taken as 2.0.

Case 3 For twin post truss-type upright post with the post connected to two truss chords of a horizontal tri-chord or box truss, the effective column length factor for that column shall be taken as 1.65

- For twin post truss-type uprights, the unbraced length of the post shall be from the chord to post connection to the top of base plate.

For twin post truss-type uprights, when the post is subject to axial compression, bending moment, shear, and torsion the post shall satisfy the 2009 AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 5th Edition*, and the 2010 and 2011 Interim Revisions Equations 5-17, 5-18 and 5-19. To reduce the effects of secondary bending, in lieu of Equation 5-18, the following equation may be used:

$$\frac{f_a}{F_a} + \frac{f_b}{\left(1 - \frac{0.6f_a}{F_e}\right)F_b} + \left(\frac{f_v}{F_v}\right)^2 \leq 1.0$$

Where  $f_a$  = Computed axial compression stress at base of post

- The base plate thickness for all uprights and poles shall be a minimum of 2" but not less than that determined by the following criteria and design.

Case 1 Circular or rectangular solid base plates with the upright pole welded to the top surface of base plate with full penetration butt weld, and where no stiffeners are provided. A base plate with a small center hole, which is less than 1/5 of the upright diameter, and located concentrically with the upright pole, may be considered as a solid base plate.

The magnitude of bending moment in the base plate, induced by the anchoring force of each anchor bolt shall be calculated as  $M = (P \times D_1) / 2$ .

Case 2 Circular or rectangular base plate with the upright pole socketed into and attached to the base plate with two lines of fillet weld, and where no stiffeners are provided, or any base plate with a center hole that is larger in diameter than 1/5 of the upright diameter

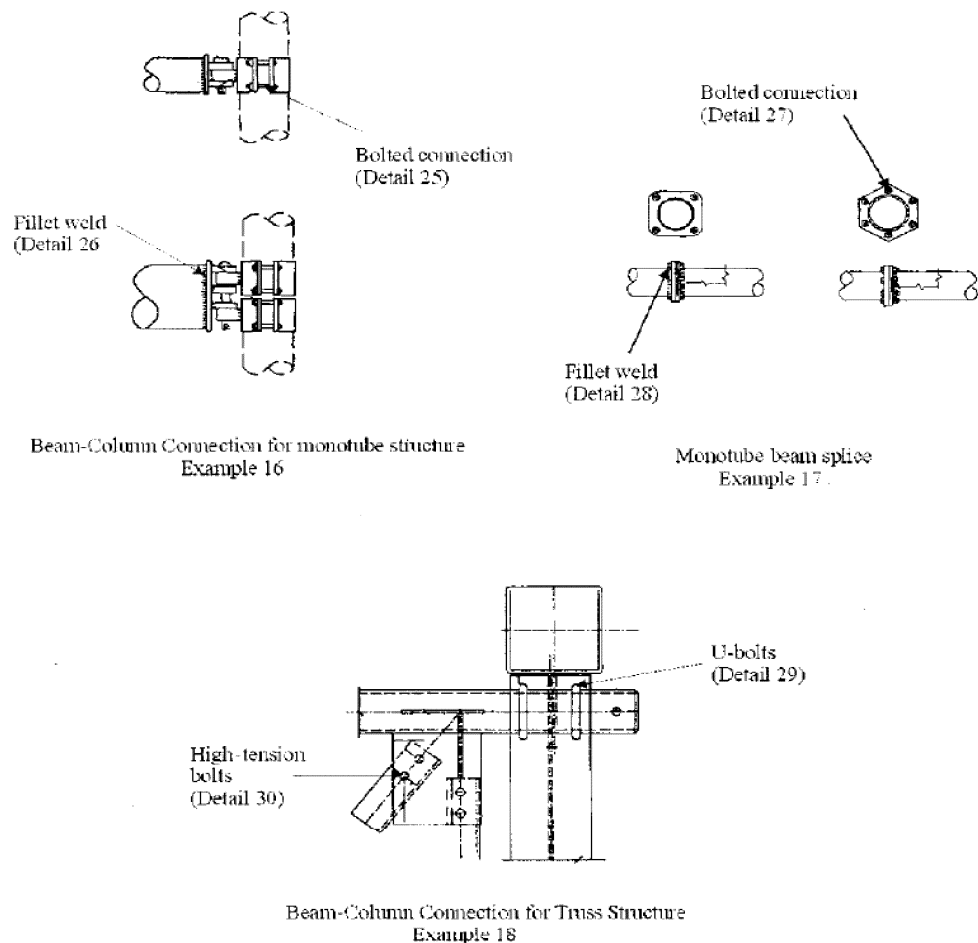
The magnitude of bending moment induced by the anchoring force of each anchor bolt shall be calculated as  $M = P \times D_2$ .

- M - bending moment at the critical section of the base plate induced by one anchor bolt
  - P - anchoring force of each anchor bolt
  - $D_1$  - horizontal distance between the center of the anchor bolt and the outer face of the upright, or the difference between the radius of the bolt circle and the outside radius of the upright
  - $D_2$  - horizontal distance between the face of the upright and the face of the anchor bolt nut
- The critical section shall be located at the face of the anchor bolt and perpendicular to the radius of the bolt circle. The overlapped part of two adjacent critical sections shall be considered ineffective.
  - The thickness of Case 1 base plate shall not be less than that calculated based on formula for Case 2.
  - Uprights, foundations, and trusses that support overhead signs shall be designed in accordance with the Overhead and Dynamic Message Sign Foundations Project Special Provision for the effects of torsion. Torsion shall be considered from dead load eccentricity of these attachments, as well as for attachments such as walkways, supporting brackets, lights, etc., that add to the torsion in the assembly. Truss vertical and horizontal truss diagonals in particular and any other assembly members shall be appropriately sized for these loads.
  - Uprights, foundations, and trusses that support overhead mounted signs shall be designed for the proposed sign wind area and future wind areas. The design shall consider the effect of torsion induced by the eccentric force location of the center of wind force above (or below) the center of the supporting truss. Truss vertical and horizontal truss diagonals in particular and any other assembly members shall be appropriately sized for these loads.

For non-cantilevered monotube sign support structures, the following table and figures are considered as a required addition to the 2009 AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 5th Edition*, and the 2010 and 2011 Interim Revisions:

<b>Construction</b>	<b>Detail</b>	<b>Stress Category</b>	<b>Application</b>	<b>Example</b>
Mechanically Fastened Connections	25. Bolts in Tension	D	Beam column connection for monotube structures	16
Fillet Weld Connections	26. Fillet welded with one side normal to applied stress	E'	Beam column connection for monotube structures	17
Mechanically Fastened Connections	27. High strength bolts in tension	D	Monotube or truss-chord splice	17
Fillet Weld Connections	28. Fillet welded with one side normal to applied stress	E'	Monotube or truss-chord splice	17
Mechanically Fastened Connections	29. U-bolts tied to transverse truss column to keep chords in place	D	Horizontal truss connection with vertical truss	18
Mechanically Fastened Connections	30. Net section of full-tightened, high tension bolts in shear	B	Truss bolted joint	18



Add to the Specifications, Figure 11-1:

Fabricate all overhead sign assemblies, including but not limited to foundations, in accordance with the details shown on the approved shop drawings and with the requirements of these Specifications.

Fabricate the span and cantilever supporting structures using tubular members of either aluminum or steel, using only one type of material throughout the project.

Horizontal components of the supporting structures for overhead signs may be of a truss design or a design using singular (monotube) horizontal members to support the sign panels.

Truss or singular member centerline must coincide with the centerline of sign design area shown on the structure line drawing.

Provide permanent camber in addition to dead load camber in accordance with the 2009 AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*, 5th Edition, and the 2010 and 2011 Interim Revisions.

Indicate on the shop drawings the amount of camber provided and the method employed in the fabrication of the support to obtain the camber.

Use cantilever sign structures that meet the following design criteria:

- a. Do not exceed an  $L / 150$  vertical dead load deflection at the end of the arm due to distortions in the arm and vertical support, where  $L$  is the length of the arm from the center of the vertical support to the outer edge of the sign.
- b. Do not exceed an  $L / 40$  horizontal deflection at the end of the arm due to distortions in the arm and vertical support, as a result of design wind load.

Fabricate attachment assemblies for mounting signs in a manner that allows easy removal of sign panels for repair.

## **OVERHEAD AND DYNAMIC MESSAGE SIGN FOUNDATIONS**

(9-1-11)

DB11 R013

### **Description**

Sign foundations include foundations for overhead and dynamic message signs (DMS) supported by metal poles or upright trusses. Sign foundations consist of footings with pedestals or drilled piers with or without grade beams or wings, conduit and anchor rod assemblies. Construct sign foundations in accordance with the contract and accepted submittals. Define “cantilever sign” as an overhead cantilever sign support in accordance with Figure 1-1 of the AASHTO 2009 *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*, 5th Edition, with the 2010 and 2011 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.

### **Assumed 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 = 120 lb/cf,
- (B) Friction angle = 30 degrees,
- (C) Cohesion = 0 lb/sf, and
- (D) Groundwater 7 feet below finished grade.

A subsurface investigation is 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 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.

### **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 2 feet of finished grade before beginning drilling. Drill borings to 2 drilled pier diameters below anticipated pier tip elevations or refusal, whichever is higher.

Use the computer software gINT version 8.0 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 appropriate wind zone and the 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 AASHTO 2009 *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*, 5th Edition, with the 2010 and 2011 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 lb/sf 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 5.0 or later manufactured by Ensoft, Inc. to analyze drilled piers. Provide drilled pier designs with a horizontal deflection of less than 1" 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 AASHTO 2009 *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*, 5th Edition, with the 2010 and 2011 Interim Revisions.

Submit boring logs, if any, working drawings and design calculations for acceptance in accordance with Article 105-2 of the 2012 *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* provision.

## **BRIDGE JOINT DEMOLITION**

**(SPECIAL)**

### **DESCRIPTION**

This provision addresses the removal of existing joint material and adjacent concrete to facilitate the installation of new bridge joints at the locations noted in the plans developed by the Design-Build Team.

### **EQUIPMENT**

Use the following surface preparation equipment:

- Sawing equipment capable of sawing concrete to a specified depth.
- Power driven hand tools for removal of concrete are required that meet the following requirements:

Pneumatic hammers weighing a nominal 15 lbs (7 kg) or less.

Pneumatic hammer chisel-type bits that do not exceed the diameter of the shaft in width.

- Hand tools such as hammers and chisels for removal of final particles of concrete.

### **REMOVAL AND PREPARATION**

Prior to any construction, take the necessary precautions to ensure debris from joint construction shall not fall below the bridge deck.

Remove existing joint material by methods approved by the Engineer. Provide a 1" deep saw cut around the perimeter of areas noted for bridge deck removal.

Remove by chipping with hand tools concrete adjacent to the joint to the limits shown on the plans developed by the Design-Build Team. Use a small chipping hammer (15 lb. class) to prepare the edges of the repair area to limit micro fractures. In addition, all loose and unsound

concrete shall be removed.

In overhangs, removing concrete areas greater than 0.60 ft<sup>2</sup>/ft. length of bridge shall require overhang support. Submit the overhang support method to the Engineer for approval.

Care shall be taken not to cut, stretch, or damage any exposed reinforcing steel. Dispose of the removed concrete.

If the condition of the concrete is such that deep spalls or sheer faces result, notify the Engineer for the proper course of action.

Clean, repair or replace rusted or loose reinforcing steel. Thoroughly clean the newly exposed surface to be free of all grease, oil, curing compounds, acids, dirt, or loose debris.

## **OVERLAY SURFACE PREPARATION**

**(12-18-12)**

### **DESCRIPTION**

This provision addresses the surface preparation activities required prior to the placement of latex modified concrete. Unless specifically mentioned below, all requirements specified for the bridge deck shall also be required for the approach slabs.

### **DEFINITIONS**

Scarification shall consist of the removal of any asphalt wearing surface and concrete surface to a uniform depth within ½" of the plan overlay thickness to the limits shown on the plans developed by the Design-Build Team.

Hydro-demolition shall consist of the removal of the deck surface by means of high pressure water blasting which shall remove concrete, oil, dirt, concrete laitance and rust from the exposed reinforcing bars by direct impact, pressurization of micro and macro cracks and cavitation produced by jet instability.

### **MANAGING HYDRO-DEMOLITION WATER**

Prior to beginning work, submit for approval a Hydro-demolition Management Plan. This plan shall describe the collection, treatment, and disposal of run-off water generated by the scarification and hydro-demolition processes. Prepare the plan in accordance with the NCDOT Guidelines for Managing Hydro-demolition Water available at the website noted below:

**[www.ncdot.gov/projects/ncbridges](http://www.ncdot.gov/projects/ncbridges)**

The Design-Build Team shall comply with applicable regulations concerning such water disposal.

**EQUIPMENT**

Use the following surface preparation equipment:

- Scarifying equipment that is a power-operated, mechanical grinder capable of removing a minimum depth of 1/4" for each pass.
- Hydro-demolition machine, self-propelled with a minimum orifice pressure of 17,000 psi.
- All water used for hydro-demolition shall be potable.
- Equipment capable of sawing concrete to the specified plan depth.
- Hand-held high velocity (7,500 psi minimum) water-jet equipment capable of removing rust scale from reinforcing steel, removing small chips of concrete partially loosened by the scarifying or chipping operation, and for removing rehydrated dust left from scarification.
- Power driven hand tools for removal of unsound concrete are required that meet the following requirements:
  - Pneumatic hammers weighing a nominal 35 pounds or less.
  - Pneumatic hammer chisel-type bits that do not exceed the diameter of the shaft in width.
- Hand tools such as hammers and chisels for removal of final particles of unsound concrete.
- Vibratory screed for overlays, except as noted herein.

The hydro-demolition machine shall be self-propelled and capable of producing a water-jet through an orifice at a pressure of at least 17,000 psi. The machine shall move the jet transversely across the area and forward and backward so that the entire deck is covered with the water-jet and operated at a pressure sufficient to remove the unsound concrete.

The machine shall have sufficient means to control and vary the following functions:

- (1) Water pressure
- (2) Angle and distance of the orifice in relation to the surface to be blasted
- (3) Limits of transverse and longitudinal movement of the orifice
- (4) Speed of the orifice in the transverse and longitudinal direction

High pressure pump(s) shall be equipped with over-pressurization relief valves and rupture disc systems. All high pressure components shall be rated at full working pressure of the hydro-demolition system. The complete hydro-demolition system must be capable of depressurization from a single point.

The equipment must operate at a noise level less than 90 decibels at a distance of 50 feet.

**SURFACE PREPARATION**

Remove all existing asphalt overlays and all loose, disintegrated, unsound or contaminated concrete to the limits shown on the plans with the following requirements:

- A. Sealing of Bridge Deck: Seal all expansion joints subject to run-off water from the hydro-demolition process with material approved by the Engineer, prior to beginning any demolition. The expansion joints shall remain sealed until water from the hydro-demolition process no longer passes over them. Take all steps necessary to eliminate the flow of water through the expansion joints, and any other locations water could leak from the deck.

All deck drains in the immediate work area and other sections of the bridge affected by the work being performed shall be sealed prior to beginning scarification. Drains shall remain sealed until it has been determined that materials from the hydro-demolition and concrete overlay operations cannot be discharged through them any longer.

- B. Scarifying Bridge Deck: Removal of any asphalt wearing surface from the bridge deck and scarification of the concrete deck to remove the entire concrete surface of the deck to a uniform depth within  $\frac{1}{2}$ " of the overlay thickness shown on the plans developed by the Design-Build Team, but not less than  $\frac{1}{2}$ -inch above the top mat of reinforcing steel.

It shall be the Design-Build Team's responsibility to determine the amount of cover for the reinforcing steel. Use a pachometer or other approved device, as directed by Engineer, prior to beginning hydro-demolition. Readings shall be taken in the presence of the Engineer. Readings shall be taken for each span at  $\frac{1}{5}$  points longitudinally and  $\frac{1}{3}$  points transversely.

**Estimated average cover to top mat:**

**Bridge # 457:  $2\frac{1}{2}$ "  $\pm$   $\frac{3}{8}$ "**

**Bridge # 458:  $2\frac{1}{2}$ "  $\pm$   $\frac{3}{8}$ "**

The above top mat cover dimensions are an estimate based on the best available information. Calibrate scarifying equipment in order to avoid damaging the reinforcing steel in the bridge floor or the approach slab. If reinforcing bars or bridge drainage devices are pulled up or snagged during scarification operations, the cease work and consult with the Engineer to determine any necessary adjustments to the roto-milling operation.

Remove and dispose of all concrete and asphalt, and thoroughly clean the scarified surface. In areas where reinforcing steel is located in the depth to be scarified, use another method with the Engineer's approval.

- C. Calibration of Hydro-Demolition Equipment: Two trial areas shall be designated by the Engineer to demonstrate that the equipment, personnel, and methods of operation are capable of producing results to the satisfaction of the Engineer. The first trial area shall consist of approximately 50 square feet of sound concrete as determined by the Engineer. The equipment shall be calibrated to remove the sound concrete from the scarified surface to the depth required to achieve the overlay thickness shown on the plans developed by the Design-Build Team. After completion of this test area, the equipment shall be moved to the second area consisting of deteriorated or defective concrete, to determine whether this unsound

concrete will be completely removed with the previous calibration and to establish a baseline for requiring the Design-Build Team to place under-deck containment in areas subject to full depth removal, before beginning the hydro-demolition process in a span. Should it be determined that not all defective concrete has been removed, the hydro-demolition system shall be recalibrated to remove an additional 1/4 inch of sound concrete, then re-test on deteriorated concrete.

If additional defective concrete is found, the depth of cut will increase in 1/4-inch increments until only sound concrete is found remaining.

When satisfactory results are obtained, the machine parameters shall be used for production removal. The contractor shall make adjustments to the operating parameters, as required, to perform concrete removal as indicated on the plans developed by the Design-Build Team and to adjust to the variance in the compressive strength of the concrete.

Hand held water blasting equipment, pneumatic hammers, and hand tools may be substituted for the hydro-demolition unit in inaccessible or inconvenient areas.

The Engineer will re-inspect after each removal and require additional removals until compliance with plans and specifications are met.

Regardless of the method of removal, the removal operation shall be stopped if it is determined that sound concrete is being removed to a depth greater than required by the plans developed by the Design-Build Team, including any 1/4-inch increments added per the above calibration process.

Appropriate recalibration, or change in equipment and methods shall be performed prior to resuming the removal operation.

- D. Hydro-demolition (Overlay Depth): Remove by hydro-demolition or chipping with hand tools all loose, unsound and contaminated deck concrete and, if necessary, sound concrete in order to allow for the placement of an overlay with the minimum depth required elsewhere in this RFP. In areas where reinforcing steel is exposed and debonded for a length greater than 2 feet, remove deck to an average depth of 1/2" below the exposed and debonded reinforcing steel. Dispose of the unsound concrete, clean, repair or replace damaged reinforcing steel and thoroughly clean the newly exposed surface.

Care shall be taken not to cut, stretch, or damage any exposed reinforcing steel.

Any areas of the prepared surface contaminated by oil or other materials detrimental to good bond as a result of the Design-Build Team's operations shall be cleaned at the Design-Build Team's expense.

- E. Class II Surface Preparation (Partial Depth): At locations as directed by the Engineer for Class II Surface Preparation, verify the depth of removal achieved by the hydro-demolition. The average depth of removal shall be approximately one-half the deck thickness but no less than 3/4" below the top mat of steel. When hydro-demolition did not achieve the Class II



Surface Preparation depth requirements, remove by hydro-demolition or chipping with hand tools all existing patches and contaminated concrete to the required depth.

All patches shall be removed under Class II surface preparation. If any patch cannot be removed by means of hydro-demolition, the Design-Build Team shall use hand tools to remove the patch. Areas indicated on the plans developed by the Design-Build Team that require Class II surface preparation, including the locations of existing patches, are from the best information available. The Design-Build Team shall verify prior to surface preparation the location of all existing patches.

Dispose of the removed concrete, clean, repair or replace rusted or loose reinforcing steel and thoroughly clean the newly exposed surface. Care shall be taken not to cut, stretch, or damage any exposed reinforcing steel.

In overhangs, removing concrete areas of less than 0.60 ft<sup>2</sup>/ft. length of bridge without overhang support is permitted unless the Engineer directs otherwise. Overhang support shall be required for areas removed greater than 0.60 ft<sup>2</sup>/ft. length of bridge. Submit details of overhang support to the Engineer for approval prior to beginning the work.

- F. Class III Surface Preparation (Full Depth): Remove by hydro-demolition or chipping with hand tools the full depth of slab. Dispose of the removed concrete, clean, repair or replace damaged reinforcing steel and thoroughly clean the newly exposed surface. Care shall be taken not to cut, stretch, or damage any exposed reinforcing steel.

For areas of less than 3 ft<sup>2</sup> suspending forms from existing reinforcing steel using wire ties will be permitted. For larger areas, support forms by blocking from the beam flanges, or other approved method.

Overhang support shall be required for full depth removal adjacent to bridge rails. Submit details of overhang support to the Engineer for approval prior to beginning the work.

Under Deck Containment: Under deck containment shall be installed where Class III surface preparation occurs. The containment shall be installed prior to hydro-demolition in the areas where full depth removal is required or blow thru may occur during the hydro-demolition process.

Submit for approval detailed plans for the under deck containment system. Detail how waste, debris, and wastewater shall be contained.

Concrete for Full Depth Repair: Fill the Class III surface preparation areas with Class AA, high early strength structural concrete or latex modified concrete in accordance with the methods described below:

Refill areas with Class AA concrete to the bottom of the proposed concrete overlay in accordance with Section 420 of the 2012 *Standard Specifications for Roads and Structures*. Any of the methods for curing Class AA concrete as stated in the 2012 *Standard Specifications for Roads and Structures* are permitted except the membrane curing compound method.

Provide a raked finish to the surface of the Class AA concrete which provides a minimum relief of 1/16" and a maximum relief of 1/4". Place the overlay course after the Class AA concrete has attained a minimum compressive strength of 2500 psi. The strength shall be verified by an approved, non-destructive test method.

Refill the areas where concrete was removed with high early strength concrete as described in the *Concrete for Deck Repair* and *Volumetric Mixer* Project Special Provisions found elsewhere in this RFP.

Refilling the areas from which concrete has been removed with latex modified concrete during the Class III repair is permitted if any of the following conditions are met:

- The reinforcing steel cover is 1½ inches or less for the top mat of steel
- The area being repaired is less than 1 yd<sup>2</sup>
- The Engineer directs the fill

- G. Preparation of Reinforcing Steel: Remove concrete without cutting or damaging existing steel unless otherwise directed by the Engineer. Damaged reinforcing steel, such as bars with nicks deeper than 20% of the bar diameter, shall be repaired or replaced. Reinforcing steel which has a cross section reduced to 75% or less shall be replaced with new reinforcing steel of similar cross section area. Replacement bars shall be Grade 60 and shall meet the material requirements of Section 1070 of the 2012 *Standard Specifications for Roads and Structures*. Replacement bars shall be spliced to existing bars using either minimum 30 bar diameter lap splices to existing steel with 100% cross sectional area or approved mechanical connectors.

Support and protect the exposed reinforcing steel left unsupported by the hydro-demolition process against displacement and damage from loads such as those caused by removal equipment and delivery buggies. All reinforcing steel damaged or dislodged by these operations shall be replaced with bars of the same size at the Design-Build Team's expense.

Reinforcing steel exposed and cleaned by hydro-demolition will not require additional cleaning if encased in concrete within seven (7) days. Rebar exposed for more than seven (7) days shall be cleaned by high velocity water jets, with a minimum pressure 4,000 psi, prior to placement of the new concrete.

When large areas of the deck on composite bridges are removed resulting in the debonding of the primary reinforcing bars, the removal shall be performed in stages to comply with the construction sequence shown on the plans developed by the Design-Build Team or as directed by the Engineer.

- H. Safety: Provide a containment system for handling expected and unexpected blow thru of the deck. The containment system shall retain runoff water and debris and protect the area under the bridge deck. The Design-Build Team shall be responsible for any injury or damage caused by their operations. The containment system shall remain in place until the concrete has been cast and reach minimum strength.

Provide adequate lighting when performing hydro-demolition activities at night. Submit a lighting plan to the Engineer for approval prior to beginning work.

Removal of Debris: Removal of concrete debris shall be accomplished either by hand or mechanical means capable of removing wet debris and water in the same pass and after the hydro-demolition process to prevent debris from setting or adhering to the surface of the sound concrete. All concrete debris shall become the property of the Design-Build Team and shall be legally disposed of by the Design-Build Team's expense. The Design-Build Team shall be responsible for disposing of all debris generated by the scarification operations.

Any debris which is allowed to set or adhere to the surface of the sound concrete shall be carefully removed at no additional cost. Exercise care to avoid any damage to the remaining sound concrete or exposed reinforcement. Prior to the placement of the overlay, the entire surface shall be cleaned with high pressure water to remove any bond-breaking residue, loose material from the concrete surface, and / or rust from the reinforcing steel. This residue shall be collected and disposed of by the Design-Build Team.

## **CONCRETE FOR DECK REPAIR**

(12-18-12)

### **DESCRIPTION**

This provision addresses the material requirements of high early strength structural concrete to be used for reconstruction of Class III repairs.

### **MATERIALS**

Furnish Department approved pre-packaged concrete or bulk concrete materials in a mix proportioned to satisfy provisions for Class AA Concrete detailed in Section 1000-4 of the 2012 *Standard Specifications for Roads and Structures* or as otherwise noted in this Request for Proposals.

Concrete mix shall meet the following requirements:

Physical Property	Threshold Limitation	Test Method
Compressive Strength (at 3 hrs.)	4500 psi (min.)	ASTM C39/C109
Slump	4 in. (min.) 7 in. (max.)	AASHTO T119
Water to Cement Ratio	0.450 (max.)	N/A
Modulus of Elasticity (at 28 days)	5200 ksi (max.)	ASTM C469
Coefficient of Thermal Expansion (at 28 days)	4.5 in./in./°F (min.) 5.5 in./in./°F (max.)	AASHTO T336
Concrete Setting Times		
Initial	30 min. (max.)	ASTM C191
Final	40 min. (max)	

Concrete shall be capable of placement on existing concrete substrate surfaces within the following temperature limitations:

40° F (min.)

100° F (max.)

Measurement for determination of concrete material compositions shall be in accordance with Section 1000-8 of the 2012 *Standard Specifications for Roads and Structures*.

Submit pre-packaged concrete mix contents or concrete mix design, including laboratory compressive strength data, for a minimum of six 4-inch by 8-inch cylinders at an age of 3 hours and 1 day to the Engineer for review and acceptance. Include test results for the slump and air content of the laboratory mix. Perform tests in accordance with AASHTO T119 and T152.

Provide aggregates that are free from ice, frost and frozen particles when introduced into the mixer.

For equipment, proportioning and mixing of concrete compositions, see Section 1000-12 of the 2012 *Standard Specifications for Roads and Structures* and the *Volumetric Mixer* Project Special Provision found elsewhere in this RFP. Prior to beginning any work, obtain approval for all equipment to be used for joint area preparation, mixing, placing, finishing, and curing the deck repair concrete.

## **VOLUMETRIC MIXER**

**(12-18-12)**

### **DESCRIPTION**

This provision addresses the requirements for batching deck repair concrete at the point of delivery using a Mobile High Performance Volume Mixer (MHPVM). Work shall be in

accordance with the general requirements of Section 1000-12 of the 2012 *Standard Specifications for Roads and Structures*, and as amended by these provisions.

## **MATERIALS**

Produce high early strength concrete with MHPVM equipment. Furnish project site storage facilities that will provide protection of materials in accordance with the *Standard Specifications* and all material suppliers' recommendations.

## **EQUIPMENT**

MHPVM devices shall have prominently displayed stamped metal plate(s) from the Volumetric Mixers Manufacturers Bureau stating that the equipment conforms to the requirements of ASTM C685.

Hydraulic cement concrete shall be mixed at the point of delivery by a combination of materials and mixer unit conforming to the following:

1. The unit shall be equipped with calibrated proportioning devices for each ingredient added to the concrete mix. The unit shall be equipped with a working recording meter that shall be visible at all times and shall furnish a ticket printout with the calibrated measurement of the mix being produced. If at any time the mixer fails to discharge a uniform mix, production of concrete shall be suspended until such time that problems are corrected.
2. Each unit shall have prominently displayed stamped metal plate(s) attached by the manufacturer on which the following are plainly marked: the gross volume of the transportation unit in terms of mixed concrete, the discharge speed and the mass calibrated constant of the machine in terms of volume.
3. MHPVMs shall be calibrated by an NCDOT approved testing agency in accordance with the manufacturer's recommendations at an interval of every 6 months or a maximum production of 2500 cubic yards, whichever comes first prior to use on the project. The yield shall be maintained within a tolerance of +/- 1% and shall be verified using a minimum 2 cubic feet container every 500 cubic yards or a minimum of once per week.
4. The three cubic feet initially discharged from the truck shall be discarded and not used for concrete placement. Acceptance of the concrete shall comply with the 2012 *Standard Specifications for Roads and Structures* except that the sample secured for acceptance testing shall be taken after four cubic feet is discharged from the delivery vehicle. During discharge, the consistency, as determined by ASTM C143, on representative samples taken from the mixer discharge at random intervals shall not vary by more than 1-inch. Acceptance tests shall be performed on each load. If test data demonstrates that acceptable consistency of concrete properties is being achieved, the Engineer may reduce testing requirements.
5. MHPVM equipment shall be operated by a person who is a certified operator by the equipment manufacturer. Any equipment adjustments made during the on-site production of concrete shall be done under the direct on-site supervision of the producer's NCDOT Certified Concrete Batch Technician.

**UNIFORMITY AND ACCEPTANCE**

The Design-Build Team shall be responsible for providing a Certified Concrete Plant Technician during batching operations, and a Certified Concrete Field Technician during placing operations

**LATEX MODIFIED CONCRETE**

(8-9-13)

**DESCRIPTION**

This provision addresses the requirements for furnishing and placing an overlay of latex modified concrete (LMC) over existing concrete or repair concrete on bridge decks and approach pavement. Perform this work in accordance with this Special Provision and the applicable parts of the 2012 *Standard Specifications for Roads and Structures*.

**MATERIALS**

For materials, equipment, and proportioning and mixing of modified compositions, see Section 1000-7 of the 2012 *Standard Specifications for Roads and Structures*.

Provide aggregates for use in the LMC that are free from ice, frost, frozen particles or other contaminants when introduced into the mixer.

The 2012 *Standard Specifications for Roads and Structures* shall be revised as follows:

**1000-7(A)** – Add the following paragraph to the end of the section:

Submit the LMC mix design, including laboratory compressive strength data for a minimum of six 4-inch by 8-inch cylinders at the appropriate age (7 days for normal setting concrete; 3 hours for very early strength concrete) to the Engineer for review and acceptance. Include test results for the slump and air content of the laboratory mix. Perform tests in accordance with AASHTO T 22, T 119 and T 152.

**PREPARATION OF SURFACE**

Completely clean all surfaces within 48 hours prior to placing the overlay unless otherwise approved by the Engineer.

Thoroughly soak the clean surface and maintain a wet surface for at least 12 hours immediately prior to placing the LMC. After soaking the surface for at least 12 hours, cover it with a layer of white opaque polyethylene film that is at least 4 mils thick. Immediately prior to placing the LMC, remove standing water from the surface using an approved vacuum system.

**PLACING AND FINISHING**

Prior to placing LMC, install a bulkhead of easily compressible material at expansion joints to the required grade and profile. Placing material across expansion joints and sawing it later will not be permitted.

Construction joints will not be permitted unless approved by the Engineer. At construction joints, remove 4" of previously placed LMC prior to placing the adjacent latex concrete. Also, for staged construction, 4" of previously poured LMC shall be scarified, hydro-demolitioned and recast with the next stage.

Place and fasten screed rails in position to ensure finishing the new surface to the required profile. Do not treat screed rails with parting compound to facilitate their removal. Prior to placing the overlay attach a filler block to the bottom of the screed and pass it over the area to be repaired to check the thickness. The filler block thickness shall be equal to the design overlay thickness. Remove all concrete that the block does not clear. Individual aggregates left after hydro-demolition may be allowed to project above the base of the filler block. Remove aggregate that does not provide a 1" clear cover to the top of the overlay.

Brush a latex cement mixture onto all vertical surfaces and do not let the brushed material dry before it is covered with the additional material required for the final grade. Remove all loose aggregate from the latex cement brushed surface prior to latex concrete placement (NOTE: For surfaces not prepared with hydro-demolition brush the lean latex mixture over horizontal and vertical surfaces).

Do not place the LMC until the burlap is saturated and approved by the Engineer. Drain excess water from the wet burlap before placement.

Place the LMC in one operation. Provide a minimum overlay thickness of 1 1/4".

Once LMC placement begins a single layer of wet burlap shall be placed 5 feet behind the screed's burlap drag. In the event of a delay of 10 minutes or more, temporarily cover all exposed latex concrete with wet burlap and white opaque polyethylene.

When a tight, uniform surface is achieved and before the concrete becomes non-plastic, further finish the surface of the floor by burlap dragging or another acceptable method that produces an acceptable uniform surface texture.

Within 1 hour of covering with wet burlap, place a layer of 4 mil white opaque polyethylene film on the wet burlap and cure the surface for 48 hours. Then remove the curing material for an additional 48 hours air cure.

Screed rails or construction dams shall be separated from the newly placed concrete by passing a pointing trowel along the face of the formwork and the newly placed concrete. Carefully make this trowel cut for the entire depth and length of rails or dams after the LMC has sufficiently stiffened and cannot flow back.

As soon as practical, after the concrete has hardened sufficiently, test the finished surface with an approved rolling straightedge that is designed, constructed, and adjusted so that it will accurately indicate or mark all deck areas which deviate from a plane surface by more than 1/8" in 10'. Remove all high areas in the hardened surface in excess of 1/8" in 10' with an approved grinding or cutting machine. Additionally, the final LMC deck surface shall not deviate from the line and elevation indicated on the plans developed by the Design-Build Team by more than 0.3" over any 50' length. Where variations are such that the corrections extend below the limits of the top layer of grout, seal the corrected surface with an approved sealing agent as required by the Engineer. If approved by the Engineer, correct low areas in an acceptable manner.

Unless otherwise directed by the Engineer, groove the bridge floor in accordance with Article 420-14(B) of the 2012 *Standard Specifications for Roads and Structures*.

### **LIMITATIONS OF OPERATIONS**

The mixer shall not be permitted on the bridge deck unless otherwise approved by the Engineer.

No traffic will be permitted on the finished LMC surface until the total specified curing time is completed and until the concrete reaches the minimum specified compressive strength.

Do not place LMC if the temperature of the concrete surface on which the overlay is to be placed is below 50°F or above 85°F. Measure the surface temperature by placing a thermometer under the insulation against the surface.

Prior to placing LMC, the Engineer will determine the air temperature and wind speed. Do not place LMC if the ambient air temperature is below 50°F or above 85°F, or if the wind velocity is greater than 10 mph.

Do not place LMC when the temperature of the LMC is below 45°F or above 85°F.

Do not place LMC if the rate of evaporation of surface moisture from the LMC exceeds 0.05 pounds per square foot per hour during placement. The evaporation rate is calculated using the following formula:

$$E = (T_c^{2.5} - r \cdot T_a^{2.5}) \cdot (1 + 0.4V) \cdot (10^{-6})$$

where,

E = Evaporation Rate,

T<sub>c</sub> = Concrete Temp (°F),

r = Relative Humidity (%/100)

T<sub>a</sub> = Air Temp (°F),

V = Wind Velocity (mph)

Do not place LMC if the National Weather Service predicts the air temperature at the site to be below 35°F during the next 72 hours. If the predicted air temperature is above 35°F, but below 50°F, then use insulation to protect the LMC for a period of at least 48 hours. Use insulation that meets the requirements of Subarticle 420-7(C) and, if required, place it on the LMC as soon as initial set permits. When using insulation to protect LMC during the wet curing period, do not remove the insulation until the ambient air temperature is at least 50°F and rising. Leave the LMC uncovered for the 48 hour air curing period.

Stop all placement operations during periods of precipitation. Take adequate precautions to protect freshly placed LMC from sudden or unexpected precipitation. Keep an adequate quantity of protective coverings at the worksite to protect the freshly placed pavement from precipitation.

If working at night, provide approved lighting.



**SOUND BARRIER WALL**

(3-06-15)

**1.0 DESCRIPTION**

This work consists of furnishing precast panels, structural steel, concrete, 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 2012 *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 elevation between wall sections is 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 March 31, 2009 R-2250C Design Noise Report Memorandum provided by the Department and as superseded in the March 9, 2015 R-2250C Design Noise Report Memorandum – Addendum No. 1 provided by the Department.

**2.0 ALTERNATE PILE SPACING**

As an alternate, the Design-Build Team may submit plans for pile spacing greater than 10 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 March 31, 2009 R-2250C Design Noise Report Memorandum and as superseded in the R-2250C Design Noise Report Memorandum – Addendum No. 1. 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.

**3.0 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. 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.

#### **4.0 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 2012 *Standard Specifications for Roads and Structures*.

Provide precast panels that are nominally 4 inches  $\pm$  ¼ inch thick with a simulated stone masonry textured surface on both faces. All texture shall extend outward from the nominal panel thickness. Furnish three 24" x 24" samples for approval which establish the acceptable variations in color, texture and uniformity. After the color, texture and uniformity of the furnished samples are approved, produce a full scale panel unit meeting design requirements. This mock-up and the furnished samples establish the standard quality for determining acceptance 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.

#### **5.0 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.

##### **A. 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 2012 *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 1/4-inch.

#### B. 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 2012 *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.

### 6.0 WORKING DRAWINGS

In accordance with Article 1077-2 of the 2012 *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.

**ARCHITECTURAL CONCRETE SURFACE TREATMENT**

(1-28-15)

**1.0 GENERAL**

The work covered by this Project Special Provision shall consist of constructing a stained, simulated stone textured surface on both faces of pre-cast concrete panels used in sound barrier 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 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. The architectural concrete surface treatment shall match the appearance (size, shape, texture, pattern and relief) of an actual stone to resemble an “ashlar stone” pattern with panel staining on both sides to match the Grey Palette Color # FS 36152 found in the *Federal Standard 595B – Colors Used in Government Procurement*. All texture shall be in addition to the nominal thickness of the wall panels of four inches  $\pm$  ¼ inch. Maximum depth of textured surface shall not exceed 1½ inches. 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  
[www.scottssystem.com](http://www.scottssystem.com)  
Pattern: Ashlar Stone # C167C

Creative Form Liners, Inc.  
3411 Windom Road  
Brentwood, Maryland 20722  
[www.creativeformliners.com](http://www.creativeformliners.com)  
Pattern: Ashlar Stone # CFL-FF008

Architectural Polymers, Inc.  
1220 Little Gap Road  
Palmerton, Pennsylvania 18071  
[www.architecturalpolymers.com](http://www.architecturalpolymers.com)  
Pattern: Ashlar Stone # 904

The Design-Build Team has the option of supplying an alternative pattern of simulated ashlar 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 ashlar stone, joint locations, form tie locations, and end, edge or other special conditions. The drawings shall include typical cross sections of applicable surfaces, joints, corners, ashlar stone relief, ashlar 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 ashlar 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. The top 1'-0" of the top panel shall remain untreated. This portion shall have a smooth, non-textured finish, and remain in its natural concrete color.

Shop drawings shall be reviewed and accepted prior to fabrication of any form liners.

**Sample 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 2012 *Standard Specifications for Roads and Structures*. The sample panel(s) shall be constructed from 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 acceptance.

Architectural surface treatments and patterns of the finished work shall achieve the same final effect as demonstrated on the accepted sample panel(s). Upon acceptance by the Engineer, the sample panel(s) shall be used as the quality standard for the project. After the acceptance of the completed structure, the Design-Build Team shall dispose of the sample panels, as directed by the Engineer.

## 3.0 MATERIAL REQUIREMENTS

**Form Liner** – The form liner shall be a high quality, reusable product manufactured of high strength urethane rubber or other approved material which attaches easily to the form work system, and shall not compress more than 1/4-inch when concrete is poured at a

rate of ten vertical feet per hour. The form liners shall be removable without causing deterioration of the surface or underlying concrete.

**Form Release Agent** – Form release agent shall be a non-staining petroleum distillate free from water, asphaltic, and other insoluble residue, or an equivalent product. Form release agents shall be compatible with the color system applied and any special surface finish.

**Form Ties** – Form ties shall be set back a minimum of two inches from the finished concrete surface. The ties shall be designed so that all material in the device to a depth of at least two inches back of the concrete face (bottom of simulated mortar groove) can be disengaged and removed without spalling or damaging the concrete. The Design-Build Team shall submit the type of form ties to the Engineer for approval.

**Concrete Color System / Stain** – Special surface color system shall be performed using approved coloring systems / stains suitable for the purpose intended and applied in a manner consistent with the design intent of the project. The approved sample panel shall be the basis for determining the appropriate color / stain application.

Color stains shall be a special penetrating stain mix as provided by the manufacturer and shall be medium to dark gray to achieve a full, natural color in the finished surface. The stain shall create a surface finish that is breathable (allowing water vapor transmission), and that resists deterioration from water, acid, alkali, fungi, sunlight, and / or weathering. Stain mix shall meet the requirements for mildew resistance of Federal Test Method Standard 144, Method 6271, and requirements for weathering resistance of 1,000 hours accelerated exposure measures by Weatherometer, in accordance with ASTM G 26. Color samples shall be submitted for approval by the Engineer. Final coloring system and the Grey Palette Color # FS 36122 shall be subject to acceptance by the Engineer.

**Quality Standards** – Manufacturer of simulated ashlar stone form liners and custom coloring system shall have at least five years' experience making ashlar stone molds and color stains to create formed concrete surfaces to match natural ashlar 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 ashlar stone 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 ashlar stone manufacturer and final coloration 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 accepted 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 ashlar 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 ashlar 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 2012 *Standard Specifications for Roads and Structures*, except that curing of concrete shall be done to accommodate the application of coloring and surface finish treatment.

**Grout Pattern Joints** – Grout pattern joints shall be constructed to simulate the appearance of mortared joints produced in laid up masonry work. Grout pattern joints shall be produced in accordance with the form liner / concrete color system manufacturer.

**Color / Stain Application** – Finished concrete and patches shall stand in place 30 days after form liners are removed prior to application of coloring / staining agent. Maintain the concrete temperature between 40°F and 85°F during color / stain application and for

48 hours after color / stain application. Consult the manufacturer's recommendations for preparation, application, curing and storage of coloring agents / stains. The Design-Build Team shall provide a Color Application Artist who is trained in the special techniques to achieve realistic surface appearances, if requested by the Engineer. Treated surfaces located adjacent to exposed soil or pavement shall be temporarily covered to prevent dirt or soil splatter from rain.

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.

**\*\* NOTE \*\*** Deleted *Thermal Sprayed Coatings (Metallization)* Project Special Provision



**GENERAL**

The State will not be bound by oral explanations or instructions given at any time during the bidding process or after award. Only information that is received in response to this RFP will be evaluated; reference to information previously submitted will not suffice as a response to this solicitation.

**NO CONTACT CLAUSE**

To ensure that information is distributed equitably to all short-listed Design-Build Teams, all questions and requests for information shall be directed to the State Contract Officer through the Design-Build e-mail address. This precludes any Design-Build team member, or representative, from contacting representatives of the Department, other State Agencies or Federal Agencies either by phone, e-mail or in person concerning the Design-Build Project.

**USE OF TERMS**

Throughout this RFP and all manuals, documents and standards referred to in the RFP the terms Contractor, Bidder, Design-Builder, Design-Build Team, Team, Firm, Company and Proposer are synonymous.

Throughout this RFP and all manuals, documents and standards referred to in the RFP, the terms NCDOT, Department, Engineer and State are synonymous.

Throughout this RFP and all documents referred to in the RFP, references to the Technical Proposal include all Technical Proposal supplemental information that may be submitted in response to a Best and Final Offer RFP.

**DESIGN REFERENCES**

Design references developed and published by NCDOT and those developed and published by other agencies and adopted for use by NCDOT which are to be used in the design of this project may be obtained by contacting Contract Standards and Development Unit within the Technical Services 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 10 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 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. The Design-Build Team shall inform the Design-Build Unit in writing of any proposed changes to the NCDOT preliminary designs, Technical Proposal and / or previously reviewed submittals and obtain approval prior to incorporation. 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 Design-Build Project R-2250 will provide a four-lane divided facility from south of Old NC 11 to US 264. The project extends a distance of approximately 12.4 miles and is on new location.

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
  - **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**
- ✓ The R-2250 State Final Environmental Impact Statement (SFEIS) was approved on December 20, 2007.
- ✓ The R-2250 State Record of Decision (SROD) was approved on August 28, 2008.

**Construction Engineering Inspection will be provided by the NCDOT Division personnel or will be performed under a separate contract.**

## GENERAL SCOPE

The scope of work for this project includes design, construction and management of the project. The design work includes all aspects to construct a four-lane divided facility on new location from south of Old NC 11 to US 264, a distance of approximately 12.4 miles. 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 and Price Proposal submission date or the Best and Final Offer submission date.

Construction shall include, but not be limited to, all necessary clearing, grading, roadway, drainage, structures, utility coordination and relocation, and erosion and sediment control work items for the proposed four-lane facility and installation of the control of access fence. Construction engineering and management shall be the responsibility of the Design-Build Team.

Construction shall comply with 2012 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
- Hydraulic Design
- Permit Application
- Railroad Coordination
- Geotechnical
- GeoEnvironmental
- Foundation Design for Structures and Roadway
- Erosion and Sedimentation Control Design and Implementation
- Utility Construction
- R/W Utilities, Conflicts and / or Construction
- Transportation Management Plan Design and Implementation
- Pavement Marking Design
- Sign Design
- ITS Design
- Traffic Signal Design
- Construction
- Project Management
- Design and Construction Management
- Construction Surveying
- Location and Surveys
- Right of Way Acquisition
- Public 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 for constructing a four-lane divided facility on new location from south of Old NC 11 to US 264, a distance of approximately 12.4 miles, 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 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 structures that are different than the existing prequalification status must be prequalified prior to the Technical and Price Proposal submittal deadline. Subcontractors need only be prequalified prior to performing the work. Design firms should be prequalified prior to the Technical and Price Proposal submittal deadline. If not prequalified at the time of the Technical and Price 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. Design firms and Natural Systems firms are prequalified by the particular office performing the work. If the work is to be performed by an office other than the one that is prequalified, that office shall be prequalified prior to any design submittals.

## **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. The Design-Build Project Manager for each short-listed team shall provide a list of team members that will require access to this portal. This list

shall include the name, e-mail address and North Carolina Identity Management (NCID) for each individual team member. Once the list is complete, it shall be submitted to the Design-Build e-mail address (designbuild@ncdot.gov). No distribution of Provided Materials will be possible prior to this list being submitted and the access privileges established as noted herein.

To create an NCID account, each individual shall go to NCDOT's Connect website (<https://connect.ncdot.gov>) and click on the "How to get an Account" link and then, "Create NCID".

The Department will obtain access rights for these individuals and notify the Design-Build Project Manager accordingly. Individuals may then re-enter the "Connect" site and login with their NCID account. Once logged in, the Teamsite "R-2250 Project" 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 that are assembled in a portfolio. 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 or their subcontractors shall restrict such person or persons from working on any of the Design-Build Team's contracted projects in which the person or persons were "formerly involved" while employed by the State. The restriction period shall be for the duration of the contracted project with which the person was involved. *Former Involvement* shall be defined as active participation in any of the following activities:

- Drafting the contract
- Defining the contract scope
- Design-Build Team selection
- Negotiation of the contract cost (including calculating manhours or fees); and
- Contract administration

An exception to these terms may be granted when recommended by the Secretary and approved by the Board of Transportation.

Failure to comply with the terms stated above in this section shall 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.**

### **GENERAL**

Technical Proposals will be accepted until **4:00 p.m. Local Time on Tuesday, March 31, 2015**, at the office of the State Contract Officer. Technical Proposal Supplemental Information, requested as part of Addendum No. 4, and the Price Proposal will be accepted **until 4:00 p.m. on Monday, April 27, 2015**, at the office of the State Contract Officer:

Mr. Randy A. Garris, PE  
Contract Standards and Development  
1020 Birch Ridge Drive  
Century Center Complex - Building B  
Raleigh, NC 27610

**No Proposals will be accepted after the time specified.**

Proposals shall be submitted in two separate, sealed parcels containing the Technical Proposal / Technical Proposal Supplemental Information in one and the Price Proposal in the other parcel.

**TECHNICAL PROPOSAL**

Technical Proposals shall be submitted in a sealed package. The outer wrapping shall clearly indicate the following information:

Technical Proposal  
Submitted By: (Design-Build Team's Name)  
Design-Build Team Address  
Contract Number C 203609  
TIP Number R-2250  
Pitt County  
Greenville Southwest Bypass from south of Old NC 11 to US 264

If delivered by mail, the sealed envelope shall be placed in another sealed envelope and the outer envelope addressed to the Contract Officer as stated in the Request for Proposals. The outer envelope shall also bear the statement "Technical Proposal for the Design-Build of State Highway Contract No. C 203609".

**Technical Proposal Requirements**

12 Copies  
8 ½ inch by 11 inch pages  
No fold-out sheets allowed  
Printed on one side only  
Double-spaced  
Font size 12  
Minimal font size 10 is permissible within embedded tables, charts, or graphics. No more than 50 pages, excluding the introductory letter to Mr. Randy Garris, P.E. (two-page maximum length) and the 11 inch by 17 inch appropriate plan sheets -  
24 x 36 inch fold out sheets will only be allowed to present interchange plans

The aforementioned introductory letter to Mr. Randy Garris, P.E. shall include a statement acknowledging that the NCDOT may destroy all Technical Proposals not retained by the Department **or** 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. Randy Garris, PE, at the address below:

NCDOT- Contract Standards and Development  
Century Center Complex - Building B  
1020 Birch Ridge Drive  
Raleigh, NC 27610

**TECHNICAL PROPOSAL SUPPLEMENTAL INFORMATION**

Technical Proposal Supplemental Information shall be submitted in a sealed package. The outer wrapping shall clearly indicate the following information:

Technical Proposal Supplemental Information  
Submitted By: (Design-Build Team's Name)  
Design-Build Team Address  
Contract Number C 203609  
TIP Number R-2250  
Pitt County

Greenville Southwest Bypass from south of Old NC 11 to US 264

If delivered by mail, the sealed envelope shall be placed in another sealed envelope and the outer envelope addressed to the Contract Officer as stated in the Request for Proposals. The outer envelope shall also bear the statement "Technical Proposal Supplemental Information for the Design-Build of State Highway Contract No. C 203609".

**Technical Proposal Supplemental Information Requirements**

12 Copies  
8 ½ inch by 11 inch pages  
No fold-out sheets allowed  
Printed on one side only  
Double-spaced  
Font size 12

Minimal font size 10 is permissible within embedded tables, charts, or graphics. No more than three pages, excluding the introductory letter to Mr. Randy Garriss, P.E. (one page maximum length) and excluding the 11 inch by 17 inch appropriate plan sheets - 24 x 36 inch fold out sheets will only be allowed to present interchange plans

The aforementioned introductory letter to Mr. Randy Garriss, P.E. shall include a statement acknowledging that the NCDOT may destroy all Technical Proposal Supplemental Information not retained by the Department **or** that the NCDOT should return all Technical Proposal Supplemental Information not retained by the Department.

**PRICE PROPOSAL**

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 C 203609  
TIP Number R-2250  
Pitt County

Greenville Southwest Bypass from south of Old NC 11 to US 264



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.

If delivered by mail, the sealed envelope shall be placed in another sealed envelope and the outer envelope addressed to the Contract Officer as stated in the Request for Proposals. The outer envelope shall also bear the statement "Price Proposal for the Design-Build of State Highway Contract No. C 203609".

### **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 firm's understanding of the project, demonstrate the Team's capabilities to complete the project, document their selection of appropriate design criteria and state their approach and schedule for completing all design and construction activities.

The review of design plans by the Department is not intended to reflect a reviewer's personal preferences, but rather to ensure that all contract requirements are met, sound engineering judgment is exercised by the Design-Build Team, and that the Design-Build Team adheres to all referenced documents, including but not limited to, design standards, codes, memos and manuals. As such, the award of the Design-Build contract does not in any way imply that the NCDOT accepts the details of the Technical Proposal submitted by the Design-Build Team.

The Technical Proposal will be evaluated in each of the following major categories:

	<b>EVALUATION FACTORS</b>	<b>POINTS</b>
1.	Management	10
2.	Responsiveness to Request for Proposal	35
3.	Long Term Maintenance	7
4.	Schedule and Milestones	25
5.	Innovation	8
6.	Maintenance of Traffic and Safety Plan	10
7.	Oral Interview	5

**TECHNICAL PROPOSAL EVALUATION CRITERIA****1. Management – 10 points*****Design-Build Team Management***

- Describe the Design-Build Team's concept of design management. The proposal shall identify key positions and subordinate organizational units.
- Describe the plan for the coordination of civil / structural, utilities, traffic maintenance, constructability and environmental responsibility.
- Provide a narrative description of the proposed location of the design office(s) and their respective responsibilities.
- Describe how the designs developed by different firms and offices will be integrated.
- Describe how design personnel will interface with the construction personnel.
- Describe the overall strengths of the Design Team and their ability to fulfill the design requirements of this project.
- List projects, including description and similarity to the subject project that the Design-Build Team's designer(s) have developed Transportation Management Plans, Pavement Marking Plans and Signing Plans.

***Quality Management***

- Describe how the Design-Build Team will comply with the quality control requirements for both design and construction. Specifically, include a narrative describing the Design-Build Team's understanding of the Department's construction quality control philosophy for this project and how the Design-Build Team will implement it.
- The Design-Build Team should detail the number of inspectors they expect the Department to furnish, during various phases, to allow satisfactory progress of project construction.
- Describe any significant quality control issues experienced on NCDOT projects in the last ten years and how those issues will be addressed for this project.
- The narrative shall include both design and construction activities.

***Construction Management***

- 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.
- Provide a brief narrative description of the Design-Build Team's proposed plan for performing construction on the project. This description shall include at least the following:
  - A construction organization chart for the project, showing the relationships between functions shown on the chart and the functional relationships with subcontractors.

- The chart shall indicate how the Design-Build Team intends to divide the project into work segments to enable optimum construction performance.
- Descriptions of those categories of work 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.
- The Design-Build Team's plans and procedures to insure timely deliveries of materials to achieve the project schedule.
- Describe the overall strengths of the construction team and their ability to fulfill the construction and construction management requirements of this project.
- Describe the Design-Build Team's approach to site access and material staging.

## **2. Responsiveness to RFP – 35 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, riparian buffers and other environmentally sensitive areas. Describe any temporary impacts and associated minimization approaches.
- Describe the Design-Build Team's understanding of the overall approach to permitting and the Team's comfort level with obtaining the required permits within the allowed timeframe.
- Identify methods of construction in wetlands, streams and buffers.
- 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.
- Provide a narrative overview of the Design-Build Team's Vegetation Management Plan.

### ***Design Features***

- Show plan view of design concepts with key elements noted.
- Identify preliminary horizontal and vertical alignments of all roadway elements.
- Show mainline typical sections.
- Specify the mainline pavement Alternate chosen. The pavement Alternate chosen for the mainline will not be a part of the Technical Proposal evaluation and the selection thereof will not impact the Technical Scores; although an alternate pavement design, as approved as an ATC, may be considered in the evaluation.

- Specify the pavement option chosen for the mainline median and outside shoulders, if applicable.
- Specify the base option chosen (ABC or asphalt) for all -Y- Lines, ramps and service roads.
- If applicable, specify where all underlying longitudinal joints will be located and demonstrate how the underlying longitudinal joint location will minimize reflective cracking.
- Identify proposed deviations to the preliminary design provided by the Department.
- If applicable, specify the extent of impacts to properties with contaminated soils, indicating the anticipated contamination excavation limits.
- Identify drainage modifications and designs to be implemented.
- Identify the months the Department should schedule the 4B and 4C meetings.
- Identify the appropriate design criteria for each feature, if not provided herein.
- Identify all bridge types to be constructed, including any special design features or construction techniques needed.
- Identify any deviations, including proposed design exceptions, from the established design criteria that will be utilized. Explain why the deviation is necessary.
- 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 Scope of Work.
- Identify any special aesthetics considerations 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.
- Identify types of any retaining walls and / or sound barrier walls, if applicable.
- Provide a Preliminary Signing Concept Map that includes all proposed overhead sign structures and ground mounted guide signs.

### **3. Long Term Maintenance – 7 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 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.
- 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 schedule shall include the Design-Build Team’s committed durations for Intermediate Contract Time Nos. 5, 6 and 8.

## **5. Innovation – 8 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 – 10 points**

### ***Maintenance of Traffic***

- Describe any traffic control requirements 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.
- Identify any self-imposed liquidated damages and associated Intermediate Contract Time(s), if applicable.
- 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.
- If a temporary barrier system will be utilized, provide the type, duration and why it is needed.
- If temporary shoring will be required, provide the type and why it is required.
- Identify all proposed road closures and / or offsite detour routes; reason for need and duration.
- Address where and how law enforcement officers will be used.
- Describe the Design-Build Team’s approach to provide the public with communication access to project personnel to inquire as to traffic impacts, including vehicular and pedestrian.
- 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 Team's Technical Proposal, background, philosophies and project approach.
- Presentation, questions, and answers shall not exceed 90 minutes. No more than 10 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. Prior to the first partial payment, the Design-Build Team shall submit a document that provides additional warranty / guarantee specifics in sufficient detail that allows the document to be made a part of the contract through supplemental agreement.

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 proposals are responsive to the requirements of the Request for Proposals. 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 will 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 Proposal score for each Design-Build Team to the State Contract Officer.

#### **Quality Credit Evaluation Factors for Technical Proposals**

Management	10
Responsiveness to Request for Proposal	35
Long Term Maintenance	7
Schedule and Milestones	25
Innovation	8
Maintenance of Traffic and Safety Plan	10
Oral Interview	5
<b>Maximum Score</b>	<b>100</b>

The State Contract Officer will use a table based on the maximum quality credit percentage to assign a Quality Credit Percentage to each proposal based on the proposal's overall Technical Score. The maximum quality credit percentage for this project will be **30%**. The Technical Review Committee may elect to assign point values to the nearest one-half of a point (e.g. 90.5). In this event, the Quality Credit Percentage will be determined by linearly interpolating within the table entitled "Quality Credit Percentage for Technical Proposals".

**Quality Credit Percentage for Technical Proposals**

Technical Score	Quality Credit (%)	Technical Score	Quality Credit (%)
100	30.00	84	14.00
99	29.00	83	13.00
98	28.00	82	12.00
97	27.00	81	11.00
96	26.00	80	10.00
95	25.00	79	9.00
94	24.00	78	8.00
93	23.00	77	7.00
92	22.00	76	6.00
91	21.00	75	5.00
90	20.00	74	4.00
89	19.00	73	3.00
88	18.00	72	2.00
87	17.00	71	1.00
86	16.00	70	0.00
85	15.00		

**The maximum Technical Score, including any extra credit given for warranties or guarantees, shall not exceed 100 points in determining the Quality Credit percentage.**

If any of the Technical Proposals are considered non-responsive, the State Contract Officer will notify those Design-Build Teams of that fact. The State Contract Officer shall publicly open the sealed Price Proposals and multiply each Design-Build Team's Price Proposal by the Quality Credit Percentage earned by the Design-Build Team's Technical Proposal to obtain the Quality Value of each Design-Build Team's Technical Proposal. The Quality Value will then be subtracted from each Design-Build Team's Price Proposal to obtain an Adjusted Price based upon Price and Quality combined. Unless all Proposals are rejected or the Department elects to proceed with the Best and Final Offer process, the Department will recommend to the State Transportation Board that the Design-Build Team having the lowest adjusted price be awarded the contract. The cost of the Design-Build contract will be the amount received as the Price Proposal.



The following table shows an example of the calculations involved in this process.

### **An Example of Calculating Quality Adjusted Price Ranking**

<b>Proposal</b>	<b>Technical Score</b>	<b>Quality Credit (%)</b>	<b>Price Proposal (\$)</b>	<b>Quality Value (\$)</b>	<b>Adjusted Price (\$)</b>
A	95	25.00	3,000,000	750,000	2,250,000
B	90	20.00	2,900,000	580,000	2,320,000
C *	90	20.00	2,800,000	560,000	2,240,000
D	80	10.00	2,700,000	270,000	2,430,000
E	70	0.00	2,600,000	0	2,600,000
* Successful Design-Build Team – Contract Cost \$2,800,000					

### **Opening of Price Proposals**

Prior to opening the Price Proposals, the State Contract Officer will provide to each Design-Build Team their Technical Score in a sealed envelope. The sealed envelope will contain that Team's score only.

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 Proposal, Technical Score and Adjusted Price 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 to not 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 of 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 their Technical Proposal details. 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 total 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.

### **Technical Proposal Supplemental Information**

As requested as part of Addendum No. 4, the Department will accept Technical Proposal Supplemental Information. If provided, this supplemental information shall include sufficient information to clearly identify those items, including construction procedures, that have changed from the original Technical Proposal. The Technical Proposal Supplemental Information shall only reflect changes made to address revisions to the Final RFP in Addendum No. 4. The Technical Proposal Supplemental Information shall not change the overall contract time, warranty provisions or team members. In accordance with the Technical Proposal evaluation criteria, the Department will only evaluate those design features and / or construction methods provided in the Technical Proposal Supplemental Information that address revisions to the Final RFP made as part of Addendum No. 4.

If the Design-Build Proposal is accepted and the Award is made, both the Technical Proposal and Technical Proposal Supplemental Information submitted by the Design-Build Team shall be, by reference, incorporated and made part of this contract.

**Stipend**

A stipulated fee of **\$100,000** 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 award of the contract 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 Design-Build Proposal submittal date current at the time of the suspension, no stipulated fee will be paid.

**ROADWAY SCOPE OF WORK** (4-20-15)

**It should be noted that TIP Project R-2250, as referenced throughout this Request for Proposals, represents projects that were formerly designated as TIP Projects R-2250A, B & C. All references to TIP Projects R-2250A, B & C in material provided by the Department shall apply to this project.**

**Throughout this Request for Proposals, references to the Preliminary Roadway Plans shall include the R-2250A, B & C Preliminary Roadway Plans provided by the Department.**

**Project Details**

- The Design-Build Team shall design and construct a four-lane divided facility from south of Old NC 11 to US 264. Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall design and construct the -L- Line providing the same or better access, widening, improvements and level of service included in the Preliminary Roadway Plans provided by the Department. The limits of -L- Line construction shall be of sufficient length to tie to existing based upon the current NCDOT guidelines and standards. Throughout the entire project limits, the mainline (-L- Line) shall be designed and constructed to meet a 70 mph design speed for a level terrain freeway designed to interstate standards. The Design-Build Team shall provide all other design criteria, based on the 2040 traffic volumes in the October 2014 *Traffic Forecast Report* and the NCDOT *Functional Classification Maps*, in the Technical Proposal.
- Throughout the entire project limits, the Design-Build Team shall design and construct minimum 14-foot total outside shoulders (12' 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) along the mainline. Throughout the entire project limits, the Design-Build Team shall design and construct minimum six-foot median shoulders, four-foot of which shall be full depth paved shoulders along the mainline. From the beginning of the project to Station 57+75 -L-, the Design-Build Team shall maintain the existing median width along the mainline. Excluding from the beginning of the project to Station 57+75 -L-, the Design-Build Team shall design and construct a minimum 46-foot median along the mainline.
- Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall design and construct -Y- Lines, ramps, loops, service roads and cul-de-sacs providing the same or better access, widening, improvements and level of service included in the Preliminary Roadway Plans provided by the Department. The limits of -Y- Line construction shall be of sufficient length to tie to existing based upon the current NCDOT guidelines and standards.
- The Design-Build Team shall design and construct all -Y- Lines such that the through movement is not required to change lanes through the project limits.
- If the Design-Build Team elects to build a diamond or partial clover-leaf interchange at NC 102, Forlines Road (SR 1126), and / or US 13 / US 264 Alternate, the Design-Build Team shall adhere to the following:
  - The Design-Build Team shall design and construct a consistent typical section width between ramp terminals.

- The Design-Build Team shall prepare functional horizontal and vertical designs for a future full cloverleaf interchange (ramps and loops in all quadrants). The loops shall be designed for a minimum 30 mph design speed. The minimum loop radius shall be 230 feet, or the length required to adhere to the turn lane length requirements noted elsewhere in this RFP, whichever is greater.
- The Design-Build Team shall design and construct all bridges (at interchanges and grade separations for required future continuous auxiliary lanes, if necessary) to allow / accommodate the aforementioned future full cloverleaf interchange. (Reference the Structures Scope of Work found elsewhere in this RFP)
- The Design-Build Team shall make a determination of, and acquire, the additional right of way required for the aforementioned future full cloverleaf interchange. (Reference the Right of Way Scope of Work found elsewhere in this RFP)
- The Design-Build Team shall relocate / coordinate the relocation of utilities in conflict with the aforementioned future full cloverleaf interchange. (Reference the Utilities Coordination Scope of Work found elsewhere in this RFP)
- The Design-Build Team shall design and construct NC 102 as an arterial with a 50 mph design speed. From NC 11 westward to the furthest Quadrant A or B ramp, the Design-Build Team shall install 2'-6" curb and gutter with a ten-foot berm along both sides of NC 102.
- Beneath all mainline bridges over -Y- Lines that are not otherwise improved, the Design-Build Team shall design and construct a typical section equal to the lane and shoulder widths required by design criteria that is based on the 2040 traffic volumes in the October 2014 *Traffic Forecast Report* and the NCDOT *Functional Classification Maps*. The Design-Build Team will not be required to design or construct a resurfacing grade for the aforementioned -Y- Lines.
- Excluding the ramps in Quadrants A and D of the US 264 interchange (Ramps -Y21RPA- and -Y21RPD-), the Design-Build Team shall design and construct ramps that adhere to the following:
  - One-lane ramps shall have a minimum 16-foot lane width
  - Two lane ramps shall have a minimum 12-foot lane width
  - One-lane and two-lane 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 include 1) all preconstruction costs required to modify the ramps in Quadrants A and D of the US 264 interchange (Ramps -Y21RPA- and -Y21RPD-) to adhere to all design criteria noted herein and 2) all resurfacing construction costs for Ramps -Y21RPA- and -Y21RPD- in the lump sum price bid for the entire project. All other construction costs associated with the aforementioned ramp modifications will be paid for as extra work in accordance with Subarticle 104-8(A) of the 2012 *Standard Specifications for Roads and Structures*. (Reference the Pavement Scope of Work found elsewhere in this RFP)
- If the end of the taper on an entrance ramp is within 2,500 feet of the beginning of the taper for an exit ramp, the Design-Build Team shall design and construct a continuous auxiliary lane between the entrance and exit ramps.
- Excluding the ramps in Quadrants B and C of the US 264 interchange, the Design-Build Team shall design and construct all directional ramps with a minimum of two 12-foot lanes from back of gore to back of gore (12-foot width). The minimum design speed for all directional ramps shall adhere to the middle range design speed noted in Table 10-1, *Guide Values for Ramp Design Speed as Related to Highway Design Speed* shown in AASHTO's *A Policy on Geometric Design of Highways and Streets* (2011). The Design-Build Team shall design and construct all directional ramp structures 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 Table 3-29, *Design Widths of Pavements for Turning Roadways*, shown in AASHTO's *A Policy on Geometric Design of Highways and Streets* (2011) - 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. Excluding loops in Quadrants A and D of the US 264 interchange, 1) the minimum loop design speed shall be 30 mph, and 2) the minimum loop radius shall be 230 feet, or the length required to adhere to the turn lane length requirements noted elsewhere in this RFP, whichever is greater. (The Design-Build Team will not be required to replace / modify the loop in Quadrant C of the US 264 interchange.)

- 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 mainline) 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 edge of travel lane.
  - The four ramp channelization islands shall be raised grass islands bordered with 2'-6" curb and gutter.
  - Between the DDI crossovers, the Design-Build Team shall provide a minimum ten-foot wide pedestrian accommodation 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 TL-2 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.
  - The curves approaching / departing the crossovers shall slope from the median to the outside at a 0.02 cross slope.
- The mainline grade point shall be located at the median edge of the lane. In a normal crown section, the mainline lanes shall slope in the same direction from the pavement edge adjacent to the median shoulder to the outside edge of pavement at a 0.025 cross slope.

- Excluding two-lane and four-lane roadways crowned at the centerline of pavement, the Design-Build Team shall design and construct all -Y- Lines and service roads with a 0.025 cross slope in normal crown sections.
- Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall design and construct all at-grade intersections with the lane configurations noted in the January 28, 2015 Congestion Management Report provided by the Department. Except that 1) the Design-Build Team will not be required to improve the NC 11 / Old Snow Hill Road intersection lane configuration and 2) at the NC 11 / NC 102 intersection, the Design-Build Team will not be required to design or construct the NC 102 westbound exclusive left turn or right turn lanes, as shown in the aforementioned Report. At all intersections impacted by the Design-Build Team's design and / or construction, excluding resurfacing, the Design-Build Team shall design and construct turn lanes that adhere to the greater of the following:
  - All turn lane lengths shall adhere to the NCDOT 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 January 28, 2015 Congestion Management Report, and as superseded in the March 16, 2015 Congestion Management Report – Addendum No. 1, 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 Congestion Management Report and Addendum; the minimum deceleration length, as defined in the NCDOT Roadway Design Manual (Reference Section 9-1, Figure F-4A); and the approach / departure taper.
  - Right turn lanes / tapers shall be provided in accordance with the NCDOT Right Turn Lane Warrants, as defined in the Roadway Design Manual (Reference Section 9-1, Figure F-4C).
- For all intersection / interchange design modifications, the Design-Build Team shall provide a traffic analysis that adheres to the January 1, 2012 Congestion Management Capacity Analysis Guidelines for the Department's review and acceptance.
- 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 5-inch keyed-in concrete monolithic channelization islands.
- Within the interchange limits of all three-lane facilities, the Design-Build Team shall design and construct a minimum four foot wide 5-inch keyed-in concrete monolithic channelization island.
- The minimum width of all grass covered islands / medians shall be eight feet, measured face to face from the surrounding mountable concrete curb and gutter or from edge of pavement to edge of pavement, as appropriate. All grass covered islands shall be 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 islands 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 with the typical section, topsoil specifications and construction details. Within

all proposed grass covered island limits, the Design-Build Team shall completely remove and dispose of the existing pavement structure.

- The mainline is a full control of access facility, including but not limited to the section of existing NC 11 between proposed Old NC 11 (-Y5-) and Old Snow Hill Road (SR 1113 / -Y6-). The Design-Build Team shall bring to the Design-Build Unit's attention any deviations from the proposed control of access shown on the Preliminary Roadway Plans provided by the Department. The proposed right of way and / or control of access limits may deviate in proximity to cultural, historic, or otherwise protected landmarks, including cemeteries, to eliminate / minimize impacts. Prior to negotiating right of way, easement and / or control of access with the 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:
  - With the exception of within subdivision limits, the Design-Build Team shall install woven wire fence.
  - Within existing subdivision limits, the Design-Build Team shall install 5 foot chain-link fence.
  - Except as required otherwise above, the Design-Build Team shall replace, in kind all control of access fence damaged during construction.
  - Except as required otherwise above, the Design-Build Team shall install all missing control of access fence, matching the adjacent fence type.
- The Design-Build Team shall not impact any cemetery located within the project limits. The proposed right of way, easement and / or control of access limits shall not encroach on any cemetery property.
- Within the project limits, the Design-Build Team shall locate and install metal caps with fiberglass markers for all parcels. The aforementioned markers shall delineate all proposed right of way and permanent easements. The Design-Build Team shall replace all existing right of way and easement markers / monuments damaged and / or relocated during construction. In accordance with the NCDOT Policy, the Department will furnish the metal caps with fiberglass markers.
- 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, including maintaining the horizontal and vertical alignments on the aforementioned preliminary plans through the Renston Historic District. The Design-Build Team shall not acquire right of way or easements from the aforementioned features unless shown on the Preliminary Roadway Plans provided by the Department.



- 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 January 2012 Roadway Standard Drawings.
- For all bridges over roadways, the Design-Build Team shall submit vertical and horizontal clearance design calculations at all critical points. The Design-Build Team shall submit post construction survey points for the aforementioned critical points to verify that the 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.
- The Design-Build Team shall design and construct the sound barrier wall listed in the March 31, 2009 R-2250C Design Noise Report Memorandum, and as superseded in the March 9, 2015 R-2250C Design Noise Report Memorandum – Addendum No. 1, and perform any additional geotechnical investigation necessary to design the foundation. The Design-Build Team shall be responsible for the wall envelope details. If the Design-Build Team revises the horizontal and / or vertical alignments such that greater noise impacts are possible on surrounding receptors, the Design-Build Team shall re-analyze and complete a revised noise report that adheres to current guidelines / policy, if necessary, for NCDOT review and acceptance. The R-2250C Final Design Noise Report will be provided to the Design-Build Team to assist in their determination of anticipated additional noise impact on current receptors due to design changes. If adjustments to, or addition of, sound barrier walls are required as a result of design deviations, the Design-Build Team shall be responsible for all costs associated with the adjustments and / or additions.
- 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 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 2012 *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 design and construct all 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 service roads with two 12-foot lanes and six-foot minimum

shoulders with a Type “B” ditch as per the *Roadway Design Manual*. (Note that the Design-Build Team will not be required to design or construct Service Road -SR10- shown on the Design Public Hearing Map & Official Corridor Map south of the Norfolk Southern Railway.)

- Excluding haul roads and -Y- Lines noted elsewhere in this RFP, the Design-Build Team shall design and construct resurfacing grades for all roadways impacted by construction. All resurfacing grades shall adhere to the design criteria and standards, provide all required pavement wedging (Reference the Pavement Management Scope of Work found elsewhere in this RFP) and adhere to the minimum requirements noted below:
  - The Design-Build Team shall resurface all lanes and shoulders of an undivided facility throughout the limits of proposed widening and construction.
  - The Design-Build Team shall resurface each one-way roadway of a divided facility throughout the limits of the one-way roadway widening and construction, allowing varying resurfacing limits for the opposing directions of travel.
  - 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 any gaps along the facility where construction activities are not required (e.g. along existing NC 11 between the Greenville Southwest Bypass interchange and the NC 11 / NC 102 intersection improvements). The aforementioned resurfacing limits will not be required to extend to the four proposed Dynamic Message Sign installations (Reference the ITS Scope of Work found elsewhere in this RFP).
  - The Design-Build Team shall resurface all existing facilities to the limits of pavement marking obliterations / revisions.
- The Design-Build Team shall provide turn-arounds on all roads that are dead-ended.
- 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, 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 shall 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.
- Excluding the horizontal clearance beneath the MacGregor Downs Road bridge, design exceptions will not be allowed for the -L- Line, including all ramps and loops. NCDOT prefers not to have design exceptions for the -Y- Lines and service roads. If the Design-Build Team anticipates any design exceptions, they shall be clearly noted in the Technical Proposal. Prior to requesting / incorporating a design exception into the Final Plans, 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.

### **General**

- The design shall be in accordance with the 2011 AASHTO *A Policy on Geometric Design of Highways and Streets*, 2002 NCDOT *Roadway Design Manual*, including all revisions effective on the Technical Proposal submittal date, January 2012 NCDOT Roadway Standard Drawings, or as superseded by detail sheets located at <https://connect.ncdot.gov/resources/Specifications/Pages/2012-Roadway-Drawings.aspx>, *Roadway Design Policy and Procedure Manual*, *Roadway Design Guidelines for Design-Build Projects*, 2012 *North Carolina Standard Specifications for Roads and Structures* and the 2011 AASHTO *Roadside Design Guide*, 4<sup>th</sup> Edition and 2012 Errata.
- If the NCDOT *Roadway Design Manual*, the 2011 AASHTO *A Policy on Geometric Design of Highways and Streets*, the 2012 *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 otherwise noted 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.
- At all intersections, the Design-Build Team shall provide a maximum 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, the Design-Build Team shall design and construct bridge rail offsets as indicated in the NCDOT *Roadway Design Manual* or that are equal to the approach roadway paved shoulders, whichever is greater. Narrower bridge rail offsets based on bridge length will not be allowed.
- Unless noted otherwise elsewhere in this RFP, the maximum allowable cut and fill slope shall be 3:1. (Reference the Geotechnical 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 web site.

- 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, removal of the existing embankments supporting all removed roadway sections.
- Unless noted otherwise elsewhere in this RFP, all guardrail / guiderail placement shall be in accordance with the January 2012 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. The guardrail / guiderail design shall be submitted for review with the Preliminary 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 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.
- The Design-Build Team shall submit Structure Recommendations and Design Criteria for NCDOT review and acceptance prior to the Preliminary Roadway Plans submittal. The Design-Build Team shall develop Structure Recommendations that adhere to the format noted in the March 25, 2003 and September 1, 2004 memos from Mr. Jay Bennett, PE, former State Roadway Design Engineer.
- 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 2011 AASHTO *A Policy on Geometric Design of Highways and Streets*, or the anticipated / actual posted speed plus five mph. If a speed limit is not physically posted on an existing facility, General Statutes mandate the speed limit as 55 mph, resulting in a 60 mph design speed.
- Within the vehicle recovery area, the Design-Build Team shall design and construct single face concrete barrier in front of all sound barrier walls, retaining walls and all elements acting as retaining walls located on the outside shoulder in fill sections. The aforementioned

concrete barrier shall be located beyond the typical section shoulder point, requiring the Design-Build Team to widen the outside shoulder beyond the typical section width.

- At all -Y- Line / -Y- Line intersection radius points, including service roads, the minimum lane width for the secondary roadway shall be 15 feet.
- At all intersections impacted by the Design-Build Team's design and / or construction methods, excluding resurfacing, the following design vehicles shall be required for all turning movements:
  - WB-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
- Unless noted otherwise elsewhere in this RFP, all roundabouts shall adhere to the design and operation parameters as detailed in *Roundabouts: An Informational Guide*, Second Edition (NCHRP Report 672). Prior to incorporation, the Design-Build Team shall provide a traffic analysis of the proposed roundabout(s), utilizing the 2040 projected traffic volumes and SIDRA Intersection 5.1 analysis software, for NCDOT review and acceptance. All roundabouts shall be designed and constructed to accommodate a WB-67.
- 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.
- Excluding grades required to tie to existing, the minimum longitudinal grade shall be 0.30%.
- The Department has followed the Merger 01 Process used by the Environmental Agencies and the Department to obtain environmental permits. Any variations in the Department's proposed design and / or construction methods that nullify any Concurrence Points obtained or 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.
- Excluding parcels restricted by Control of Access, 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 that 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.
- The maximum driveway grade shall be 10%.
- 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 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.
- Shoulder berm gutter shall not be installed in cut sections.
- At all locations with paved shoulders that extend beyond the typical width (i.e. to the face of single face barrier and 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)
- Cut and fill slope transitions shall not exceed one increment (i.e. 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 R-2250 State Final Environmental Impact Statement (FEIS) and R-2250 State Record of Decision (SROD), 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 the Preliminary Roadway Plans developed by the Department. The Design-Build Team is cautioned that the preliminary designs shown on these plans are provided solely to assist the Design-Build Team in the development of the project design. The Design-Build Team shall be fully and totally responsible for the accuracy and completeness of the project design, including, but not limited to, the use of the NCDOT's design, the use of portions of the NCDOT's design or modifications to the NCDOT's design.
- The NCDOT will provide 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. The Design-Build Team shall modify / incorporate boundary information used for the determination and valuation of property solely under the direct supervision of a Professional Land Surveyor registered in North Carolina. Known existing utilities have been located and will be included with the survey data. The Design-Build Team shall be responsible for confirming the location of the utilities and the type / size of facilities. All supplemental Subsurface Utility Engineering (SUE) work shall be the responsibility of the Design-Build Team.
- The NCDOT will provide the R-2250 electronic design files.
- The NCDOT will provide final pavement designs for R-2250. The Design-Build Team shall be responsible for all temporary pavement designs. (Reference the Pavement Management Scope of Work found elsewhere in this RFP).
- The NCDOT will provide a Geotechnical Subsurface Investigation for R-2250. 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)

**PAVEMENT MANAGEMENT SCOPE OF WORK** (3-16-15)

**MAINLINE WIDENING**

From the southern project limits to the beginning of new mainline (-L- Line) travel lanes (≈ Sta. 75+46 -L-), the Design-Build Team shall use the following pavement design for construction of the mainline (-L- Line) widening, including outside and median shoulders:

3.0” S9.5C  
3.0” I19.0C  
5.0” B25.0C

Throughout the limits noted above, the Design-Build Team shall resurface the existing mainline pavement with a minimum 3.0” S9.5C. (Reference the Roadway Scope of Work found elsewhere in this RFP)

From the end of new mainline (-L- Line) travel lanes to the northern project limits (the northern termini of the -Y21RPA- and -Y21RPD ramp tapers), the Design-Build Team shall use one of the following pavement designs for construction of the mainline (-L- Line) widening, including outside and median shoulders:

<u>Alternate 1</u>	<u>Alternate 2</u>
3.0” S9.5C	3.0” S9.5C
3.0” I19.0C	3.5” I19.0C
5.5” B25.0C	10.0” ABC

Throughout the limits noted above, the Design-Build Team shall resurface the existing mainline pavement with a minimum 3.0” S9.5C. (Reference the Roadway Scope of Work found elsewhere in this RFP)

**MAINLINE NEW LOCATION**

From the beginning of new mainline (-L- Line) travel lanes (≈ Sta. 75+46 -L-) to the end of the project, the Design-Build Team shall use one of the following alternates for construction of the mainline (-L- Line) travel lanes:

<u>Alternate 1</u>	<u>Alternate 2</u>	<u>Alternate 3</u>
3.0” S9.5C	3.0” S9.5C	10.0” Concrete
3.0” I19.0C	3.5” I19.0C	6.0” ABC
5.5” B25.0C	10.0” ABC	

For Alternates 1 and 2 the mainline outside and median paved shoulders shall consist of the mainline travel lane pavement design.

For Alternate 3, the joints shall be uniformly spaced 15 feet apart and the mainline outside and median paved shoulders shall consist of 3.0” S9.5C, 3.0” I19.0C and minimum 4.0” B25.0C.

For the mainline new location section, the pavement alternate chosen for the mainline travel lane and shoulder shall be used for the entire section. If the Design-Build Team choses an asphalt pavement design for the mainline new location pavement, the Design-Build Team shall chose the same pavement design for the northern mainline widening pavement. The Design-Build Team shall specify the mainline travel lane and shoulder pavement alternates chosen in the Technical Proposal.



## OTHER REQUIREMENTS

Other pavement designs for this project shall be as listed in the table below:

<b>** LINE</b>	<b>Surface</b>	<b>Intermediate</b>	<b>Base</b>	<b>ABC</b>
-FLYBY7 2- and -RCY7 2-	3.0" S9.5C	3.0" I19.0C	-----	8.0"
-Y5- (Old NC 11)	3.0" S9.5B	-----	-----	* 8.0"
-Y6- (SR 1113)	3.0" S9.5B	-----	4.0" B25.0B	-----
-Y8- (NC 102), -RPAY8-, -RPBY8-, -RPCY8- and -RPDY8-	3.0" S9.5B	2.5" I19.0B	-----	8.0"
-Y10- (SR 1117)	3.0" S9.5B	-----	4.0" B25.0B	-----
-Y11- (NC 903)	3.0" S9.5B	-----	5.0" B25.0B	-----
-Y12- (SR 1125)	3.0" S9.5B	2.5" I19.0B	-----	8.0"
SR 1118, Cheek Farm Road	1.5" SF9.5A	-----	-----	* 8.0"
-Y14- (SR 1126), -Y14RPA-, -Y14RPB-, -Y14RPC- and -Y14RPD-	3.0" S9.5B	2.5" I19.0B	-----	8.0"
-Y17- (US 13 / US 264 ALT), -Y17LPA- and -Y17LPC-	3.0" S9.5B	4.0" I19.0B	-----	8.0"
-Y17RPA-, -Y17RPB-, -Y17RPC- and -Y17RPD-	3.0" S9.5B	2.5" I19.0B	-----	8.0"
SR 1128	3.0" S9.5B	2.5" I19.0B	-----	8.0"
Connection between existing SR 1128 and SR 1128	2.0" SF9.5A	-----	-----	* 8.0"
SR 1206, Bell Arthur Road	3.0" S9.5B	-----	4.0" B25.0B	-----
-Y19- (SR 1127)	3.0" S9.5B	-----	-----	* 8.0"
-Y20- (SR 1200)	3.0" S9.5B	2.5" I19.0B	-----	8.0"
-Y21- (US 264)	3.0" S9.5C	4.0" I19.0C	5.5" B25.0C	-----
-Y21RPB-, -Y21RPC-, -Y21LPA-, -Y21LPB- and -Y21LPD-	3.0" S9.5C	4.0" I19.0C	-----	8.0"
All Service Roads	2.0" SF9.5A	-----	-----	* 8.0"

\* Prime coat required.

\*\* Alignment as denoted on the Design Public Hearing Map & Official Corridor Map provided by the Department.

Warm mix asphalt will be allowed.

For the -Y- Lines noted in the table above, the Design-Build Team may substitute an asphalt base course layer for an ABC layer. If such an alternative is proposed, the Design-Build Team shall use an asphalt base course mix that matches the asphalt base course mix specified for the roadway. If an asphalt base course mix is not specified, the Design-Build Team shall use B25.0B 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.

For the -Y- Lines noted in the table 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 thickness specified for the roadway. If the asphalt surface course is placed directly on the ABC layer, the Design-Build Team shall apply prime coat.

The Design-Build Team shall maintain the same pavement design throughout the -Y- Line construction limits. In the Technical Proposal, the Design-Build Team shall specify the base option chosen (ABC or asphalt) for all -Y- Lines. The Design-Build Team may substitute an asphalt base course layer for an ABC layer, as described above, for tie-ins and narrow widening.

Throughout the entire ramp / loop limits, the Design-Build Team shall resurface the existing pavement on -Y21RPA-, -Y21RPD- and -Y21LPC- with a minimum 3.0" S9.5C. For all other -Y- Lines, the Design-Build Team shall resurface the existing pavement with a minimum pavement depth that equals the full thickness of surface course as provided in the table above. (Reference the Roadway Scope of Work found elsewhere in this RFP)

On all 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 six 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 approval. Tapers that tie proposed pavement to existing pavement are excluded from the narrow widening requirements noted above.

In areas where the existing 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.

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. Temporary pavements shall be designed in accordance with the most recent version of the North Carolina DOT *Pavement Design Procedure*. Temporary pavement designs and associated calculations shall be submitted for review and comments 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.

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 SF9.5A) and 8" ABC. 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 SF9.5A) and 8" ABC with prime coat.
- For existing concrete driveways, use 6" jointed concrete reinforced with woven wire mesh.

The rate of application and the maximum and minimum thickness per application and layer shall be in accordance with the NCDOT Roadway Design Manual.

Shoulder drains will not be required.

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 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" of ABC (or 4" B25.0B or B25.0C), a split seal and 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.

When a 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 features(s). 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, the Design-Build Team shall perform incidental milling for a minimum distance of 25 feet at bridges and six feet at curb sections. 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 (ATCs) that provide an alternate **mainline** pavement design will be considered subject to the following restrictions:

- ATCs on pavement design will only be permitted on the mainline and shall not be submitted until after issuance of the Final Request for Proposals.
- Unless noted otherwise elsewhere in this RFP, the pavement design in the ATC shall be determined using one of the methods noted below:
  1. The NCDOT Interim Pavement Design Procedure dated April 1, 2000, as modified by Modifications to the April 2000 Interim Pavement Design Procedure dated November 2007 using a minimum 30-year design life.
  2. The AASHTOWare Pavement ME Design Software, Version 2.0, Build 2.0.19. Unless clear and convincing supporting documentation is provided, the pavement design in the ATC shall incorporate the design parameters that will be provided with issuance of the Final Request for Proposals:

Parameter	Greenville Southwest Bypass
Design Life	30 years
Reliability	90%
<b>Asphalt Pavement</b>	
Total Rutting	0.50 inch
AC Rutting	0.25 inch
Top Down Cracking	1000 feet / mile
Bottom Up Cracking	10%
IRI (30 year design life)	185 inch / mile
<b>Concrete Pavement</b>	
Faulting	0.15 inch
Slab Cracking	10%
IRI (30 year design life)	185 inch / mile

- The pavement design in the ATC must be sealed by a professional engineer who 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 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 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)

**STRUCTURES SCOPE OF WORK** (3-16-15)**Project Details**

The Design-Build Team shall be responsible for all structures necessary to complete the project, including at the following locations:

- Bridge(s) at NC 11 southbound (-FLYBY7\_2) and the -L- Line
- Bridge(s) at Old Snow Hill Road (SR 1113) and the -L- Line
- Bridge(s) at NC 102 and the -L- Line
- Dual bridges on the -L- Line over Abbott Farm Road (SR 1117)
- Dual bridges on the -L- Line over NC 903
- Bridge(s) at Pocosin Road (SR 1125) and the -L- Line
- Bridge(s) at Forlines Road (SR 1126) and the -L- Line
- Bridge(s) at Davenport Farm Road (SR 1128) and the -L- Line
- Bridge(s) at US 13 / US 264 Alternate and the -L- Line
- Bridge(s) at Froglevel Road (SR 1127) and the -L- Line
- Bridge(s) on the -L- Line over Carolina Coastal Railroad (Service Road -SR10- has been deleted)
- Bridge(s) at Stantonsburg Road (SR 1200) and the -L- Line
- Replacement of the existing 60" RCP on Bell Arthur Road with a reinforced concrete box culvert and all other reinforced concrete box culverts required by the Design-Build Team's design
- Sound barrier walls required by the Design-Build Team's design (Reference the Roadway Scope of Work found elsewhere in this RFP)

If the Design-Build Team elects to construct a bridge on NC 102 over the -L- Line, the Design-Build Team shall design and construct a bridge that carries three 12-foot travel lanes and a minimum four-foot wide concrete monolithic island. The Design-Build Team shall also design and construct 5'-6" sidewalks, that are offset two feet from the edge of the travel lanes, and 3-bar metal rails on both sides of an NC 102 bridge over the -L- Line. (Reference the Roadway Scope of Work found elsewhere in this RFP)

If the Design-Build Team elects to construct a bridge on Forlines Road over the -L- Line, the Design-Build Team shall design and construct a bridge wide enough to carry three 12-foot travel lanes and a minimum four-foot wide concrete monolithic island, with appropriate bridge rail offset. (Reference the Roadway Scope of Work found elsewhere in this RFP)

At the following locations, the outside bridge barrier shall be per Standard Drawing BMR3 and BMR4; and the median barrier rail shall be per Standard Drawing CBR1. All other proposed bridge barrier rails shall be per Standard Drawing CBR1.

- Dual bridges on the -L- Line over Abbott Farm Road (SR 1117)
- Dual bridges on the -L- Line over NC 903

If the Design-Build Team elects to construct a diamond or partial cloverleaf interchange at NC 102, Forlines Road (SR 1126) and / or US 13 / US 264 Alternate, the Design-Build Team shall design and construct bridges at the aforementioned interchanges that have 1) a minimum horizontal length that accommodates a future full cloverleaf interchange (ramps and loops in all quadrants) without design exceptions or additional construction to lengthen the bridges and 2) a minimum vertical clearance that will allow the bridges to be widened in the future to

accommodate a full cloverleaf interchange without design exceptions. The Design-Build Team shall also design and construct all grade separations impacted by the future full cloverleaf interchanges, including but not limited to structures that will accommodate future continuous auxiliary lanes that have 1) a minimum horizontal length that accommodates a future full cloverleaf interchange without design exceptions or additional construction to lengthen the bridges and 2) a minimum vertical clearance that will allow the bridges to be widened in the future to accommodate a full cloverleaf interchange without design exceptions. (Reference the Roadway Scope of Work found elsewhere in this RFP)

The following locations shall have standard spill through end bents with concrete slope protection. No retaining walls, including but not limited to any combination of a retaining wall, concrete barrier and slope protection, will be allowed in lieu of the aforementioned concrete slope protection. The exposed end bent cap height, from the top of the concrete slope protection berm to the highest bridge seat, shall not exceed three feet.

- Dual bridges on the -L- Line over Abbott Farm Road (SR 1117)
- Dual bridges on the -L- Line over NC 903

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 local roads and collector roads shall be 15'-6". The minimum vertical clearance for bridges constructed over a railroad shall be 23'-0".

End bents and end bent slopes at each end of a bridge shall have the same appearance.

Regardless of wall height, sound barrier walls shall be designed in accordance with AASHTO LRFD Bridge Design Specifications. The traffic side of all sound barrier walls shall be form lined with a pattern to be determined by the Engineer. All ground-mounted sound barrier walls shall be detailed in accordance with Structure Standards SBW1 and SBW2, and concrete piles shall be used. Unless otherwise approved by the Department, the top of all sound barrier walls shall be constructed to provide a continuous elevation transition in increments no greater than one-foot. (Reference the *Sound Barrier Wall* and *Architectural Concrete Surface Treatment* Project Special Provisions, and the Roadway Scope of Work found elsewhere in this RFP)

The number of expansion joints for each structure shall be kept to a minimum. Structures shall be integral if the criteria listed in the NCDOT *Structures Management Unit Manual* is met. When required by the criteria in Section 6.2.3.2 of the NCDOT *Structures Management Unit Manual*, the Design-Build Team shall use expansion joints, except Bullets 3 and 4 in the aforementioned Section shall apply to all roadways.

All bridges shall meet approved roadway typical sections and grades. Bridge geometry (width, length, skew, span arrangement, etc.) shall be in accordance with the accepted Structure Recommendations prepared by the Design-Build Team.

A live load rating chart for proposed girders shall be included with the highway bridge plans and shall state design assumptions and methodology used in the load rating calculations. The load rating shall be in accordance with the NCDOT *Structures Management Unit Manual* (including policy memos) and AASHTO's *Manual for Bridge Evaluation*.

A live load rating chart for reinforced concrete box culverts shall be included in the culvert plans.

The following will not be permitted on the project:

- Cored slab, box beam, fracture critical, cast-in-place deck slab and deck girder bridges
- Precast barrier rails
- Empirical method for deck design
- Interior pile bents
- Monotube or cantilever DMS support structures
- Attachment of sign structures to new bridges
- Bridge attachments (e.g. ITS conduit, waterlines) in the overhang of bridge structures
- Casting of conduit in the bridge deck or barrier rail highway bridges

#### **Bridge Rehabilitation for Bridge Nos. 457 and 458**

For Bridge Nos. 457 and 458, the Design-Build Team shall replace all bridge joints at interior bents with link slabs. The Design-Build Team shall replace all bridge joints at end bents with foam joint seals with elastomeric concrete. For joint removal, reference the *Bridge Joint Demolition* Project Special Provision found elsewhere in this RFP.

For Bridge Nos. 457 and 458, the Design-Build Team shall overlay the existing decks and approach slabs with latex modified concrete. (Reference the *Overlay Surface Preparation and Latex Modified Concrete* Project Special Provisions found elsewhere in this RFP). The Design-Build Team shall mill and hydro-demolition the existing decks and approach slabs to perform Class I and Class IA Surface Preparation. The Design-Build Team shall perform Class II and / or Class III Surface Preparation for areas which are found to be unsound or delaminated, or areas that need to be removed due to the required joint replacement or link slab construction, as determined by the Engineer. In such case, the Class II and Class III repairs will be paid for as extra work in accordance with Subarticle 104-8-(A) of the 2012 Standard Specifications for Roads and Structures at the price of \$300 per square yard and \$700 per square yard, respectively.

Very early strength Latex Modified Concrete will only be allowed with prior written approval from the Department.

#### **General**

The Design-Build Team's primary design firm shall be on the Department's list of firms qualified for structure design and maintain an office in North Carolina.

Design 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*



*Manual* (including policy memos) and NCDOT Bridge Policy Manual except as noted otherwise elsewhere in this RFP.

Reinforced concrete box culvert designs shall be in accordance with the latest edition of the AASHTO *LRFD Bridge Design Specifications*, and the Culvert Survey Reports prepared by the Design-Build Team and accepted by the Department. (Reference the Hydraulics Scope of Work found elsewhere in this RFP) Precast box culverts will be allowed.

Construction and materials shall be in accordance with 2012 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.

### **NCDOT Information Supplied**

The NCDOT will provide copies of the As-Built Plans and Bridge Inspection Reports for Bridge Nos. 457 and 458.

**RAILROAD COORDINATION SCOPE OF WORK** (12-30-14)

The Design-Build Team shall be fully responsible for coordinating with the railroad to secure the railroad agreements necessary for the construction of bridges over the Norfolk Southern Railway (NSR) operated by Carolina Coastal Railway (“CLNA”) and 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 all costs incurred by CLNA and NSR associated with this project, including but not be limited to, plan reviews, Railroad furnished materials, signals and communications work, track and related construction by the Railroad and / or its representatives(s), required insurances and railroad flagging.

**Preparation for Construction within the Existing NS-Line Corridor, operated by CLNA**

- I. The Design-Build Team shall comply with the following applicable documents, unless noted otherwise elsewhere in this RFP, and / or a design exception is received from CLNA and NCDOT via the NCDOT Design-Build Unit:
  - A. *AREMA Manual for Railway Engineering*, latest edition
  - B. Norfolk Southern Railway - *Standard Specifications for Materials and Construction*, latest edition
  - C. Norfolk Southern Railway - *Public Projects Manual*, latest edition
  - D. NCDOT *Construction Manual* Section 105-8
  - E. NCDOT *Construction Manual* Section 107-9
  - 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
- II. According to a July 17, 2014 e-mail from CLNA one train per day operates in each direction at a speed of 25 mph with a second daily train anticipated by 2015. The maximum speed allowed by NSR at the proposed overhead bridge location is 49 mph. The Design-Build Team shall verify the number of trains per day and the maximum speed allowed at the proposed overpass bridge location. (Reference the *Protection of Railway Interests* Special Provision found in the Norfolk Southern Railway - *Public Projects Manual*)

Railroad inspection and maintenance requirements, in addition to normal train operations, will occur that may impact construction activities.

- III. This project is located on the NSR at approximately Milepost NS 151.84. The NSR is operated and maintained by CLNA through an operating and maintenance agreement with NSR. The corridor contains one freight track and one spur track at this location. Railroad traffic shall be maintained at current levels at all times.
- IV. The Design-Build Team shall design and construct a bridge(s) on the mainline over the Carolina Coastal Railroad that completely spans the existing NSR right of way. (No portion of the bridge structure, including but not limited to piers and abutment walls, shall encroach into the NSR existing 100-foot right of way.) The bridge(s) over the Carolina Coastal Railroad shall provide a minimum 23-foot vertical clearance above the highest rail, including but not limited to the future track to be installed 16 feet north of the existing track centerline.

#### **Arrangements for Protection and Adjustments to Existing Railroad Surface and Roadbeds**

- I. The Design-Build Team shall make the necessary arrangements with CLNA for the improvements to any existing crossing surfaces, installation of temporary construction crossing surfaces, removal of temporary construction crossings after completion of project, shoring plans, railroad force account estimates and agreements. All temporary crossing surfaces shall conform to NSR standards. To prevent unauthorized use, all temporary construction crossings shall have a cable or chain installed on the north side of the crossing that restricts access. All temporary crossing surfaces and / or existing crossing surfaces improvements shall be procured, installed and removed by CLNA, or their representative, at the Design-Build Team's expense.

The Design-Build Team shall not commence any work on the NSR right of way / easement until all agreements have been executed, insurance acquired and approved in accordance with NSR and CLNA policies and procedures, and all construction plans have been approved by the CLNA and NCDOT. The Design-Build Team shall make the necessary arrangements with the CLNA that are required to protect against property damage that may result in loss of service, expense, or loss of life. The Design-Build Team shall be responsible for all damage to the NSR and CLNA resulting from their operations and the CLNA may issue a stop order until all dangerous situations are remedied. (Reference the *Protection of Railway Interests* Special Provision found in the Norfolk Southern Railway - *Public Projects Manual*)

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 NSR and CLNA. (CLNA follows the *Protection of Railway Interests* Special Provision found in the Norfolk Southern Railway - *Public Projects Manual*.) The Design-Build Team shall be responsible for verifying and obtaining the appropriate insurance and coverage with the NSR and CLNA. Other insurance requirements, including those for all subcontractors, are detailed in the *Protection of Railway Interests* Special Provision found in the Norfolk Southern Railway - *Public Projects Manual*.

- II. Prior to any utility installation, removal or relocation across the NSR 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 the CLNA and private utility owners to obtain the necessary permits and secure the appropriate Encroachment Agreements. The Design-Build Team shall assist the private utility owners obtain their respective Encroachment Agreement in the private utility owner's name. The private utility owners will be responsible for all associated fees and providing the necessary insurance coverage, in accordance with the requirements noted herein and the NSR specifications.

All work associated with any utility installation across the NSR right of way / easement shall adhere to the requirements noted herein and the NSR specifications.

- III. After negotiations among the Department, the Design-Build Team and CLNA 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, 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 the 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 CLNA. This section particularly applies if a modification to an agreement is necessary.

### **Coordination with CLNA**

The Design-Build Team shall coordinate with Virgil Holman, General Manager, Carolina Coastal Railway, P.O. Box 8158, Wilson, NC27893, (telephone number 252-237-8259) to obtain plan approval and a partially executed legal agreement with CLNA and the Department of Transportation (which includes NCDOT Rail Division plan review) as the parties in the agreement for the NSR overhead grade separation. Plan approval shall be based on multiple submittals including at minimum a preliminary plan submittal and 90% plan submittal. The preliminary plan submittal to the CLNA shall include the NSR's "Overhead Grade Separation Data Sheet," as applicable, appropriate roadway plan sheets showing impacts to the NSR right of way / easement, erosion control plans, and drainage calculations for any drainage on or across the NSR right of way / easement, and bridge plans showing a vertical and horizontal alignment and preliminary general drawings. The 90% plan submittal shall include all necessary details, insets, and notes for construction with no substantial changes to the alignments and layout shown in the preliminary plan submittal and all supporting design calculations. An electronic copy (pdf format) of all review plans and associated data shall be submitted to CLNA through the NCDOT Design-Build Unit. If any re-submittals of plans or any additional information is required an electronic copy (pdf format) shall be submitted to the NCDOT Design-Build Unit for forwarding to the CLNA. RFC Plans shall be submitted to CLNA before construction begins. For RFC Plans, a minimum of three (3) half-size sets and an electronic copy of the plans (pdf format) shall be submitted to the NCDOT Design-Build Unit for forwarding to the CLNA. Working Drawings affecting the CLNA's operations and / or NSR right of way / easement shall follow the submittal process as outlined in the 2012 *Standard Specifications for Roads and Structures* or Special

Provisions. The Department will review all agreement modifications prior to submittal to CLNA. The Department will execute and distribute the agreement modifications within 14 calendar days of receipt. The agreements and any modifications thereto shall include necessary Force Account items such as preliminary engineering, construction engineering, crossing surfaces, and flagging. The railroad agreements state that the Department will be responsible for payment of the CLNA's Force Account work and expenses; however, the Design-Build Team shall reimburse the Department for these costs including any 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 CLNA's invoices to the Design-Build Team for review. The Design-Build Team shall have ten (10) days to provide written comments to the NCDOT Design-Build Unit, after which the Department will pay the invoice. The Design-Build Team shall be responsible for maintaining records to verify the invoice items.

**Coordination with NCDOT Rail Division**

All plans submitted to CLNA, as above, shall be accompanied by a pdf of the plans for submission to the NCDOT Rail Division through the NCDOT Design-Build Unit.

**GEOTECHNICAL ENGINEERING SCOPE OF WORK** (1-13-15)**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 at:

**<https://partner.ncdot.gov/VendorDirectory/default.html>**

The prequalified geotechnical firm shall prepare foundation design recommendation reports for use in designing structure foundations, roadway foundations, retaining wall foundations, sound barrier wall foundations, overhead sign structure and luminary foundations, and temporary structures.

The Engineer of Record who prepares the foundation design recommendation reports shall be a Professional Engineer registered in the State of North Carolina who has completed a minimum of three geotechnical design projects of scope and complexity similar to that anticipated for this project using the load and resistance factor design (LRFD) method and in accordance with the latest edition of the AASHTO *LRFD Bridge Design Specification*.

The prequalified geotechnical firm shall also determine if additional subsurface information, other than that required and noted elsewhere in this RFP, is required based upon the subsurface information provided by the NCDOT and the final roadway and structure designs. If a determination is made that additional subsurface information is required; the Design-Build Team shall use a prequalified geotechnical firm to perform all additional subsurface investigation and laboratory testing in accordance with the current NCDOT Geotechnical Engineering Unit *Guidelines and Procedures Manual for Subsurface Investigations*. Submit additional information collected by the Design-Build Team to the Geotechnical Engineering Unit 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.

A minimum of 1 standard penetration test (SPT) / rock core boring shall be required per bent for all bridges except dual bridges. A minimum of 2 SPT / rock core borings shall be required across the roadway typical section, at each bent location for dual bridges. All driven piles shall be located within 75 feet of an SPT / rock core boring. All drilled piers and other types of bridge foundations shall be located within 25 feet of an 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 barriers shall be equal to the maximum height of the wall or to SPT refusal.

The Design-Build Team is permitted to design bridges on this project using software that accounts for the structural effects of soil / pier interaction.

## II. DESCRIPTION OF WORK

Unless otherwise noted herein, the Design-Build Team shall design foundations (except for sign foundations), embankments, slopes, retaining walls and sound barrier walls in accordance with the current edition of the AASHTO *LRFD Bridge Design Specifications*, NCDOT *LRFD Driven Pile Foundation Design Policy*, all applicable NCDOT Geotechnical Engineering Unit Standard Provisions, NCDOT *Structures Management Unit Manual*, and NCDOT *Roadway Design Manual*. The NCDOT *LRFD Driven Pile Foundation Design Policy* is located on the NCDOT Geotechnical Engineering Unit's website at:

**<https://connect.ncdot.gov/resources/Geological/Pages/default.aspx>**

For *Geotechnical Guidelines For Design-Build Projects*, the Design-Build Team shall adhere to the guidelines located at the following website:

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

### A. Structure Foundations

End bent fill slopes up to 35 feet in height (defined as the difference between grade point elevation and finished grade at toe of slope) shall be 1.5:1 (H:V) or flatter. End bent fill slopes with heights greater than 35 feet shall be 2:1 or flatter. All end bent cut slopes shall be 2:1 or flatter. Design all end bent fill slopes to have a minimum factor of safety of 1.3 for global stability. Design all end bent cut slopes to have a minimum factor of safety of 1.5 for global stability. For both end bent cut and fill slopes, extend end bent slope protection from the toe of slope to berm and to 2.75:1 (H:V) slope.

Analyze drilled pier and pile bent foundations using either LPile or FB-Pier. Design drilled piers and vertical piles with a sufficient embedment in soil and / or rock to achieve "fixity".

All steel H-piles shall have pile points. All steel pipe piles shall have cutting shoes if open ended. All concrete piles shall have steel pile tips.

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 Design-Build Unit, for review and acceptance.

No raising of culvert headwalls / endwalls or the addition of retaining walls shall be used to reduce culvert length.

## **B. Roadway Foundations**

Excluding the transition required to tie to existing, design the new alignment mainline grade to maintain a minimum five feet of vertical separation between the existing ground and the lowest mainline travel lane pavement subgrade for any given cross-section.

Excluding the transition required to tie to existing, design all new alignment -Y-Line and Service Road grades to have one of the following options:

- Maintain a minimum four feet of vertical separation between existing ground and the lowest travel lane pavement subgrade for any given cross-section, unless fully functional lateral ditches are installed with adequate grades and outfalls that prevent water ponding.
- If fully functional lateral ditches are installed with adequate grades and outfalls that prevent water ponding, maintain a minimum three feet of vertical separation between existing ground and the lowest travel lane pavement subgrade for any given cross-section; and maintain a minimum six feet of vertical separation between the lowest travel lane pavement subgrade for any given cross-section and the bottom of ditches.

For existing roadway sections that are widened or reconstructed, if groundwater is encountered in subsurface investigations or during construction within five feet of the proposed subgrade elevation, one, or a combination of the following shall be required on the side(s) that is widened:

- Lateral ditch, with a grade and outfall that prevents ponding, cut to a depth of at least six feet below the proposed pavement subgrade.
- Subsurface Drains in accordance with NCDOT Standard Drawing 815.02 and Section 815 of the NCDOT 2012 *Standard Specifications for Roads and Structures* to six feet below the proposed pavement subgrade with grades and outfalls that prevent water ponding within the subsurface drains.
- A roadway grade that provides a minimum of five feet between the subgrade elevation and the groundwater elevation.



Design all non-reinforced fill and cut slopes except bridge end bent slopes (see Section A) for a slope of 3:1 (H:V) or flatter. Design all roadway fill slopes to have a minimum factor of safety of 1.3 for global stability. Design all roadway cut slopes to have a minimum factor of safety of 1.5 for global stability. Use limiting equilibrium methods, such as Modified Bishop, Simplified Janbu, Spencer, or any other generally accepted method for slope stability analysis. Design reinforced soil fill slopes in accordance with FHWA *Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes* – Volume I and Volume II, FHWA-NHI-10-024 and FHWA-NHI-10-025. Submit detailed design calculations and slope stability analysis for all reinforced slopes and any non-reinforced slopes higher than ten feet for review and acceptance by the Geotechnical Engineering Unit prior to construction. Provide design and construction recommendations for all cut slopes that will intersect groundwater. Provide subsurface drainage details for all cut slopes and grade points that intersect groundwater.

Any subsurface and / or slope drainage that is designed for either subgrade or slope stability shall be installed regardless of site conditions at the time of construction.

Bridge approach embankments shall be defined as embankments within 250 feet of end bents. Design and construct bridge approach embankments such that no more than one (1) inch of settlement shall occur after the waiting period or monitoring ends or embankment fill is constructed to subgrade elevation. Bridge approach embankment settlement monitoring shall be required when a waiting period of more than one month is recommended or more than four (4) inches of settlement is calculated in the foundation design recommendation reports developed by the Design-Build Team. When embankment monitoring is required, construct the embankment and approach fill to the proposed roadway grade prior to monitoring. Use an appropriate method to monitor settlement across the length of the embankment (from toe to toe) such as settlement gauges, surveyed stakes on finished subgrade or other methods; but submit documentation describing the method and procedures to the NCDOT Geotechnical Engineering Unit, via the Design-Build Unit, for review and acceptance prior to construction of the embankment. Bridge approach embankment waiting periods shall not be ended until less than one (1) inch of the anticipated settlement remains and less than 0.10 inch of settlement is measured over a period of four weeks. Do not drive piles or construct end bent caps until after bridge approach embankment waiting periods are complete.

Design and construct roadway embankments such that no more than two (2) inches of settlement will occur following pavement construction. Embankment settlement monitoring shall be required for locations when a total settlement of more than six (6) inches is calculated in the roadway foundations design recommendation report developed by the Design-Build Team. Where computed settlement is greater than six (6) inches, monitor settlement across the width of the embankment at maximum spacing interval of 250 feet by settlement gauges or

other approved methods. Submit documentation describing the method and procedures to the Geotechnical Engineering Unit, via Design-Build Unit, for review and acceptance prior to construction of the embankment. Roadway embankment waiting periods shall not be ended until less than two (2) inches of settlement is anticipated following pavement construction and less than 0.10 inch of settlement is measured over a period of four weeks.

Soil improvement techniques to mitigate long term settlement problems or to transfer embankment load to a deeper bearing stratum are allowed at bridge approach and roadway embankments. 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*.

Material that does not meet the requirements of Table 1018-2 of the NCDOT 2012 *Standard Specifications for Roads and Structures* shall be considered unsuitable material. Unsuitable unclassified excavation material may be used within embankments under medians of divided highways between the inside edges of pavements and not within the top six feet of embankments or to flatten slopes beyond a theoretical 3:1 (H:V) slope starting at the embankment shoulder point. All earth materials within the entire embankment cross-section shall be compacted in accordance of Section 235 of the NCDOT 2012 *Standard Specifications for Roads and Structures*, regardless of source of material. The Design-Build Team may propose an Alternative Technical Concept to chemically modify unsuitable unclassified excavation material for use at locations other than outlined above.

Except where existing pavement sections will be retained, undercut all unsuitable or unstable soils to the extent required to improve the stability of embankments or pavement subgrades. At a minimum, undercut unsuitable or unstable soils to two feet outside edge of pavement to two feet outside edge of pavement and to a depth of three feet below proposed pavement subgrade or use Aggregate Subgrade in accordance with Section 505 of the NCDOT 2012 *Standard Specifications for Roads and Structures* except with a minimum Select Material, Class IV thickness of 12 inches from two feet outside edge of pavement to two feet outside edge of pavement. The Design-Build Team shall undercut or increase Aggregate Subgrade to deeper depths and / or wider dimensions, or incorporate higher strength geosynthetics, as necessary, to adhere to embankment and pavement subgrade stability requirements.

Except where existing pavement sections will be retained, at a minimum, undercut the locations listed below from two feet outside edge of pavement to two feet outside edge of pavement; and to three feet below the proposed pavement subgrade or use Aggregate Subgrade in accordance with Section 505 of the NCDOT 2012 *Standard Specifications for Roads and Structures* except with a minimum Select Material, Class IV thickness of 12 inches from two feet outside edge of pavement to two feet outside edge of pavement. At the locations listed

below, the Design-Build Team shall undercut or increase Aggregate Subgrade to deeper depths and / or wider dimensions, or incorporate higher strength geosynthetics, as necessary, to adhere to embankment and pavement subgrade stability requirements.

The following locations shall be as defined in the R-2250 A, B and C preliminary roadway plans provided by the Department.

#### **R-2250A**

<b><u>Line</u></b>	<b><u>Station</u></b>
-L-	13+00 to 83+75
-FLYBY7-	10+00 to 18+25
-Y1-	12+75 to 18+32
-Y1-	18+40 to 18+55
-Y2-	10+00 to 15+20
-Y2-	15+37 to 18+12
-Y2-	29+75 to 34+90
-Y2-	34+92 to 35+31
-Y3-	10+52 to 21+05
-Y3-	30+75 to 42+48
-Y5-	10+51 to 10+56
-Y5-	10+61 to 22+75
-Y5-	23+25 to 24+25
-Y6-	18+50 to 29+00
-Y6B-	10+58 to 18+33
-Y6C-	10+03 to 20+60

#### **R-2250B**

<b><u>Line</u></b>	<b><u>Station</u></b>
-RPBY8-	16+77 to 18+83
-RPCY8-	14+53 to 15+55
-RPDY8-	21+25 to 28+75
-Y8-	14+25 to 19+75
-Y8-	40+25 to 57+75
-Y8C-	12+00 to 17+22
-Y8D-	10+35 to 12+73
-Y8D-	12+76 to 15+65
-Y8D-	15+73 to 18+65
-Y9-	20+50 to 26+75
-Y9-	37+35 to 38+56
-Y9-	75+25 to 76+05
-Y11-	15+51 to 21+59
-Y12A-	14+35 to 16+72

**R-2250C**

<b><u>Line</u></b>	<b><u>Station</u></b>
-Y1-	14+00 to 21+10
-Y1-	42+75 to 55+00
-Y1RPA-	7+93 to 15+80
-Y1RPB-	9+89 to 16+25
-Y1RPC-	15+40 to 18+10
-Y1RPD-	7+28 to 20+60
-Y2-	12+30 to 61+39
-Y2-	67+25 to 69+79
-Y2-	72+44 to 83+24
-Y2-	86+25 to 87+75
-Y2-	88+25 to 92+75
-Y2-	95+25 to 106+60
-Y2LPA-	11+25 to 15+83
-Y2LPC-	10+78 to 15+83
-Y2RPA-	18+89 to 20+25
-Y2RPA-	20+90 to 29+64
-Y2RPB-	10+20 to 14+15
-Y2RPB-	14+55 to 14+67
-Y2RPC-	15+35 to 27+43
-Y2RPC-	27+72 to 27+83
-Y2RPD-	8+65 to 13+61
-Y3-	10+00 to 10+80
-Y4-	10+42 to 14+57
-Y4-	39+75 to 45+07
-Y4-	45+10 to 45+25
-Y4-	50+97 to 62+00
-Y5-	15+75 to 21+05
-Y6-	12+14 to 22+74
-Y7-	13+00 to 20+25
-Y7-	44+19 to 45+10
-Y9RPB-	10+04 to 20+85
-Y10-	10+00 to 11+19
-Y10-	11+80 to 12+20
-SR1-	10+00 to 17+00
-SR2-	11+82 to 26+27
-SR2-	26+29 to 28+73
-SR5-	10+00 to 25+25
-SR5-	34+75 to 47+92
-SR6-	10+00 to 11+97
-SR7-	11+75 to 20+75
-SR8-	12+93 to 30+00
-SR9-	15+25 to 27+03
-SR10-	10+06 to 18+00
-SR11-	10+45 to 14+00

Place Geotextile for Soil Stabilization, Type 4 in accordance with Section 270 of the NCDOT 2012 *Standard Specifications for Roads and Structures* or higher strength geosynthetics, as necessary, on the base of all undercut sections. If proposing geogrid in lieu of Geotextile for Soil Stabilization, Type 4, nonwoven geotextile shall be incorporated at the base of Aggregate Subgrade.

Use Select Granular Material in accordance with Section 265 of the NCDOT 2012 *Standard Specifications for Roads and Structures* to backfill undercut areas, except when employing shallow undercut which shall require the use of Select Material, Class IV.

Document and provide spring box or other subsurface drainage recommendations for all springs located under proposed fill sections.

### **C. Permanent Retaining Wall Structures**

Retaining walls or abutment walls will not be allowed at any location where more than five feet of scour is calculated at the base of the wall.

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>**

Construct MSE walls using coarse aggregate if groundwater is above finished grade. Provide subsurface drainage at the back of the reinforced volume for MSE retaining walls constructed with fine aggregate.

With the exception of gravity walls, design and construct permanent retaining walls in accordance with the applicable NCDOT Geotechnical Engineering Unit *Project Special Provisions*, which can be provided upon request by the Design-Build Team. Geotechnical Provisions and Notes can be found at the NCDOT Geotechnical Engineering Unit's website at:

**[https://connect.ncdot.gov/resources/Geological/Pages/Geotech\\_Provisions\\_Notes.aspx](https://connect.ncdot.gov/resources/Geological/Pages/Geotech_Provisions_Notes.aspx)**

With the exception of cast-in-place gravity walls, submit a wall layout and design for each retaining wall. At a minimum the submittal shall include the following:

- Wall envelope with top of wall, bottom of wall, existing ground and finished grade elevations at incremental stations
- Wall alignment with stations and offsets
- Typical sections showing top and bottom of wall, drainage, embedment, slopes, barriers, fences, etc.
- Calculations for bearing capacity, global stability and settlement
- Details of conflicts with utilities and drainage structures

- Roadway plan sheets showing the wall (half size)
- Roadway cross sections showing the wall (half size)
- Traffic control plans showing the wall (half size)

Cast-in-place gravity walls shall be designed and constructed in accordance with the NCDOT Structure Standard Drawings and the NCDOT 2012 *Standard Specifications*. Cast-in-place gravity walls shall be identified in the roadway foundation design recommendation report developed by the Design-Build Team. Cast-in-place cantilever walls shall be designed and constructed in accordance with the NCDOT 2012 *Standard Specifications*. Conceptual wall layouts and wall designs shall be submitted for NCDOT review and acceptance.

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 end bent slopes, all slopes behind walls shall be 3:1 (H:V) or flatter.

Drainage over the top of retaining walls shall not be allowed. Sags in the top of walls shall not be permissible. 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. A paved concrete ditch with a minimum depth of six inches shall be required at the top of walls when slopes steeper than 6:1 (H:V) intersect the back of walls.

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 six inches above where the finished or existing grade intersects the back of the wall. A fence shall be required on top of the facing, coping or barrier or immediately behind the wall, if there is no slope behind the wall.

Deep foundations shall be used for end bents when abutment retaining walls are employed. When using abutment retaining walls, design and construct the end bent and the wall independent of each other. When using abutment retaining walls, the end bent foundation shall be designed and constructed with one of the following deep foundations: (1) plumb piles with sufficient brace piles battered toward the wall to carry lateral loadings, (2) plumb piles with MSE reinforcement connected to the back of the cap, (3) integral abutment with plumb piles and no reinforcement connected to the back of the cap in accordance with FHWA GEC 11 pages 6-8 through 6-10, or (4) drilled piers. Wing walls independent of abutment retaining walls shall be required unless accepted otherwise by the NCDOT. Do not consider lateral support from any fill placed around drilled piers behind abutment retaining walls when analyzing end bent stability. All pile foundations for end bents with abutment retaining walls shall penetrate minimum 10 feet into natural ground.

#### **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 2012 *Roadway Standard Drawing* Detail No. 1170.01.

### **III. CONSTRUCTION REQUIREMENTS**

All construction and materials shall be in accordance with the NCDOT 2012 *Standard Specifications* and current NCDOT Project Special Provisions unless stated otherwise in this scope of work. The Design-Build Team shall be responsible for investigating, proposing and incorporating remedial measures for any construction problems related to foundations, retaining walls, sound barrier walls, subgrades, embankment settlement, slope global instability, slope surficial instability, and construction vibrations. Submit these proposals to the NCDOT Geotechnical Engineering Unit for review and acceptance.

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 NCDOT 2012 *Standard Specifications for Roads and Structures*), and siltation or draining of ponds off the right of way. The Design-Build Team shall be responsible for deciding what, if any, pre and post-construction monitoring and inventories need to be conducted to satisfy their liability concerns. Any monitoring and inventory work shall be performed by a qualified private engineering firm experienced in the effects of construction on existing structures. At a minimum, the Design-Build Team shall perform pond preconstruction condition assessments as outlined in the NCDOT Geotechnical Engineering Unit *Guidelines and Procedures Manual for Subsurface Investigations*.

The prequalified geotechnical firm that prepared the foundation designs shall review the settlement monitoring data a minimum of once a month and issue a letter prior to releasing the embankment or approach fill from monitoring. Monitoring shall not be ended until less than 0.10 inch of settlement is measured over a period of four weeks. Submit the settlement monitoring data to the Design-Build Unit for review and acceptance prior to issuing the release letter.

The prequalified geotechnical firm that prepared 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 to the NCDOT for review and acceptance prior to beginning construction.

Perform hammer approvals with GRLWEAP Version 2010 or later and in accordance with the NCDOT LRFD Driven Pile Foundation Design Policy. The foundation design firm shall develop pile driving inspection charts or tables, based upon PDA testing and CAPWAP analysis, if applicable, for acceptance by the NCDOT prior to pile installation.

Construct piles in accordance with Section 450 of the 2012 *Standard Specifications for Roads and Structures*. Perform Pile Driving Analyzer (PDA) testing using a NCDOT prequalified company to develop pile driving inspection charts or tables. For each permanent bridge that includes driven pile bents or driven pile footings, perform a minimum of one (1) PDA test (dual bridges are counted as one structure) for each pile size, pile type (material or shape) and pile driving hammer combination. Additional PDA tests may be required based upon the AASHTO LRFD Bridge Design Specifications. If the bridge length with driven pile foundations is longer than 400 feet, perform an additional PDA test at every 400-foot interval. Provide additional PDA testing for any revisions to pile type, size or hammer previously approved. The locations of specific piles to be tested must be accepted by the NCDOT prior to any PDA test. Perform PDA tests in accordance with ASTM D 4945-89, Standard Test Method for High Strain Dynamic Testing of Piles and this scope of work.

Analyze data with the Case Pile Wave Analysis Program (CAPWAP), version 2006 or later. At a minimum, analysis shall be required for a hammer blow near the end of initial drive and for each restrike and redrive. Additional CAPWAP analysis shall be required as determined by the Engineer.

Meet the guidelines for NCDOT PDA reports from the Geotechnical Engineering Testing Contract for PDA test reports. To obtain a list of pre-approved Geotechnical Engineering Testing Contract companies to perform PDA testing and guidelines for PDA test report, contact the Geotechnical Engineering Unit at 919-707-6850. PDA testing may be performed by a technician, but PDA testing must be overseen and the reports sealed by a Professional Engineer registered in the State of North Carolina. Submit a complete PDA report sealed by the professional engineer who performed the test to the foundation design firm. The foundation design firm shall develop pile driving inspection charts or tables for acceptance by the NCDOT prior to pile installation.

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 2012 *Standard Specifications for Roads and Structures*. 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 that cannot be dewatered due to unstable soil or rock. The Design-Build Team shall notify Sam Lawhorn by e-mail (sclawhorn@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 Sam Lawhorn of all SID testing cancellations as soon as possible at the e-mail address noted above and at (919) 329-4200. 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 as needed. The Department will determine which piers will be CSL tested. Submit CSL test information and results to the Geotechnical Engineering Unit, via the Design-Build Unit, for review and acceptance.

The prequalified geotechnical firm that prepared the original design shall perform any changes to the foundation designs. All changes shall be based upon additional information, subsurface investigation and / or testing. Drilled pier tip elevations shall not be changed during construction unless the prequalified geotechnical firm that prepared 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. Send copies of revised designs including additional subsurface information, calculations and any other supporting documentation sealed by a professional engineer registered in the State of North Carolina to the NCDOT for review and acceptance.

Except where existing pavement sections will be retained, conduct proof rolling on the -L- Line, all ramps and loops, and all new construction -Y- Lines connecting to ramps or loops. Conduct proof rolling in accordance with Section 260 of the 2012 *Standard Specifications for Roads and Structures*, except use a 35 ton proof roller. Proofroll areas again following the completion of corrections necessary to create a stable subgrade.

To ensure proper subgrade stability in areas not required to be proof rolled, the Department will conduct dynamic cone penetrometer (DCP) tests after the subgrade is compacted and graded to within ½-inch of the final pavement subgrade. DCP testing does not replace density test or subgrade stability requirements. The Department will conduct DCP testing within two weeks prior to placement of the base layer and after density requirements have been met. The Design-Build Team shall notify the Engineer their schedule of the base layer placement at least three weeks in advance. The Department will conduct the DCP test every 200 feet to a depth of 32". If the number of blows needed to reach the 32" depth equals or exceeds 30, the subgrade stability will be acceptable. If the blow count is less than 30, the Department will conduct additional DCP tests using a decreased DCP test spacing of 50 feet. The Engineer will develop a plan view of the failed areas showing test locations and results.

The Department will conduct DCP testing in accordance with the specifications and procedures available through the following website:

**<http://www.ncdot.org/doh/preconstruct/highway/geotech/supportserv/geopavement/>**

In the event that subgrade that has passed DCP testing is used for hauling prior to placement of the base layer, the Department has the right to perform updated or additional DCP tests in these areas.

For areas failing proof rolling or DCP testing, perform corrective actions on unstable subgrades in accordance with minimum undercut or Aggregate Subgrade requirements listed in Section “B. Roadway Foundations”, of this Scope of Work.

Send copies of any inspection forms related to foundations, settlement or sound barrier walls to the NCDOT for review.

**HYDRAULICS SCOPE OF WORK** (2-5-15)**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 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 Transportation Program Management Director and Hydraulic Review Engineer upon acceptance of the Preliminary Roadway Plans developed by the Design-Build Team.
- The Design-Build Team shall design all storm drainage systems using Geopak Drainage.
- Due to mainline typical section revisions, the signed and sealed R-2250A and R-2250C Culvert Survey Reports provided by the Department are nullified. The Design-Build Team shall provide updated Culvert Survey Reports in accordance with the Hydraulic Guidelines noted below for the Department's review and acceptance.
- If appropriate for the drainage area, the Design-Build Team shall use the USGS Scientific Investigations Report 2014-5030 (*Methods for Estimating the Magnitude and Frequency of Floods for Urban and Small, Rural Streams in Georgia, South Carolina and North Carolina, 2011*) for determining storm discharges, in lieu of the USGS Water-Resources Investigations Report 96-4084 (*Estimation of Flood-Frequency Characteristics of Small Urban Streams in North Carolina*).
- For shoulder facilities, including those with expressway gutter and shoulder berm gutter, the hydraulic spread shall not encroach into a permanent travel lane or encroach more than two feet into an operational temporary travel lane.
- For curb and gutter facilities, the hydraulic spread shall not encroach more than three feet into the travel lane(s).
- The Design-Build Team shall analyze spread for bridges identified in the Structures Scope of Work found elsewhere in this RFP and, as necessary, provide mitigation that eliminates spread in a travel lane. 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). If a closed drainage system is used on a bridge, the closed drainage system shall use 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.

- In accordance with the NCDOT Stormwater Best Management Practices Toolbox and the NCDOT Post-Construction Stormwater Program effective on the Technical Proposal submittal date, the Design-Build Team shall develop a Stormwater Management Plan that, at a minimum, demonstrates the following:
  - 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.
- In accordance with the Hydraulic Guidelines noted below, the Design-Build Team shall prepare Outfall Analyses for increases in discharge and take appropriate action to ensure that any increases are appropriately mitigated.

**\*\* NOTE \*\* Deleted bullet on Preformed Scour Holes**

- Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall remove or fill with flowable fill all pipes not retained for drainage purposes.
- Throughout the project limits, the Design-Build Team shall analyze all existing box culverts and pipes within the existing / proposed right of way for hydraulic and structural deficiencies. Based on these analyses, the following shall be adhered to:
  - The Design-Build Team shall provide the appropriate hydraulic mitigation for all hydraulically deficient box culverts and / or pipes; and for all hydraulically and structurally deficient box culverts and / or pipes, including but not limited to replacement. The hydraulic mitigation for major hydraulic crossings with a conveyance greater than the capacity of a single 72" diameter pipe shall consist of the removal and disposal of the existing hydraulically deficient box culvert(s) / pipe(s) and replacement with an appropriately sized reinforced concrete box culvert. The Design-Build Team shall identify all hydraulically deficient box culverts and / or pipes and their proposed mitigation in the Technical Proposal.
  - 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 repairs, will be paid for as extra work in accordance with Subarticle 104-8(A) of the 2012 *Standard Specifications for Roads and Structures*.
- For all major hydraulic crossings with a conveyance greater than the capacity of a single 72" diameter pipe on new location, the Design-Build Team shall adhere to the requirements noted below:

- The Design-Build Team shall design and construct an appropriately sized reinforced concrete box culvert.
- The Design-Build Team shall design and construct a hydraulic system that does not increase the water surface elevation by more than one foot above natural conditions during the 100-year storm.
- The Design-Build Team shall conduct an interagency hydraulic design review meeting (Concurrence Point 4B) and an interagency permit impacts meeting (Concurrence Point 4C) prior to submittal of the environmental permit applications. All work resulting from the hydraulic design and permit review meetings shall be the Design-Build Team's responsibility. The Design-Build Team shall provide hydraulic plans and permit impact sheets to the Transportation Program Management Director a minimum of five weeks prior to the appropriate interagency meeting. The Design-Build Team shall take minutes of the interagency meetings and provide them to the Department within three business days of the aforementioned meetings.
- The Design-Build Team shall use a minimum ditch grade of 0.3% and avoid constructing ditches in wetlands
- The Design-Build Team shall provide permit drawings, calculations and impact sheets, for the USACE 404 Permit, the NCDWR Section 401 Certification and NCDWR Riparian Buffer Authorization.
- Raised median island cuts will not be allowed.

### **General**

- The Design-Build Team's design shall be in accordance with criteria provided in the North Carolina Division of Highways "Guidelines for Drainage Studies and Hydraulics Design-1999", the addendum "Handbook of Design for Highway Drainage Studies-1973", North Carolina Department of Transportation *Best Management Practices for Construction and Maintenance Activities* – 2003, NCDOT Stormwater Best Management Practices Toolbox, NCDOT Post-Construction Stormwater Program and the North Carolina Division of Highways Hydraulics Unit web-site noted below:

**<https://connect.ncdot.gov/resources/hydro/pages/default.aspx>**

### **Information Provided**

- Eight Signed and Sealed Culvert Survey Reports for R-2250A and R-2250C – For Information Only
- R-2250A, R-2250B & R-2250C Red Line Drainage Plans & Hydraulic Design Calculations

**ENVIRONMENTAL PERMITS SCOPE OF WORK** (2-5-15)**General**

The Design-Build Team shall be responsible for preparing all documents necessary for the Department to obtain the environmental permits required for the project construction. Permit applications shall be required for the: U.S. Army Corps of Engineers (USACE) Individual Section 404 Permit and NC Department of Natural Resources (DENR) Division of Water Resources (DWR) Individual Section 401 Water Quality Certification, Tar-Pamlico Riparian Buffer Authorization and Neuse Riparian Buffer Authorization.

The Design-Build Team shall not begin ground-disturbing activities, including utility relocation in jurisdictional areas, until the environmental permits have been issued (this does not include investigative borings covered under a Nationwide Permit No. 6 and utility relocation work outside jurisdictional resources noted below). The Design-Build Team shall coordinate with the NCDOT 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 NCDOT Design-Build Unit for submittal to the appropriate agencies. If a PCN is not required, the Design-Build Team may proceed with geotechnical investigations outside jurisdictional resources, provided all of the Nationwide Permit No. 6 General Conditions are adhered to.

The Design-Build Team may begin utility relocation work prior to obtaining the aforementioned permits provided that (1) the Department is notified in writing prior to these activities; (2) such activities are outside jurisdictional resources; (3) a meeting is held with the NCDOT and permitting agencies prior to beginning work, if necessary; and (4) the Design-Build Team submits a Preconstruction Notification for the Department to forward to the permitting agencies, if necessary.

The Department will allow no 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 Natural Environment Section (NES) - Environmental Coordination & Permitting Group or the Division's Environmental Officer present. A representative from the NCDOT Design-Build Unit shall be included on all correspondence.

The Department has reached Concurrence Point 4A in the Merger 01 Process used by the environmental agencies and the Department to obtain environmental permits for projects. The Design-Build Team shall participate and present information for Concurrence Points 4B and 4C that are necessary to complete the Merger 01 Process. Any variations in the Department's proposed design and / or construction methods that nullify any concurrence Points obtained or 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. The Design-Build Team shall follow the appropriate details in the document titled "Merger 01 Implementation Team – Merger 01 Process Information" which can be found at the website noted below:

**<https://connect.ncdot.gov/resources/Environmental/Pages/Merger-Process-Guide.aspx>**

Unless otherwise stipulated in the Technical Proposal, the Department will schedule the 4B and 4C meetings for R-2250 for September 2015 and December 2015, respectively. The Design-Build Team shall clearly identify in their Technical Proposal what months they would like the Department to schedule these meetings. Failure on the part of the Design-Build Team to meet these dates places all responsibility for delays resulting from missing these dates solely in the hands of the Design-Build Team.

Unless otherwise noted 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 concurrence meetings and shall be held accountable for meeting all permit conditions. The Design-Build Team shall be required to staff any personnel necessary to provide permit compliance.

Unless noted otherwise elsewhere in this RFP, the Department will not honor any requests for additional contract time or compensation for any efforts required in order to obtain any permit or permit modification, including but not limited to public involvement, additional design effort, additional construction effort and / or additional environmental agency coordination and approvals.

### **Major Permit Application Process**

It shall be the Design-Build Team's responsibility to acquire information and prepare permit drawings that reflect the impacts and minimization efforts resulting from the Merger 01 Process and from the project as designed by the Design-Build Team. Further it shall be the Design-Build Team's responsibility to provide these permit impact sheets (drawings) depicting the design and construction details to the Department as part of the permit application. 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
- Minutes from the 4B and 4C Meetings
- Permit drawings (with and without contours)
- Wetland Permit Impact Summary Sheets
- Half-size plans
- Completed forms (Section 404 ENG 4345, etc.) appropriate for impacts
- Ecosystem Enhancement Program (EEP) Acceptance Letter

The Department will re-verify and update, as needed, the required environmental data that expires prior to the completion of the activity causing the impact in the jurisdictional areas. These include, but are not limited to, federally protected species, re-verification of wetland jurisdictional areas, historic and archaeological sites, and 303d (impaired) streams.

The Design-Build Team shall submit one permit application for the entire project; but impacts and permit drawings shall be broken out by the former project sections. The Design-Build Team shall not submit multiple applications to develop a "staged permitting" process to expedite construction activities in a phased fashion.

Direct coordination between the Design-Build Team, the NCDOT Design-Build Unit, Resident Engineer, Division Environmental Officer (DEO) and the Project Development and Environmental Analysis Unit - Natural Environment Section (PDEA-NES) shall be necessary to ensure proper permit application development. Upon completion of the permit application package, the Design-Build Team shall concurrently forward the package to the NCDOT Design-Build Unit, Resident Engineer, Division Environmental Officer (DEO) and PDEA-NES for review and approval. After all revisions are complete, the Department will subsequently forward the package to the appropriate Environmental Agencies.

Any temporary construction measures, including de-watering, construction access, etc. shall be addressed in the permit application. Impacts that result from so-called temporary measures may not be judged to be temporary impacts by the Environmental Agencies. These issues shall be addressed and reviewed by PDEA-NES prior to the 4B and 4C Meetings and resolved with the Environmental Agencies during the aforementioned meetings.

The Design-Build Team shall clearly indicate the location of and impacts of haul roads and utility relocations in jurisdictional areas. The Design-Build Team shall also identify all proposed borrow and waste sites. The temporary impact descriptions (haul roads, utility relocations, work bridges, etc.) shall include restoration plans, schedules and disposal plans. Further, the Design-Build Team shall describe the construction methods for all structures. The aforementioned information, descriptions and details shall be presented during the 4B and 4C Meetings and be included in the permit application.

The NCDOT hereby commits to ensuring, to the greatest extent practicable, that the footprint of the impacts in areas under the jurisdiction of the Federal Clean Water Act will not be increased during the Design-Build effort. In accordance with the Department of Water Resources' NCG 010000, all fill material shall be stabilized and maintained to prevent sediment from entering adjacent waters or wetlands. The Design-Build Team shall be responsible for ensuring that the design and construction of the project will not impair the movement of aquatic life.

Requests made for modifications to the permits obtained by the Design-Build Team shall only be allowed if the Engineer determines it to be in the best interest of the Department and shall be strongly discouraged. The Design-Build Team shall not take an iterative approach to hydraulic design issues. The design shall be complete prior to submitting the permit application.

### **Major Permit Timeframe**

The Design-Build Team should expect it to take up to 12 months to accurately and adequately complete all designs necessary for the permit application, submit the application to the Department, and obtain approval for the permits from the Environmental Agencies. Environmental Agency review time will be approximately 120 days from receipt of a "complete" package. No requests for additional contract time or compensation will be allowed if the permits are obtained within this 12-month period. With the exception of location and survey work, utility relocation work outside jurisdictional resources that adheres to the aforementioned requirements, permitted investigative borings covered under a Nationwide Permit No. 6 and / or Preconstruction Notification secured by the Design-Build Team, no mobilization of men, materials, or equipment for site investigation or construction of the project shall occur prior to obtaining the permits (either within the 12-month period or beyond the 12-month period). 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 men, materials (or ordering materials), or equipment prior to obtaining all permits. The Department will consider requests for contract time extensions for obtaining the permits only if the Design-Build Team has pursued the work with due diligence, the delay is beyond the Team's control, and the 12-month period has been exceeded. If time were granted, it would be only for that time exceeding the 12-month period. This 12-month period is considered to begin on the Date of Availability as noted in the RFP.

The Design-Build Team needs to be aware that the timeframes listed above for the NCDWR and the USACE to review a permit application begin only after a fully complete and 100% accurate submittal.

### **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 has acquired the compensatory mitigation for unavoidable impacts to wetlands and surface waters due to the project construction from the Ecosystem Enhancement Program (EEP). This mitigation was based on impacts as identified in the Department's preliminary plans.

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 revised design and / or construction methods, suitable compensatory mitigation for wetlands, streams and / or riparian buffers will 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 and before construction can commence. 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 additional mitigation from the Ecosystem Enhancement Program or an approved compensatory mitigation banking resource.

The Design-Build Team shall analyze all new areas to be impacted that have not been analyzed during the NEPA Process and any 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 competent environmental consultant to conduct a full environmental investigation to include, but not be limited to, Federally listed Threatened and Endangered Species, wetlands, streams, avoidance and minimization in jurisdictional areas, compensatory mitigation, FEMA compliance, and historical, archaeological, and cultural resources surveys in these areas. The environmental consultant shall obtain concurrence through PDEA-NES from the United States 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, identify the amount of time beyond the aforementioned 12-month period, and fulfill all other requirements that the permitting agencies impose to obtain the permit. Any contract time extensions resulting from additional environmental assessments required by the Design-Build Team's design and / or construction methods impacting areas outside those previously analyzed through the NEPA Process shall be solely at the Department's discretion.

### **Commitments**

The NCDOT is committed to incorporating all reasonable and practicable design features to avoid and minimize stream, wetland and riparian buffer impacts and to provide full compensatory mitigation of all remaining impacts. Avoidance measures were taken during the planning and NEPA Process and minimization measures were incorporated as part of the preliminary design. The Design-Build Team shall incorporate these avoidance and minimization features, plus any minimization identified during the 4B and 4C Meetings into the design and / or construction methods.

All work by the Design-Build Team must be accomplished in strict compliance with the plans submitted with the permit applications and in compliance with all conditions of all 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 all permits.

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 State Environmental Impact Statement (SEIS), State Record of Decision (SROD), all permits, interagency meetings and site visits.

The NCDOT will be responsible for the following items in the Memorandum of Agreement between the USACE, NCDOT and NCSHPO regarding the Renston Rural Historic District and the corresponding items as listed in the Project Commitments in the SROD:

- All landscaping requirements in Stipulations I and II (Prior to submitting the 100% Roadway Plans or beginning construction of the structures within the historic district, the Design-Build Team shall allow SHPO and other concurring parties a six-week review of the accepted Roadway Right of Way Plans and Preliminary Structure Plans developed by the Design-Build Team.)
- All requirements in Stipulations III, IV and V
- All consultation requirements of Stipulation VI
- All requirements of Stipulation VII through Stipulation X

The "Unresolved Issues" listed on page 11 of the SROD, as well as the Project Commitment to coordinate with the Town of Ayden regarding the design modifications requested in April 2007, have all been addressed in the Preliminary Roadway Plans provided by the Department.

The Project Commitments in the SROD pertaining to noise abatement barriers and hazardous material site assessments have been addressed elsewhere in this RFP.

If the Design-Build Team discovers any previously unknown historic or archeological resources while accomplishing the authorized work, they shall immediately notify the NCDOT Archaeology Supervisor and / or NCDOT Project Development Engineer, in writing as listed below, who will initiate the required State / Federal coordination after a timely initial assessment. The Design-Build Team shall also immediately notify a representative from the NCDOT Design-Build Unit. 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 Mr. Matthew Wilkerson, NCDOT Archaeology at (919) 707-6089, or Mr. Brian Yamamoto, PE, NCDOT Project Development Group Supervisor at (919) 707-6051.

**GEOENVIRONMENTAL SCOPE OF WORK** (2-6-15)**I. DEFINITION**

For the purpose of this scope of work, contamination / contaminants are defined as any substance that when discharged in any quantity may present an imminent and substantial danger to the public health or welfare. Petroleum is defined as any petroleum-derived product of any kind and in any form, including, but not limited to, crude oil, diesel fuel, fuel oil, gasoline, lubrication oil, oil refuse, oil mixed with other waste, oil sludge, petroleum related products or by-products, and all other liquid hydrocarbons, regardless of specific gravity, whether occurring singly or in combination with other substances.

**II. DESCRIPTION OF WORK**

Sites of concern were identified in the August 10, 2005 *GeoEnvironmental Impact Evaluation* and November 2, 2005 *GeoEnvironmental Impact Evaluation*. After submittal of the Right of Way / 60% Roadway Plans, 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.

As documented in the August 2013 *Preliminary Site Assessment Reports* referenced below, the Department has investigated fourteen sites of concern. Additional sites of concern within the proposed right of way that are 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 consultation to investigate and provide Right of Way Recommendations. The Right of Way Recommendations shall be completed prior to the Design-Build Team making offers to purchase the right of way on these sites of concern.

The Design-Build Team shall notify the Design-Build Unit in writing of any underground storage tanks (USTs) containing fuel, chemicals, or heating oil discovered during property appraisals. The Department shall 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 these sites of concern.

The Design-Build Team shall adhere to all Right of Way Branch 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 *Preliminary Assessment Reports* and discovered during the property appraisals and 2) remove all associated contaminated soil anticipated to require excavation to complete the project. The Department will remove the aforementioned USTs and contaminated soil within 60 days of written notification that the above-ground structures have been removed. All contaminated soil not required for removal to complete the project shall be left in place and undisturbed.

It is important to note that petroleum contaminated soil may be encountered during any earthwork activity on this project, and pesticide contaminated soil may be encountered in the vicinity of Parcel 71.

### **III. INFORMATION PROVIDED BY NCDOT:**

- GeoEnvironmental Impact Evaluation, August 10, 2005
- GeoEnvironmental Impact Evaluation, November 2, 2005
- Parcel 71 - Gayle Little Wainwright, Preliminary Site Assessment Report, August 16, 2013
- Parcel 75 - PFS Distribution Co., Preliminary Site Assessment Report, August 16, 2013
- Parcel 79 - Allen Buney, Et Ux., Preliminary Site Assessment Report, August 16, 2013
- Parcel 80 - Connolly P. Branch, Preliminary Site Assessment Report, August 16, 2013
- Parcel 82 - Foss Enterprises, Inc., Preliminary Site Assessment Report, August 16, 2013
- Parcel 85 - Phillip E Trull, Preliminary Site Assessment Report, August 16, 2013
- Parcel 86 - Charles Brinkley Moore, Preliminary Site Assessment Report, August 16, 2013
- Parcel 88 Jerry Linwood Price, Et Ux., Preliminary Site Assessment Report, August 19, 2013
- Parcel 89 - Carles Warters, Et Ux., Preliminary Site Assessment Report, August 19, 2013
- Parcel 90 - American Builders, Preliminary Site Assessment Report, August 19, 2013
- Parcel 91 - Foss Auto Parts & Salvage, Preliminary Site Assessment Report, August 19, 2013
- Parcels 92 & 93 - Archie Oakley, Preliminary Site Assessment Report, August 19, 2013
- Parcel 96 - M.E. Porter, Preliminary Site Assessment Report, August 19, 2013
- Parcel 101 - Edwin Carl Crawford, Jr., Preliminary Site Assessment Report, August 19, 2013

### **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 2012 NCDOT *Standard Specifications for Roads and Structures*.

**TRANSPORTATION MANAGEMENT SCOPE OF WORK** (12-16-14)**I. I. Laws, Standards and Specifications**

The Design-Build Team shall design the Transportation Management Plans (TMP) in accordance with the requirements of this RFP and the version of the standards listed below that are current at the time of the Technical Proposal submittal.

- Standard Specifications for Roads and Structures
- Roadway Standard Drawings
- NC Supplement to the MUTCD
- Manual on Uniform Traffic Control Devices (MUTCD)
- Roadway Design Manual
- Americans with Disabilities Act of 1990 (ADA)
- A Policy on Geometric Design of Highways and Streets
- Roadside Design Guide
- Standard Highway Signs
- Guidelines for Preparation of Traffic Control and Pavement Marking Plans for Design-Build Projects
- Design-Build Submittal Guidelines

**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 Transportation Management Plans (TMP).

**WZTC Website:** <https://connect.ncdot.gov/projects/WZTC/>

**Transportation Management Plans**

The Design-Build Team shall prepare Transportation Management Plans (TMP) that include Temporary Traffic Control Plans (TCP), an Incident Management Plan (IMP), a Traffic Operations Plan (TOP), the requirements of which are included in this Scope of Work; and assist the Department in the development of a Public Information Plan (PIP) in accordance with the Public Information Scope of Work found elsewhere in this RFP.

The Design-Build Team shall produce TMP for each phase of work that impacts road users. The TMP 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 TMP that include procedures to communicate TMP information to the public about road and travel conditions within the work zone and affected roadway network.

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 (ROW). 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.

The Design-Build Team shall select a Private Engineering Firm (PEF) that has experience developing TMP on comparable projects for the North Carolina Department of Transportation (NCDOT) and shall list these comparable projects in the Technical Proposal.

In the event any self-imposed liquidated damages are included in the Technical Proposal an Intermediate Completion Time(s) shall be established and shall become part of the contract.

### **General Requirements**

Unless permitted otherwise elsewhere in this RFP, maintain the existing number of travel lanes on all roads. For existing travel lanes that are 11-foot wide or wider, maintain a minimum of 11-foot travel lanes at all times. For existing travel lanes that are narrower than 11 feet, maintain the existing travel lane width at all times. Unless permitted otherwise elsewhere in this RFP, for existing shoulders, maintain a minimum of the existing shoulder width.

Traffic control devices shall be located a minimum 2-foot offset (shy distance) from the edge of an open travel lane.

Placement of temporary barrier systems shall be shown on the Transportation Management Staging Concept. Temporary barrier systems shall be designed in accordance with the following requirements:

- Determine the need for temporary barrier in accordance with the FHWA *Final 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 on 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 Roadside Design Guide in determining the length of need, flare rate and clear zone. The Design-Build Team shall adhere to the possible deflection of the proposed temporary barrier system in accordance with NCHRP-350 deflections from crash testing. Providing less than the minimum deflection distance shall require the use of anchored temporary barrier systems in accordance with the NCDOT 2012 *Standard Specifications for Roads and Structures*.

The design speed for temporary alignments of NC and US 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.

The 2012 *Roadway Standard Drawing* No. 1101.11 shall be used to calculate the length of temporary merges for lane closures and temporary traffic shifts. 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 crown 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 crown breaks in a normal crown section shall only occur on a lane line or lane midpoint, and shall not exceed 0.04.

Temporary traffic shifts requiring vertical grades shall be considered a temporary alignment. All temporary alignments shall adhere to the NCDOT Roadway Design Manual, 2011 AASHTO, *A Policy on Geometric Design of Highways and Streets* and the most current Highway Capacity Manual.

Maintain access to all residences, schools, bus stops, mass transit facilities (park and ride lots), emergency services and businesses at all times. Prior to incorporation, obtain written approval from the Engineer on method to maintain access.

Traffic traveling in the same direction shall not be split. (i.e. separation by any type of barrier, bridge piers, existing or proposed median, etc.).

Obtain written approval from the Engineer of any road closure prior to incorporation.

Prior to incorporation, all offsite detour routes shall be approved in writing by the Engineer and shall adhere to the following requirements:

- The Design-Build Team shall be responsible for investigating all detour routes including but not limited to, analyzing traffic capacity, investigating impacts to emergency services and schools, analyzing design characteristics to ensure the design supports the traffic volumes (existing traffic volumes plus detoured traffic volumes), and investigating pavement structural adequacy including any bridge postings on the detour route.
- The Design-Build Team shall determine and provide 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.
- Submit detour routes and all associated sign designs for review and acceptance prior to incorporation.



- 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.)
- Use only state maintained roads for off-site detour routes.

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 entail, but is not 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 on proposed overhead structures and providing the minimum clear widths as follows:

<b>Roadway</b>	<b>Minimum Clear Width</b>
US 264, US 13 / US 264 Alternate	20 feet
All other roadways	18 feet

The Design-Build Team shall coordinate with the Division Operation Engineer, Division Traffic Engineer, NCDOT Communications Office, the Division 2 Traffic Operations Center, the City of Ayden and the City of Greenville to manage traffic operations within the work zone and other roadways within the network that may be affected by the work zone activities. Coordination shall include, but not be limited to, providing notification of planned lane or road closures, traffic detours, public information, traffic management, access management, incidents, etc.

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 Transportation Management Plans.

The Design-Build Team shall take steps to minimize disruptions to existing roadway facilities during construction and shall demonstrate how the traffic control phasing, minimizes inconvenience to motorist on all roads.

### **Lane Closure Notice (LCN)**

The Design-Build Team shall issue a Lane Closure Notice (LCN) to NCDOT and affected government entities a minimum of twenty-one (21) 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 Traffic Management Plans,

The Design-Build Team shall issue a Road Closure Notice (RCN) to NCDOT and affected government entities a minimum of twenty one (21) 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, 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.

## **II. Project Operations Requirements**

The following are Time Restrictions and notes that shall be included with the Transportation Management Plans General Notes, unless noted otherwise elsewhere in this RFP:

### **A. Time Restrictions**

#### **1. Intermediate Contract Times #1 and #2 for Lane Narrowing, Lane Closure, Holiday and Special Event Restrictions**

As a minimum, the Design-Build Team shall maintain the existing number of lanes and traffic patterns; and shall not close or narrow a lane during the times below. When traffic is placed into the final traffic pattern for any roadway, that shall become the minimal traffic pattern and the following time restrictions shall still apply.

<b>Road</b>	<b>Day and Time Restrictions</b>
	Monday thru Friday
NC 11, Forlines Road, US 13 / US 264 Alternate and US 264, including all ramps / loops	6:00 a.m. to 9:00 a.m. and 3:00 p.m. to 7:00 p.m.

The Design-Build Team shall not install, reset, and / or remove any traffic control device during the times listed above.

In addition to the lane / shoulder narrowing and closure restrictions stated above, the Design-Build Team shall not close or narrow a lane, detain the traffic flow 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:

- (a) For any unexpected occurrence that creates unusually high traffic volumes, as directed by the Engineer.
- (b) For New Year's between the hours of 6:00 a.m. December 31<sup>st</sup> and 7:00 p.m. January 2<sup>nd</sup>. If New Year's Day is on a Friday, Saturday, Sunday or Monday then to 7:00 p.m. the following Tuesday.
- (c) For Easter, between the hours of 6:00 a.m. Thursday and 7:00 p.m. Monday.
- (d) For Memorial Day, between the hours of 6:00 a.m. Friday and 7:00 p.m. Tuesday.
- (e) For Independence Day, between the hours of 6:00 a.m. July 3<sup>rd</sup> and 7:00 p.m. July 5<sup>th</sup>. 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 7:00 p.m. the Tuesday after Independence Day.
- (f) For Labor Day, between the hours of 6:00 a.m. Friday and 7:00 p.m. Tuesday.
- (g) For Thanksgiving Day, between the hours of 6:00 a.m. Tuesday and 7:00 p.m. Monday.
- (h) For Christmas, between the hours of 6:00 a.m. the Friday before the week of Christmas Day and 7:00 p.m. the following Tuesday after the week of Christmas Day.
- (i) For East Carolina University home football games from 12 hours prior to the beginning of the game until 12 hours following the completion of the game.
- (j) For East Carolina University graduation between the hours of 6:00 a.m. Friday and 7:00 p.m. Monday.

**Liquidated Damages for Intermediate Contract Time #1 for the above lane narrowing, lane closure, holiday, and special event time restrictions for US 264 (including all ramps and loops) are \$500.00 per 15-minute period or any portion thereof.**

**Liquidated Damages for Intermediate Contract Time #2 for the above lane narrowing, lane closure, holiday, and special event time restrictions for NC 11, Forlines Road and US 13 / US 264 Alternate (including all ramps and loops) are \$500.00 per hour or any portion thereof.**

**2. Intermediate Contract Time #3 for Road Closure Restrictions for Installation of Overhead Sign Assemblies Over Travel Lanes**

As a minimum, the Design-Build Team shall maintain the existing traffic pattern and follow the road closure restrictions 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.

The Design-Build Team shall not close any direction of travel for the following roads or any ramps / loops during the times noted below. Closure shall only be allowed for installation of overhead sign assemblies over travel lanes.

<b>Road</b>	<b>Day and Time Restrictions</b>
NC 11 and US 264, including all ramps / loops	Monday thru Sunday 5:00 a.m. to 11:59 p.m.

The maximum road closure duration shall not exceed **30 minutes** for the roadways listed above (unless a detour is proposed and approved by NCDOT).

The Design-Build Team shall indicate the intended frequency of road closures for the above construction activities in the Technical Proposal.

Proposed road closures for any road within the project limits shall be approved by the Engineer prior to incorporation in the Transportation Management Plans.

**Liquidated Damages for Intermediate Contract Time #3 for the above road closure time restrictions for NC 11 and US 264 (including all ramps and loops) are \$500.00 per 15-minute period, or any portion thereof.**

**3. Intermediate Contract Time #4 for Road Closure Restrictions for Bridge Girder Installation over Travel Lanes**

As a minimum, the Design-Build Team shall maintain the existing traffic pattern and follow the road closure restrictions 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.

The Design-Build Team shall not close any direction of travel for the following roads during the times noted below. Closure shall only be allowed for bridge girder installation over travel lanes.

Road	Day and Time Restrictions
Old Snow Hill Road (SR 1113), Abbot Farm Road (SR 1117), NC 903 and US 13 / US 264 Alternate, including all ramps / loops	Monday thru Sunday 6:00 a.m. to 9:00 p.m.

The maximum road closure duration shall not exceed **30 minutes** for the roadways listed above (unless a detour is proposed and approved by NCDOT).

The Design-Build Team shall indicate the intended frequency of road closures for the above construction activities in the Technical Proposal.

Proposed road closures for any road within the project limits shall be approved by the Engineer prior to incorporation in the Transportation Management Plans.

**Liquidated Damages for Intermediate Contract Time #4 for the above road closure time restrictions for Old Snow Hill Road (SR 1113), Abbot Farm Road (SR 1117), NC 903, and US 13 / US 264 Alternate (including all ramps and loops) are \$500.00 per 15-minute period, or any portion thereof.**

#### **4. Intermediate Contract Time #5 for Continuous Road Closure of Pocosin Road (SR 1125)**

With an approved offsite detour, the Design-Build Team may continuously close Pocosin Road (SR 1125) for **no more than 540 consecutive days**. Prior to the continuous road closure, the Design-Build Team shall install a Department approved detour route. The Design-Build Team shall not concurrently close Pocosin Road (SR 1125) and Frog Level Road (SR 1127).

The Design-Build Team shall identify the road closure justification and duration, the detour route, and all proposed improvements to the detour route in the Technical Proposal.

The duration of this intermediate contract time shall begin the day that the Design-Build Team shifts traffic from the existing traffic pattern to the detour route.

The duration of the continuous road closure shall be defined as the duration committed to in the Technical Proposal. The duration thus proposed shall be used to assess liquidated damages in accordance with ICT #5.

**Liquidated Damages for Intermediate Contract Time #5 for the above continuous road closure time restriction of Pocosin Road (SR 1125) are \$3000.00 per day or any portion thereof.**

**5. Intermediate Contract Time #6 for Continuous Road Closure of Frog Level Road (SR 1127)**

With an approved offsite detour, the Design-Build Team may continuously close Frog Level Road (SR 1127) for **no more than 540 consecutive days**. Prior to the continuous road closure, the Design-Build Team shall install a Department approved detour route. The Design-Build Team shall not concurrently close any combination of Frog Level Road (SR 1127), Bell Arthur Road (SR 1206), and Pocosin Road (SR 1125).

The Design-Build Team shall identify the road closure justification and duration, the detour route, and all proposed improvements to the detour route in the Technical Proposal.

The duration of this intermediate contract time shall begin the day that the Design-Build Team shifts traffic from the existing traffic pattern to the detour route.

The duration of the continuous road closure shall be defined as the duration committed to in the Technical Proposal. The duration thus proposed shall be used to assess liquidated damages in accordance with ICT #6.

**Liquidated Damages for Intermediate Contract Time #6 for the above continuous road closure time restriction of Frog Level Road (SR 1127) are \$750.00 per day or any portion thereof.**

**6. Intermediate Contract #7 for Ramp and Loop Road Closure Restrictions for Resurfacing Operations**

As a minimum, the Design-Build Team shall maintain the existing traffic pattern and follow the road closure restrictions listed below. When a ramp and / or loop closure is used, the Design-Build Team shall reopen the travel lanes by the end of the road closure duration.

The Design-Build Team shall not close any direction of travel for the following ramps and / or loops during the times noted below. Closure shall only be allowed for resurfacing tie-in operations.

<b>Road</b>	<b>Day and Time Restrictions</b>
US 13 / US 264 Alternate Ramps / Loops US 264 Ramps / Loops	Monday thru Sunday 6:00 a.m. to 10:00 p.m.

Proposed road closures for any ramp or loop shall be approved by the Engineer prior to incorporation in the Transportation Management Plans.

**Liquidated Damages for Intermediate Contract Time #7 for the above road closure time restrictions for the US 13 / US 264 Alternate ramps and / or loops and the US 264 ramps and / or loops are \$1,000.00 per 15-minute period or any portion thereof.**

**7. Intermediate Contract Time #8 for Continuous Road Closure of Bell Arthur Road (SR 1206)**

With an approved offsite detour, the Design-Build Team may continuously close Bell Arthur Road (SR 1206) for **no more than 100 consecutive days**. Prior to the continuous road closure, the Design-Build Team shall install a Department approved detour route. The

Design-Build Team shall not concurrently close Bell Arthur Road (SR 1206) and Frog Level Road (SR 1127).

The Design-Build Team shall identify the road closure justification and duration, the detour route, and all proposed improvements to the detour route in the Technical Proposal.

The duration of this intermediate contract time shall begin the day that the Design-Build Team shifts traffic from the existing traffic pattern to the detour route.

The duration of the continuous road closure shall be defined as the duration committed to in the Technical Proposal. The duration thus proposed shall be used to assess liquidated damages in accordance with ICT #8.

**Liquidated Damages for Intermediate Contract Time #8 for the above continuous road closure time restriction of Bell Arthur Road (SR 1206) are \$1500.00 per day or any portion thereof.**

#### **B. Hauling Restrictions**

The Design-Build Team shall adhere to the hauling restrictions noted in the NCDOT 2012 *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.
- Haul vehicles shall not enter and / or exit an open travel lane at speeds more than 10 mph below the posted speed limit.
- Hauling entrances, exits and crossings shall be shown on the Transportation Management Plan and be in accordance with the NCDOT 2012 Roadway Standard Drawings.
- Hauling operations that perpendicularly cross a roadway shall require Traffic Control and shall be subject to the time restrictions, and holiday, holiday weekend and special event restrictions listed in ICT #1 and #2.

The Design-Build Team shall address how hauling will be conducted in the Technical Proposal, including but not limited to, hauling of any materials to and from the site and hauling material within the NCDOT right of way.

#### **C. Lane and Shoulder Closure Requirements**

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.

When barrier is placed on the shoulder of a roadway, the Design-Build Team shall install shoulder closure signs and devices in advance of the barrier using NCDOT 2012 Roadway Standard Drawing No. 1101.04.

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 NCDOT 2012 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 5 feet of an open travel lane, the Design-Build Team shall, at a minimum, close the nearest open travel lane using the NCDOT 2012 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 10 feet of an open travel lane, the Design-Build Team shall, at a minimum, close the nearest open travel lane using NCDOT 2012 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 appropriate roadway standard drawing from the NCDOT 2012 *Roadway Standard Drawings*. The Design-Build Team shall conduct the work so that all personnel and / or equipment remain within the closed travel lane.

Within the same location, the Design-Build Team shall not perform work simultaneously within 15 feet of the edge of both sides of an open travelway unless protected by guardrail or barrier.

The Design-Build Team shall not install more than one mile of lane closure on any roadway measured from the beginning of the merge taper to the end of the lane closure.

The Design-Build Team shall not install more than one lane closure in any one direction on any roadway.

#### **D. Pavement Edge Drop off Requirements**

The Design-Build Team shall backfill at a 6:1 slope up to the edge and elevation of the existing pavement in areas adjacent to an opened travel lane that has an edge of pavement drop-off as follows:

- Elevation differences that exceed 2 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 3 inches on roadways with posted speed limits less than 45 mph and with 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 2 inches in elevation between open lanes of traffic for nominal paving lifts of 1.5 inches. Install advance warning “UNEVEN LANES” signs (W8-11) 1000 feet in advance and a minimum of every half-mile throughout the uneven area.

#### **E. Traffic Pattern Alterations**

The Design-Build Team shall notify the Engineer in writing at least twenty-one (21) calendar days prior to any traffic pattern alteration. (Reference the Public Information Scope of Work found elsewhere in this RFP for public information requirements)

#### **F. Signing**

The Design-Build Team shall install advance work zone warning signs when work is within 40 feet from the edge of travel lane and no more than three days prior to the beginning of 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 ensure proper signing (including but not limited to guide signs) is in place at all times during construction, as required by the *MUTCD*. All temporary signing shall be shown on the Transportation Management Plans and / or a Temporary Signing Plan to be approved by the Work Zone Traffic Control Section and / or the Signing and Delineation Unit.

#### **G. Traffic Barrier**

The Department will not provide any type of barrier for this project. The Design-Build Team shall use only an NCDOT approved temporary traffic barrier system and adhere to the following requirements:

- Install temporary traffic barrier system a maximum of two (2) weeks prior to beginning work in any location. Once the temporary traffic barrier system is installed at any location, proceed in a continuous manner to complete the proposed work in that location.
- Place all temporary barrier used for traffic control directly on an asphalt or concrete surface.
- Temporary barrier used for traffic control shall not act as a retaining wall.

- Once the temporary traffic barrier system is installed and no work has been or will be performed behind the temporary traffic barrier system for a period longer than two (2) months, remove / reset the temporary traffic barrier system unless the barrier is protecting traffic from a hazard.
- Install temporary barrier system with the traffic flow beginning with the upstream side of traffic. Remove temporary barrier system against the traffic flow beginning with the downstream side of traffic.
- Install drums to close or keep closed tangent sections of the roadway until the temporary traffic barrier system can be placed or after the temporary traffic barrier system has been removed. The distance in feet, between drums shall be no greater than twice the posted speed limit (mph).
- The Design-Build Team shall minimize the presence of portable concrete barrier along acceleration ramps / loops. At acceleration ramps / loops, the Design-Build Team shall install temporary traffic barrier system in a manner that provides a minimum of 200 feet from the end of the pavement marking taper to the beginning of the barrier taper.
- Protect the approach end of temporary traffic barrier system (except for water filled barrier) at all times during the installation and removal of the barrier by either a truck mounted impact attenuator (maximum 72 hours) or a temporary crash cushion.
- Protect the approach end of the temporary traffic barrier system (except water filled barrier) from oncoming traffic at all times by a temporary crash cushion unless the approach end of the temporary traffic barrier system is offset from oncoming traffic as follows:

<b>Posted speed limit (mph)</b>	<b>Minimum offset (feet)</b>
40 or less	15
45 - 50	20
55	25
60 mph or higher	30

- The Design-Build Team shall be responsible for providing proper connection between the existing bridge rails and temporary barrier systems and include this information in the appropriate plans.

## **H. Traffic Control Devices**

The Design-Build Team shall use traffic control devices that conform to all NCDOT requirements and are listed on the Approved Products List. The Approved Products List is shown on NCDOT's website at:

**<https://apps.dot.state.nc.us/vendor/approvedproducts/>**

The use of any devices that are not shown on the Approved Products List shall require written approval from the Design-Build Unit prior to incorporation.

Channelizing device spacing shall not exceed a distance in feet equal to twice the posted speed limit. Channelization devices shall be spaced 10 feet on-center in radii. Channelization devices shall be three feet off the edge of an open travelway, when lane closures are not in effect. Skinny drums shall only be allowed as defined in Section 1180 of the NCDOT 2012 *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 to allow for ingress or egress.

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.

Portable changeable message signs should be placed off the shoulder of the roadway and behind a traffic barrier, if practical. Where a traffic barrier is not available to shield the portable changeable message sign, it should be placed off the shoulder and outside of the clear zone. If a portable changeable message sign must be placed on the roadway shoulder or within the clear zone, it shall be delineated with retro reflective temporary traffic control (TTC) devices. When portable changeable message signs are not being used to display TTC messages, they should be relocated such that they are outside of the clear zone or shielded behind a traffic barrier, and turned away from traffic. If relocation or shielding is not practical, the portable changeable message signs shall be delineated with retro reflective TTC devices.

## **I. Temporary Pavement Markings, Markers and Delineation**

The Design-Build Team shall show temporary pavement markings on the Traffic Control Plans that meet the requirements of the RFP and the *Guidelines for Preparation of Traffic Control and Pavement Marking Plans for Design-Build Projects*.

The Design-Build Team shall 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 pavement markings and markers in accordance with the NCDOT 2012 *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 that are the same width as existing pavement marking on all roadways. For roadways that do not have existing pavement markings, the Design-Build Team shall install temporary pavement markings that are the same width as required for the final pavement markings in the Pavement Markings Scope of Work found elsewhere in this RFP.

The Design-Build Team shall install temporary pavement markings and temporary pavement markers on the interim surface or temporary pattern as follows:

<b>Road</b>	<b>Marking</b>	<b>Marker</b>
All Roads	Any Marking on the Approved Products List	Raised Temporary
All Structures	Cold Applied Plastic Type IV - Removable Tape or Paint	Raised Temporary

The Design-Build Team may use any type of pavement markings on the NCDOT Approved Products List for temporary patterns. However, the Design-Build Team shall maintain a minimum retroreflectivity for pavement markings on all roads (existing and temporary markings) at all times during construction, as follows:

White:	125 mcd / lux / m2
Yellow:	100 mcd / lux / m2

When using Cold Applied Plastic Type IV – Removable Tape pavement markings, place temporary raised markers half on and half off edgelines and centerlines to help secure the tape to the roadway. Markers shall be spaced the appropriate distance apart as described by the 2012 *Roadway Standard Drawing* No. 1250.01, Sheet 1 of 3.

Tie proposed pavement marking lines to existing pavement marking lines.

Remove / replace any conflicting / damaged pavement markings and markers by the end of each day's operation.

Trace existing and / or proposed monolithic island locations with the proper color pavement marking prior to removal and / or installation. Place drums to delineate existing and / or proposed monolithic islands after removal and / or installation.

The Design-Build Team shall not place temporary markings other than Cold Applied Plastic Type IV – Removable Tape on any final pavement surface unless the temporary markings are placed in the exact location of the final pavement 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. Temporary pavement markings shall not be obliterated 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.

#### **J. Temporary Traffic Signals**

Use the following notes if the Design-Build Team recommends using temporary signals for maintenance of traffic. All recommended traffic signals must be approved by the Regional Traffic Engineer before implementation.

- Notify the Engineer in writing a minimum of two months before a traffic signal installation is required.
- Shift and revise all signal heads as shown on the accepted Traffic Signal Plans developed by the Design-Build Team.

#### **K. Traffic Control Supervisor**

The Design-Build Team shall provide the service of at least one qualified Traffic Control Supervisor for the project in accordance with Section 1101-13 of the Standard Specifications for Roads and Structures.

The Traffic Control Supervisor shall be knowledgeable of Traffic Control Plan design, devices and application, and has full authority to ensure traffic is maintained in accordance with the plans and specifications.

The Design-Build Team shall identify a Traffic Control Supervisor in the Technical Proposal along with that individual's qualifications. At a minimum, the Traffic Control Supervisor shall have the following qualifications:

1. A minimum 24 months of On-the-Job Training in supervision and work zone set up and implementation on similar projects.
2. Be certified by responsible party (contractor or NCDOT) to have the required experience and training and is qualified to perform the duties of this position. If certified by the contractor, a notarized certification letter shall be furnished to the Engineer at the preconstruction meeting. The letter shall state the Traffic Control supervisor is qualified, and state that the Traffic Control Supervisor has the authority to ensure traffic is maintained in accordance with the contract documents.

The Traffic Control Supervisor for the project shall be capable of performing the following:

1. During construction, be available or on call 24 hours per day, 7 days per week to direct / make any necessary changes in the traffic control operations in a timely and safe manner. The Design Build Team shall provide the Engineer with back up contacts for times when the Traffic Control Supervisor will not be available.
2. 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 setup is maintained throughout the project at all times, including periods of construction inactivity.
3. Coordinate and cooperate with NCDOT Division Incident Management staff.
4. Coordinate and cooperate with personnel at the Division 2 Traffic Operations Center, and the City of Greenville to ensure proper messages are displayed on the CMSs and DMSs.
5. Provide traffic control setup that ensures safe traffic operations and workers' safety throughout the construction area.
6. Attend all scheduled incident management, traffic control coordination, and team meetings, as required by the Engineer.
7. Monitor traffic delays and backups within the work zone.

#### **L. Law Enforcement**

Law enforcement officers shall be used during any rolling road block operations 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 Design-Build Team shall:

- Be responsible for coordinating with the law enforcement agency for the use of law enforcement officers.
- Only utilize officers who are outfitted with law enforcement uniforms and marked vehicles, which are equipped with proper lights mounted on top of the vehicle and agency emblems.
- 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.

**M. Temporary Shoring for the Maintenance of Traffic**

The Design-Build Team shall be responsible for all required temporary shoring, including but not limited to providing, installing, maintaining and removing. Temporary shoring for the maintenance of traffic is 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 5 feet from the edge of pavement of the open travelway. The Design-Build Team shall identify locations where “temporary shoring for maintenance of traffic” will be required on the Traffic Control Staging Concept. 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 Section website. 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 Traffic Control Plans)

The NCDOT Geotechnical Engineering Unit and Work Zone Traffic Control websites have more information on temporary shoring. The Design-Build Team shall adhere to the additional shoring requirements located on the websites noted below:

**<https://connect.ncdot.gov/resources/Geological/Pages/default.aspx>**

**<https://connect.ncdot.gov/projects/WZTC/Pages/default.aspx>**

The Design-Build Team shall identify on the appropriate traffic control detail where temporary shoring will be used by providing station limits, offsets, type of shoring and where temporary traffic barrier will be located, if needed.

**N. Portable Temporary Lighting**

Provide portable temporary lighting to conduct night work in accordance with the NCDOT 2012 *Standard Specifications for Roads and Structures*.

**O. Coordination**

The Design-Build Team shall coordinate with the City of Ayden, the City of Greenville, and NCDOT Resident Engineer in charge of any project in proximity to this project for any work that may affect the construction and / or the temporary traffic control of this project.

The Design-Build Team shall coordinate with the City of Ayden, the City of Greenville, and NCDOT Resident Engineer in charge of any project in proximity to this project to determine the placement of advance warning signs on all roads within the project limits.

The Design-Build Team shall coordinate with the Division Operations Engineer, Division Traffic Engineer, Law Enforcement, Emergency Services and the Work Zone Traffic Control Section to schedule and attend Traffic Safety and Operations Meetings. These meetings shall be held to monitor and assess safety and mobility during construction. The Traffic Safety and Operations Meetings shall be held on an as needed basis during project construction. Additional Traffic Safety and Operations Meetings shall be held to address any specific issue, as directed by the Engineer.



**PAVEMENT MARKINGS SCOPE OF WORK** (8-6-14)**General**

The Design-Build Team shall prepare Final Pavement Marking Plans in accordance with the 2009 edition of the *Manual on Uniform Traffic Control Devices (MUTCD)*, the 2012 NCDOT Roadway Standard Drawings, “*Guidelines for Preparation of Traffic Control and Pavement Marking Plans for Design-Build Projects*”, the “*Design-Build Submittal Guidelines*” and the contract requirements contained herein.

**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 that 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 2012 NCDOT Roadway Standard Drawings. If the roadway geometry does not allow for the use of the standard details, contact the NCDOT Contract Standards & Development Unit for alternative approved curb ramp designs.

**Pavement Markings, Markers and Delineation**

The Design-Build Team shall not place any final pavement markings or markers until the Final Pavement Marking Plans are reviewed and accepted by the Department.

The Design-Build Team shall use pavement marking and marker products that conform to all NCDOT requirements and are listed on the NCDOT's Approved Products List. The use of any devices that are not shown on the Approved Product List shall require written approval from the Signing and Delineation Standards Unit prior to incorporation.

The Design-Build Team shall install pavement markings and markers in accordance with the NCDOT 2012 *Standard Specifications for Roads and Structures*, and in accordance with the manufacturer's procedures and specifications.

The Final Pavement Marking Plans shall address any required modifications to existing pavement markings located outside the project limits to ensure appropriate tie-ins. The Design-

Build Team shall install all pavement markings and markers, located within and outside the project limits, resulting from the project construction.

The Design-Build Team shall install pavement markings and pavement markers on the final surface as follows:

<b>Road</b>	<b>Marking</b>	<b>Marker</b>
All -L- Line, asphalt surfaces, including all ramps and loops	Thermoplastic	Snowplowable
All -L- Line, concrete surfaces, including all ramps and loops (Excluding Concrete Bridge Decks)	Polyurea with Highly Reflective Elements	Snowplowable
Concrete Bridge Decks	Cold Applied Plastic, Type III	Raised
NC 11 Business, NC 102 and US 64	Thermoplastic	Raised
All other -Y- Lines	Paint or Match Existing	Match Existing

On concrete surfaces, the Design-Build Team shall install Heated-in-Place Thermoplastic or Cold Applied Plastic (Type II or III) marking for stop bars, symbols, characters and diagonals.

On asphalt surfaces, the Design-Build Team shall install Heated-in-Place Thermoplastic or Extruded Thermoplastic markings for stop bars, symbols, characters and diagonals.

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.

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 lines, edge lines and skips) for the final pavement marking. The Design-Build Team shall install gore lines that are twice the edge line width.

Using water blasting (hydro blasting) or grinding, the Design-Build Team shall remove all residue and surface laitance on all concrete surfaces prior to placing the final pavement marking materials.

**RIGHT OF WAY SCOPE OF WORK** (2-5-15)

**\*\* 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 Branch**, 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 permanent 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 also 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. Neal Strickland, in the NCDOT Right of Way Branch, at 919-707-4364. The Design-Build Team shall perform the services as set forth herein and furnish and deliver to the Department reports accompanied by all documents 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 R-2250 in Pitt County.

**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 of any 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 related 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 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 Department's Right of Way Manual.
- The Department will prepare Condemnation Maps. The Design-Build Team shall prepare all Final Condemnation Reports. 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 and the Attorney General in writing that revisions have been made that impact a condemned parcel, and provide updated plan sheets 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. 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.
  - 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 Engineer in writing, the Design-Build Team shall provide right of way, control of access and easement descriptions in metes and bounds format (bearings and distances). The Design-Build Team shall provide exhibits, diagrams and / or other information required to verify the aforementioned descriptions.
  - In accordance with the NCDOT Right of Way Manual, 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.
- 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 be added to the approved state certified appraiser list, subject to approval by the Department’s State Appraiser.
- The Design-Build Team shall provide two appraisals for all appraisals over \$1,000,000.00.
- 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 10 business days from the date of receipt, all appraisals 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 acquisition.
- 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. The Department will be responsible for the Health Department 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.
- The Design-Build Team shall provide a right of way certification prior to entering the property.
- 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.
- In accordance with Chapter 133 of the *General Statutes of North Carolina*, Section 133-40, the Council of State must approve acquisition of property with contaminated soil. Thus, 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 State Property Agent, 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

The Department will require 90 days from receipt of the information noted above to coordinate with the Council of State and obtain their approval for the acquisition of contaminated property.

**UTILITIES COORDINATION SCOPE OF WORK** (2-6-15)

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 Design-Build Team shall be responsible for coordinating all utility relocations, removals, and / or adjustments where the Design-Build Team and Utility Company, 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.

**Cost Responsibility**

The Design-Build Team shall be responsible for all costs associated with relocating water and sewer facilities, as described in the Water and Sewer Section of this Scope of Work.

The NCDOT will be responsible for all other non-betterment utility relocation cost when the utility company has prior rights of way / compensable interest. The utility company shall be responsible for the relocation costs if they cannot furnish evidence of prior rights of way or a compensable interest in their facilities. The Design-Build Team shall be responsible for verifying / determining the cost responsibility (prior rights and compensable interest) for the utility relocations. The Design-Build Team shall be responsible for all costs associated with utility relocations due to haul roads and / or any other temporary conditions resulting from the Design-Build Team's methods of operation or sequence of work.

**Project Details**

The Design-Build Team shall be responsible for verifying the utility locations, type of facilities, and identifying the utility owners in order to coordinate the relocation of any utilities, known and unknown, in conflict with the project. The following utilities are known to be located within the project construction limits:

<b>Utility Owner</b>	<b>Utility Type</b>	<b>Typical Cost Responsibility</b>
Greenville Utilities Commission	Power	NCDOT
Greenville Utilities Commission	Gas	NCDOT
Sudden Link	Cable	Utility Owner
Century-Link Telephone	Fiber Optic Cable	Utility Owner / NCDOT
MCNC	Fiber Optic Cable	Utility Owner / NCDOT
Greenville Utilities Commission	Water and Sewer	Utility Owner
Bell Arthur Water Corporation	Water	NCDOT
Neuse Regional Water & Sewer Authority *	Water & Sewer	NCDOT
Town of Ayden	Water & Sewer	NCDOT
Town of Ayden	Power	NCDOT
Town of Farmville	Water	NCDOT
Piedmont Natural Gas	Gas	Utility Owner / NCDOT
Contentnea Metropolitan Sewerage District	Sewer	NCDOT

\*The Neuse Regional Water & Sewer Authority membership consists of separate entities that shall individually review plans for their facilities.

### **Utility Conflicts**

Cooperating with the utility owners, the Design-Build Team shall identify all conflicts between the existing utility facilities and the project design and / or construction. At a minimum, the Design-Build Team shall adhere to the following utility location / relocation criteria:

1. Excluding the utilities noted below, all utilities shall be relocated / located outside of the full control of access limits:
  - a. Utilities crossing a full control of access roadway that are located within the normal right of way of a roadway with no control of access
  - b. The existing Neuse Regional Water & Sewer Authority 30" water line along existing NC 11, provided all the other requirements listed below are met
  - c. The existing Contentnea Metropolitan Sewerage District 36" gravity sanitary sewer located along existing NC 11, provided all the other requirements listed below are met
2. Utilities shall be accessible and serviceable without access from roadways and / or ramps / loops that are within full control of access limits.
3. Proposed and relocated utilities will be allowed within the outer limits of the right of way of a partial control of access roadway at five-foot increments. Existing utilities along partial control of access roadways will be allowed to remain in place if they are structurally adequate.
4. Utilities that are not structurally adequate for all anticipated loads, including but not limited to construction loads, earthen dead loads, operational traffic and impact loads, shall be replaced / relocated.
5. All above ground utilities shall be relocated / located outside of the vehicle recovery area.
6. Excluding paved shoulders, proposed and relocated water lines and sanitary sewer lines shall be encased when located under pavement. Existing utilities located under pavement that are structurally adequate do not require encasement.

**\*\* Note \*\* Only the exceptions noted above will be granted for existing and proposed utilities within full control of access limits.**

### **Water and Sewer**

If the Design-Build Team's design and / or construction requires the relocation and / or encasement of existing water or sewer facilities, designs shall be coordinated with the NCDOT Utilities Unit. All costs associated with the design and construction for relocation and / or encasement of these existing 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 project. 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.

Designs shall be coordinated with the NCDOT Utilities Unit and the utility owners or their representatives. The Design-Build Team shall be responsible for submitting five (5) sets of 11 x 17 utility construction drawings to the State Utility Agent, via the Design-Build Unit, for further handling. Each set shall include a title sheet, plan sheets, profiles and special provisions, if required. Once accepted by the State Utility Agent, the plans, with the appropriate agreement, will be sent to the utility owner for review and concurrence.

The relocation of all water and sewer facilities shall be done in accordance with the NCDOT policies and the latest utility owner design requirements / specifications. 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 aforementioned utility owners prior to installation.

The water and sewer relocations shall be functionally equivalent to the existing facilities and shall have a negligible impact on the existing system capabilities. Utility Construction Drawings shall include calculations that demonstrate the change between the existing and proposed systems is less than +1 / -3 psi total dynamic head for pressurized pipelines and less than 2% reduction of flow rate in gravity flow lines.

The Design-Build Team shall not interrupt the Contentnea MSD sewer service or the Neuse Regional Water & Sewer water or sewer services. The Design-Build Team shall indicate in the Utility Relocation Plans how service will be maintained at all times during relocation of the aforementioned sewer and water services.

### **Utility Relocation Plans**

In the event of a utility conflict, the Design-Build Team shall request that the utility company 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.

The Design-Build Team shall submit (3) three copies of the Utility Relocation Plans to the NCDOT State Utility Agent, via the Design-Build Unit, for review and approval prior to 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 found elsewhere in this scope of work). After the review process is complete, the NCDOT Utilities Unit will submit one (1) copy of the Utility Relocation Plans, executed agreements and any necessary comments back to the Design-Build Team. The NCDOT Utilities Unit will also submit a copy of the approved Utility Relocation Plans 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 company.

**Compensable Interest**

Typically, affidavits, recorded easements or NCDOT agreements can serve as evidence of prior rights. A compensable interest is identified as follows:

- (A) Existing or prior easement rights within the limits of the project, either by recorded right of way or adverse possession (Utility occupying the same location for twenty (20) plus years outside the existing highway rights of way).
- (B) Entities covered under *General Statute 136-27.1* and *136-27.2*. Statute requires the NCDOT to pay the non-betterment cost for certain water, sewer and gas relocations.
- (C) Utilities that have a joint-use agreement that constitutes a compensable interest with entities that have existing or prior easements rights within the project limits.

**Additional Work Performed by Design-Build Team for Utility Owners**

If the Design-Build Team elects to make arrangements with a Governmental Agency or any other utility owner for proposed utility construction, in which the Agency / 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 Agency / Utility Owner agree on a plan and a lump sum estimated cost for the utility construction, the Design-Build Team shall be responsible for submitting five (5) sets of 11 x 17 utility construction drawings to the State Utility Agent, 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 Agency / 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 Agreement to the Agency / Utility Owner for reimbursement shall be a two party agreement between the NCDOT and the Agency / Utility Owner; and will be developed and executed by the Department.

If the Design-Build Team is requested, in writing, by a utility company to relocate facilities not impacted by the project's construction, and / or upgrade 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 company. 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 the 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 costs.

The NCDOT will not permit CATV to place poles within the highway rights of way but will allow down guys for their facilities within the highway rights 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 rights of way then plans and encroachment agreements shall be required by the NCDOT.

### **Requirements for attachments to proposed structures**

The Design-Build Team shall avoid attachments to structures where feasible. Attachments shall only be considered when other alternatives are cost prohibitive or are not feasible due to environmental or geographical features. Attachments shall be prohibited under the following conditions, unless noted otherwise elsewhere in this RFP:

- (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 allowed, 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 or girders shall not be allowed.
- (C) A minimum of 18" of clearance to beams and / or girders shall be maintained if possible.
- (D) For water and sewer force mains, only restrained joint Ductile Iron Pipe shall be allowed.

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 company 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 Team's operations. In the event of interruption of any utilities by the project construction, the Design-Build Team shall promptly

notify the proper authority (Utility Company) and cooperate with the authority 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, then 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 construction shall be addressed in accordance with Article 104-7 of the 2012 *Standard Specifications for Roads and Structures*.

The Design-Build Team shall be required to use the guidelines as set forth in the following:

- (A) *NCDOT Utility Manual - Policies & Procedures for Accommodating Utilities on Highway Rights of Way* and the *NCDOT Utilities Policy Manual*. If the two aforementioned manuals contradict each other, the *Utilities Policy Manual* shall govern. Reference the website noted below for the current version of the NCDOT utility manuals and additional information on the transition to the new utility manuals that shall be adhered to:

**<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) *NCDENR Public Water Supply* - Rules governing public water supply
- (G) *NCDENR 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 and / or Encroachment Agreement.

The NCDOT State Utility Agent must execute approved agreements on Design-Build projects. The Utility Relocation Agreements (Cost Agreement) and Encroachment Agreements are available from the NCDOT Utilities Unit. Reference Pages 59 and 60 of the *NCDOT Utility Manual on Policies & Procedures for Accommodating Utilities on Highway Rights of Way* for the different types of Encroachment Agreements available for use.

The Design-Build Team shall be required to 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 rights of way.
- (B) For **all** new utility installations within the existing or proposed highway rights of way. This includes all water, sewer and gas lines owned by entities covered under *General Statute 136-27.1* and *136-27.2*.
- (C) In either case above, the Design-Build Team shall submit 5 copies of the encroachment plans plus 2 originals and 3 copies of the encroachment agreement to the NCDOT State Utility Agent, via the Design-Build Unit, for approval.

**SIGNING SCOPE OF WORK** (2-16-15)**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>**

- Traffic Engineering Practices, Policies, and Legal Authority (TEPPL):

**<https://connect.ncdot.gov/resources/safety/Teppl/Pages/Teppl-Select-Topics.aspx>**

- *Manual on Uniform Traffic Control Devices* (MUTCD):

**[http://mutcd.fhwa.dot.gov/kno\\_2009r1r2.htm](http://mutcd.fhwa.dot.gov/kno_2009r1r2.htm)**

- *2009 NC Supplement to the Manual on Uniform Traffic Control Devices:*

**<https://connect.ncdot.gov/resources/safety/TrafficSafetyResources/2009%20NC%20Supplement%20to%20MUTCD.pdf>**

- *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals* (AASHTO):

**[https://bookstore.transportation.org/collection\\_detail.aspx?ID=126](https://bookstore.transportation.org/collection_detail.aspx?ID=126)**

- *Guidelines for Preparation of Signing 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* (January 2012)

- *NCDOT Roadway Standard Drawings* (January 2012)

### **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 proposed overhead sign structure locations, overhead signs and ground mounted guide signs.

### **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, all -Y- Lines and all cul-de-sacs. 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 and all cul-de-sacs to ensure adequate advance signage and spacing is provided.

### **Sign Designs**

The Design-Build Team shall include all sign designs in the Signing Plans. All sign designs shall be prepared using the latest version of GuideSign software.

The Design-Build Team shall design, fabricate and install all signs required for the Greenville Southwest Bypass (-L- Line), all -Y- Lines, all ramps and loops, including Type A, 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 enhanced mile markers at half-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' from the edge of travel lane. The Design-Build Team shall install mile markers such that the bottom of the mile marker shall be four feet above the edge of travel lane (edge line) elevation. The mile marker designs shall be in accordance with the Intermediate Enhanced Reference Location Signs (D10-5) 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 loops, the Design-Build Team shall fabricate and install advisory speed signing as shown in Figure 2C-3 of the MUTCD. The advisory speed signing shall include W13-6, W13-7 and W1-13R signs.

The Design-Build Team shall design, fabricate and install 30" x 36" Chevron Alignment signs (W1-8) along all interchange loops. Each Chevron Alignment sign shall be:

- installed on two U-channel posts spaced 24" apart with cross bracing
- located and installed so the bottom of the sign is four feet above the edge of the travel lane elevation (left edge of the loop)

The first Chevron Alignment sign shall be installed as close as practical after the exit gore sign (approximately 20' from the exit gore sign), and shall not interfere with or block the exit gore sign. The first five Chevron Alignment signs shall be spaced approximately 40' apart and oriented to optimize the view of approaching motorists. After these first five Chevron Alignment signs, or beyond the midpoint of the curve, Chevron Alignment sign spacing shall adhere to the MUTCD requirements.

Prior to fabrication, the Design-Build Team shall coordinate with the Signing and Delineation Unit on destination cities and / or street names on guide signs.

### **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. 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 shall be 65 mph.

### **Interstate, US, and NC Route Designation**

Interstate, US and NC highway routing is coordinated within the Traffic 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.



Within the project limits, only US 13 and NC 11 shall be rerouted onto the Greenville Southwest Bypass (-L- Line); and shall continue on US 264 to the US 264 / US 13 / NC 11 - NC 903 (North Memorial Drive) interchange. The Design-Build Team shall design, fabricate and install all Type A and B signs and F-Assemblies required along the Greenville Southwest Bypass (-L- Line), US 13, NC 11, NC 33, NC 43 and US 264 (from the US 264 / John P East Memorial Highway to the US 264 / US 13 / NC 11 – NC 903 (North Memorial Drive) interchange) for the aforementioned rerouting. The Department will remove the existing US 13 and NC 11 signs that are no longer required. The Design-Build Team will not be required to design, fabricate or install F-Assemblies on existing US 13 or existing NC 11.

### **Sign Locations**

The Design-Build Team shall determine the station location of all signs and sign structures.

The Design-Build Team shall provide a minimum of two advanced guide signs for all freeway / expressway interchange approaches.

To avoid placing a sign or sign structure in a location that might be in conflict with future roadway projects and / or limit its usefulness / lifespan, the Design-Build Team shall coordinate all proposed sign designs and locations with the Department.

### **Ground Mounted Sign Supports**

The Design-Build Team shall locate, design and install all ground mounted sign supports.

The Design-Build Team shall design, fabricate and install ground mounted signs supports in accordance with the revised NCDOT Roadway Standard Drawing No. 903D10, Sheet 2 of 3, dated March 8, 2012. The aforementioned revised Roadway Standard Drawing and 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>**

Unless otherwise approved by the Department, the vertical mounting height for ground mounted 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 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.

The Design-Build Team shall install all Type E and F signs on a maximum of two wood supports.

### **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:

- An option lane at a multi-lane exit or freeway / ramp split (use Arrow Per Lane signs)
- A freeway ends and “All Traffic Must Exit”
- A freeway lane ends (freeway lane drop)
- Three or more lanes on a freeway ramp
- At the NC 11 / Greenville Southwest Bypass (-L- Line) Split – A series of two NC 11 northbound Arrow-per-Lane Guide Signs (with the first advance guide sign, for a total of three, ground mounted)
- Unless as allowed otherwise below, at the US 264 / Greenville Southwest Bypass (-L- Line) interchange – With appropriate pull-through signs, two Greenville Southwest Bypass northbound Full Span Exit Directionals and one US 264 eastbound Full Span Exit Directional.

The Design-Build Team shall locate, design and install overhead sign structures that meet all Department requirements, including the calculation of windload areas. The windload area shall be flush with the sign height, including exit panels, and sign width. In addition to the area of signs on the structure at the completion of the project, the windload area shall include the area of all future signs that have larger areas. The wind speed for the overhead sign structure and foundation designs for this project shall be 120 mph.

The Design-Build Team shall design, fabricate and install overhead sign supports and foundations in accordance with the *Foundation and Anchor Rod Assemblies for Metal Poles*, *Overhead and Dynamic Message Sign Foundations* and *Overhead Sign Supports* Project Special Provisions found elsewhere in this RFP.

The Design-Build Team may only install proposed signs on the overhead sign assembly(ies) attached to the bridges at the US 264 interchange that are equal or smaller in size than the existing signs. If the Design-Build Team does not install signs on the overhead sign assembly(ies) attached to the bridges at the US 264 interchange, in accordance with the requirement above, the Design-Build Team shall remove and dispose of the overhead sign assembly(ies) attached to the bridges at the US 264 interchange.

The minimum vertical clearance beneath all overhead sign assemblies shall be 17 feet. For all overhead sign assemblies, the Design-Build Team shall submit documentation that verifies the actual vertical clearance at all critical points.

Lighting and walkways will not be required on any overhead sign assembly.

### **Pedestal Overhead Sign Structures**

Pedestal mounted overhead signs will not be allowed at an exit direction sign location or at any location where Exit Only signs are required. Pedestal mounted overhead signs shall only be allowed for advance guide signs and interchange sequence signing, if **all** of the following conditions are met:

- There are three or less travel lanes in each direction
- Only a single sign is required

All pedestal mounted overhead signs shall be located on the right side of the roadway. All pedestal mounted overhead signs shall be located eighteen feet or less from the edge of the travel lane and protected by guardrail or other approved positive protection

### **Shop Drawings for Overhead Sign Structures**

The Design-Build Team shall prepare a shop drawing for each proposed or modified overhead sign structure for the Department's review and approval. For shop drawing design and submittal requirements, see *Guidelines for Preparation of Signing Plans for Design-Build Projects and Standard Specifications for Roads and Structures*.

### **Guardrail or other Positive Protection for Overhead Sign Supports**

Except as allowed below, overhead sign supports shall be located a minimum of 40 feet from the edge of the outside travel lane to the center of the sign supports. To minimize right of way, utility, drainage and / or jurisdictional impacts, or to allow a cantilever overhead sign assembly in lieu of a full-span overhead sign assembly, the minimum 40-foot offset may be reduced. All overhead sign supports that are not located a minimum of 40 feet from the edge of the outside travel lane to the center of the sign support shall be protected by guardrail or other NCDOT approved positive protection barrier. 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 positive protection meets current requirements. If not, the Design-Build Team shall design and construct new positive protection that adheres to current requirements.

**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. 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 revision of the Structure Line Drawing with the shop drawing.

**Existing Overhead Signs and Structures - Excluding the existing overhead sign assemblies attached to the bridges at the US 264 interchange**

Prior to modifying an existing overhead sign assembly to accommodate proposed signs, the Design-Build Team shall perform a structural analysis on the overhead sign structure in accordance with the 2009 AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*, 5<sup>th</sup> Edition and the 2010 and 2011 Interim Revisions. 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.

When the aforementioned structural analysis determines that an existing overhead sign structure is structurally adequate to be retained, 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 windload area, and 8) confirmation that the proposed windload area does not exceed the original windload area.

The Design-Build Team shall remove and dispose of lighting systems and walkways on all existing overhead sign structures that are retained.

**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**

The Design-Build Team shall maintain all existing signs (including all temporary sign installations that may be required by the Transportation Management Plans) during project construction to ensure the signs are in good condition, perform as intended, and are visible to motorists. All signs and supports remaining / existing at the completion of this project shall be plumb, oriented correctly and meet AASHTO requirements.

**Construction Revisions**

After submittal of RFC Signing Plans, the Design-Build Team shall submit all construction revisions to the Department for review and acceptance prior to incorporation.

**As Built Plans**

After project completion, the Design-Build Team shall provide final electronic Signing Plans to the Department. At a minimum, these plans shall include all revisions that took place during project construction and verifications for ground mounted sign supports and overhead structures. These plans shall be provided in .pdf and microstation format.

**TRAFFIC SIGNALS SCOPE OF WORK** (1-21-15)**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, and signal communication plans at locations identified below. This work shall include, but not be limited to, the preparation of Traffic Signal Plans, Closed Loop Signal System Plans, Electrical and Programming Details and Project Special Provisions. These plans shall be prepared in accordance with the “*Design-Build Submittal Guidelines*” and the “*Guidelines for Preparation of Traffic Signal & Intelligent Transportation System Plans on Design-Build Projects*” available on the Design-Build website.

The Design-Build Team shall select a Private Engineering Firm (PEF) that has experience designing and sealing ITS & Signal Plans for NCDOT on comparable projects.

A pre-design meeting **shall** take place between the NCDOT ITS & Signals Unit, the Design-Build Team, the NCDOT Division Traffic Engineer, the NCDOT Regional Traffic Engineer and any other pertinent NCDOT personnel before traffic signal designs begin. Traffic Signal Plan submittals shall only be reviewed and accepted by NCDOT ITS & Signals Unit after this pre-design meeting.

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 and the ITS & Signals Unit. Prior to placing traffic in a new pattern, all traffic signals shall be installed and operational, including but not limited to signal system timing plans and interconnection to the Signal System.

The Design-Build Team shall maintain, monitor and adjust the traffic signals as needed throughout the project. 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 traffic during construction. Prior to implementation, all signal system timing plans shall be reviewed and accepted by the Department.

Throughout the project construction, the Design-Build Team shall 1) maintain full actuation of the traffic signals located within the project limits and 2) maintain system communication between those traffic signals that the Design-Build Team installs spread spectrum wireless radio communication.

The Design-Build Team shall be responsible for providing a safe and economical design for the public. The Design-Build Team shall be responsible for ensuring that all plans and designs conform to the current design standards of the ITS & Signals Unit. Prior to installation, all plans and associated design material and specifications shall be reviewed and accepted by NCDOT.

As required below, the Design-Build Team shall install a spread spectrum wireless communication system which serves as the communications medium between the three proposed traffic signals along US 13 / US 264 Alternate to form a Closed Loop Traffic Signal System.

## II. TRAFFIC SIGNALS

As noted below, there are two traffic signal corridors on this project:

- NC 11
- US 13 / US 264 Alternate

Within the aforementioned corridors, the Design-Build Team shall design and install THREE (3) new traffic signals and maintain operation of ONE (1) existing traffic signal. The Design-Build Team shall interconnect the traffic signals as required below. The traffic signal detection for the final traffic patterns shall be inductive loop detection. The Design-Build Team may provide out of street detection only for temporary traffic patterns during construction. The traffic signal work required at each intersection is listed below.

**\*\* NOTE \*\* – Deleted Proposed Signal NC 11 (1) Table**

<b>Existing Signal NC 11 (1)</b>		
<b>Signal Number</b>	<b>Intersection Description</b>	<b>Work Requirements</b>
<b>02-0031</b>	NC 11 at NC 102 (West Third Street)	<p>The Design-Build Team shall design and implement all temporary traffic signal designs as required by the temporary construction phases and place the traffic signal in the proposed final configuration, when appropriate.</p> <p>Vehicle detection shall be maintained for all movements during construction.</p> <p>Existing equipment including cabinet, controller and signal supports may be reused.</p> <p>System interconnection is not required at this location.</p>

<b>Proposed Signals US 13 / US 264 Alternate (3)</b>		
<b>Signal Number</b>	<b>Intersection Description</b>	<b>Work Requirements</b>
<b>02-0905</b>	US 13 / US 264 Alternate at Greenville Southwest Bypass Ramps A/B	The Design-Build Team shall design and install new, fully actuated traffic signals at these locations. Each design shall include the installation of 2070 controllers and cabinets. Cabinets shall include an auxiliary output file and system interconnection equipment. Final designs shall also include system detection.
<b>02-0906</b>	US 13 / US 264 Alternate at Greenville Southwest Bypass Ramps C/D	Vehicle detection shall be provided for all movements throughout the life of the project.
<b>02-0907</b>	US 13 / US 264 Alternate at SR 1128 (Davenport Farm Road) / SR 1206 (Bell Arthur Road)	The Design-Build Team shall use <b>metal poles strain poles</b> as signal supports.  The Design-Build Team shall establish communication between these three signals with spread spectrum wireless radio. (Reference Section III for signal communication requirements)

### III. SIGNAL COMMUNICATIONS PLANS

As part of the communications design process the Design-Build Team shall **perform a Radio Path Site Survey Test**. The Design-Build Team shall ensure that the test evaluates the Signal Strength (dBm), Fade Margin (dB), Signal-to-Noise Ratio, Data Integrity (poll test) and a complete frequency spectrum scan. The Design-Build Team shall ensure that the Radio Path Site Survey Test is performed using the supplied brand of radio equipment to be deployed. The Design-Build Team shall submit copies of the test results and colored copies of the frequency spectrum scan along with an electronic copy of this information to the Engineer for review and acceptance.

The Engineer during the initial Radio Path Signal Strength Test review may determine that a repeater station shall be necessary to complete the intended link. Additional standalone repeater sites, if necessary, shall be considered incidental to the project.

Upon completion of the **Radio Path Site Survey Test** and acceptance by the Engineer, the Design-Build Team shall provide a detailed set of Wireless Communications Plans and Project Special Provisions 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 Wireless Communications Plans and Specifications.



The Communications Plans and Project Special Provisions shall consist of the four major items listed below:

- Radio Site Survey Test Results
- Wireless Communications Plans
- Project Special Provisions
- Catalog Cut Sheets

The Design-Build Team shall install all antenna in such a manner that avoids conflicts with other utilities (separation distances in accordance with the guidelines of the NESC) and as specified in the antenna manufacturer's recommendations.

**ITS SCOPE OF WORK** (12-12-14)**GENERAL**

Design, furnish, and install ITS devices near and along the project. Major items of work shall include, but not be limited to, the following:

- Three (3) Digital Closed Circuit Television Cameras (CCTV)
- Four (4) New Dynamic Message Sign (DMS)
- Electrical service equipment
- Local Area Network Equipment

Furnish and install guardrail to protect the ITS devices as required.

Determine the location of each ITS device. Obtain the Engineer's approval of the locations prior to construction. Furnish and install ITS devices and implement test procedures to ensure all ITS devices on a section of roadway are operational prior to opening that section of roadway. Notify the Engineer, in writing, a minimum of ten days prior to performing any test on ITS devices so that the Department may observe the test procedures. The Department will integrate the ITS devices. (The Design-Build Team shall install fiber optic communications cable that connects the DMS controller to the DMS sign. The Design-Build Team will not be responsible for installing any communication cable to integrate the ITS devices with the Division 2 Traffic Operations Center.)

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 and / or power cable at no cost to the Department.

Perform all work in accordance with the *Dynamic Message Sign* and *Digital CCTV Cameras* Project Special Provisions found elsewhere in this RFP; the January 2012 NCDOT *Standard Specifications for Roads and Structures*; and the 2012 NCDOT *Roadway Standard Drawings*.

**DIGITAL CCTV CAMERAS**

The Design-Build Team shall strategically locate and install three (3) digital CCTV cameras at the locations described below so the cameras provide optimum viewing of the routes indicated.

Install one digital CCTV at each of the following locations:

- US 264 and Greenville Southwest Bypass (-L- Line) interchange (Exit 73)
- US 13 and the Greenville Southwest Bypass (-L- Line) interchange
- NC 102 and the Greenville Southwest Bypass (-L- Line) interchange

Determine the exact location of each digital CCTV camera, obtain Engineer's approval of the locations, and install the cameras. The Engineer may require site surveys, including but not limited to bucket truck surveys, to ensure camera coverage areas are acceptable.

## **DMS**

The Design-Build Team shall locate and install four (4) pedestal mount DMSs. Determine the exact location of the DMSs, obtain Engineer's approval of the location, and install the DMSs as described below.

Install one DMS at each of the following locations:

- NC 11 northbound, approximately two miles prior to the Greenville Southwest Bypass (-L- Line)
- Greenville Southwest Bypass (-L- Line) northbound approximately two miles prior to the US 13 exit
- US 264 eastbound approximately two miles prior to the Greenville Southwest Bypass (-L- Line) interchange
- US 264 westbound approximately two miles prior to the Greenville Southwest Bypass (-L- Line) interchange

The DMSs to be installed under this project shall be selected from the Department's Qualified Products List located at:

**<https://apps.ncdot.gov/Products/QPL/>**

## **ELECTRICAL SERVICE**

Install new electrical service with 200Amps, 240/120 VAC service drops for each ITS device. Furnish and install related items of work, including, but not limited to standard size junction boxes, risers, conduit, guy assemblies, and wood poles with all necessary hardware in accordance with Section 1700 of the 2012 *Standard Specifications for Roads and Structures*.

## **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 shall 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 2012 *Standard Specifications for Roads and Structures*.

Conform to the NCDOT and NC Statewide IT Policies and Standards as described at **<https://www.scio.nc.gov/mission/itPoliciesStandards.aspx>**. The architecture of the IT modules

shall be approved by NCDOT IT and the NC Office of Information Technology architecture groups.

## **SUBMITTALS**

Submit a 90% set of preliminary ITS plans & specifications and a 100% set of project plans, including specifications for materials, catalog cuts, and installation and testing requirements for review and acceptance by the Department. No construction of the ITS devices shall begin until the Department has accepted the 100% plans and specifications. Provide the Department with a minimum of 10 working days for each review.

## **MATERIALS & CONSTRUCTION**

Furnish and install new materials and hardware that meet the requirements of the 2012 *NCDOT Standard Specifications for Roads and Structures* and this Scope of Work.

## **DIGITAL CCTV CAMERAS**

Install each digital CCTV camera on a 60-foot Class III wood pole. Install digital CCTV equipment in a 336S equipment cabinet mounted on the pole. Install the following minimum equipment in each digital CCTV equipment cabinet:

- Power equipment, including but not limited to power supplies, circuit breakers, surge protectors, and other related materials.

Refer to the *Digital CCTV Cameras* Project Special Provision found elsewhere in this RFP for detailed material specifications and construction requirements.

## **LOCAL AREA NETWORK EQUIPMENT**

Install Ethernet switches in the field equipment cabinets that meet or exceed NEMS TS-2 requirements for temperature, shock, humidity and vibration.

Reference the *Local Area Network Equipment* Project Special Provision found elsewhere in this RFP for detailed material specifications and construction requirements.

## **DYNAMIC MESSAGE SIGNS**

Install DMSs on a single steel pedestal type structure with ladders, ladder safety cages, and access platforms 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.

Refer to the *Dynamic Message Sign* Project Special Provision found elsewhere in this RFP for detailed material specifications and construction requirements.

## **QUALIFIED PRODUCTS LIST**

Submit a listing of items including Dynamic Message Signs on the NCDOT 2012 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 web site is:

**<https://connect.ncdot.gov/resources/safety/Pages/default.aspx>**

## **MAINTENANCE AND REPAIR REQUIREMENTS**

Until final acceptance of the project by the NCDOT, maintain and repair the ITS devices within the project scope. After final acceptance of the project, the Design-Build Team shall be responsible for repairing the system due to faulty materials or workmanship in accordance with the *Twelve Month Guarantee* Project Special Provision found elsewhere in this RFP or longer warranty period offered by the Design-Build Team.

## **PLAN OF RECORD DOCUMENTATION**

Prepare and submit to the Department Plan of Record (POR) documentation that depicts the ITS device locations. Submit final POR documentation in electronic and hard copy format for acceptance by the Department. Provide electronic plans in MicroStation (latest release in use by the Department) format on CD. Submit hard copy documentation on 22 X 34 inch plan sheets. POR documentation shall include the final location and depth of conduits, wiring external to the cabinets. Include in the POR documentation real world coordinates for all ITS devices 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.

## **TESTING**

Develop unit and system test plans and procedures for the DMSs and digital CCTVs and submit to the Engineer for review and acceptance. Conduct unit and system tests according to approved test plans 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. 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.

**EROSION AND SEDIMENTATION CONTROL SCOPE OF WORK** (1-5-15)

The NCDOT Roadside Environmental Unit shall review and accept all Erosion and Sedimentation Control Plans. Clearing & Grubbing and Final Grade Release for Construction (RFC) Erosion Control Plans shall be submitted 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 NCDENR - *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 August 3, 2011 NCG-010000 General Construction Permit, issued by the North Carolina Department of Environment and Natural Resources, 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, provisions for the early establishment of grasses / vegetation, and 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-Built Plans that detail when and where permanent / temporary / repair seeding and 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. Utilize skimmer basins, infiltration 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.
5. Take into account topography and show existing contour lines on Clearing & Grubbing Plans only.
6. Show 50-foot Environmentally Sensitive Area (ESA) around all jurisdictional streams on Clearing & Grubbing Plans only.
7. Utilize Temporary Rock Silt Checks Type 'B' (TRSC-B) to reduce velocity in existing ditches with spacing of 250 feet divided by percentage of ditch grade. Also utilize TRSC-B's in proposed TSD's and temporary diversions (TD).
8. 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.
9. Provide adequate silt storage for 3600 cubic feet per disturbed acre and sediment basins shall be sized 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 (NCDENR - *Erosion and Sediment Control Planning and Design Manual* or NOAA's National Weather Service web site <http://dipper.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.
10. Skimmer Basins shall provide adequate silt storage for 1800 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 (NCDENR - *Erosion and Sediment Control Planning and Design Manual* or NOAA's National Weather Service web site <http://dipper.nws.noaa.gov/hdsc/pfds/> for partial duration (ARI) time series type). Skimmer Basins shall be designed to dewater in 2 to 3 days. A Skimmer Basin Designer Spreadsheet will be provided by the NCDOT Roadside Environmental Unit upon request.
11. Infiltration Basins shall provide adequate silt storage for 1800 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 (NCDENR - *Erosion and Sediment Control Planning and Design Manual* or NOAA's National Weather Service web site <http://dipper.nws.noaa.gov/hdsc/pfds/> for partial duration (ARI) time series type). Infiltration Basins shall be designed to dewater in three days or less. Infiltration Basins shall not be placed in cut ditches and shall only be placed in areas where Skimmer Basins will not have positive drainage. An Infiltration 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 1800 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 NCDENR- *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 shall require a construction sequence. Prior to installation of pipes smaller than 48 inches in jurisdictional areas, 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 Coir Fiber Wattles with Polyacrylamide (PAM) and / or TRSC-As with Matting and PAM in temporary and permanent, existing and proposed ditches at a spacing of 50 feet 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 Roadside Environmental Unit.
  18. Place a device utilizing PAM at all sediment basin inlets.
  19. At a maximum spacing of 200 feet and as directed, utilize Coir Fiber Wattle drainage breaks in silt fence.
  20. Do not place erosion control devices that require excavation (i.e. sediment basins, silt ditches, etc.) in wetlands or buffer zones.
  21. Within the entire project limits, provide disturbed and undisturbed drainage areas 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 perimeter 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. Utilize TRSC-B's to reduce velocity in existing and proposed ditches with spacing of 250 feet divided by percentage of ditch grade. Also utilize TRSC-B's in proposed TSD's and TD's.
5. Utilize temporary slope drains and earth berms at top of fill slopes 5 feet or higher and a fill slope grade of 3:1 or steeper, or where there are superelevations above 0.04 and fills are greater than 3 feet. Maximum slope drain spacing shall be 200 feet.
6. Utilize rock energy dissipater and / or silt basin at outlet of slope drain.
7. Devices at all drainage turnouts shall utilize infiltration, skimmer, or sediment control stone (TRSD-B, TRSC-A, etc.) and a spillway with an adequately designed base length to distribute outflow.
8. Provide adequate silt storage for 3600 cubic feet per disturbed acre and sediment basins shall be sized 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 (NCDENR - *Erosion and Sediment Control Planning and Design Manual* or NOAA's National Weather Service web site <http://dipper.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.
9. Skimmer Basins shall provide adequate silt storage for 1800 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 (NCDENR - *Erosion and Sediment Control Planning and Design Manual* or NOAA's National Weather Service web site <http://dipper.nws.noaa.gov/hdsc/pfds/> for partial duration (ARI) time series type). A Skimmer Basin Designer Spreadsheet will be provided by the NCDOT Roadside Environmental Unit upon request.
10. Infiltration Basins shall provide adequate silt storage for 1800 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 (NCDENR - *Erosion and Sediment Control Planning and Design Manual* or NOAA's National Weather Service web site <http://dipper.nws.noaa.gov/hdsc/pfds/> for partial duration (ARI) time series type). Infiltration Basins shall be designed to dewater in three days or less. Infiltration Basins shall not be placed in cut ditches and shall only be placed in areas where Skimmer Basins will not have positive drainage. An Infiltration 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 1800 cubic feet per disturbed acre draining to the river 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 NCDENR- *Erosion and Sediment Control Planning and Design Manual* for additional design criteria.
12. Provide matting for erosion control in all ditch lines, including but not limited to temporary ditch lines (TDs) utilized to divert offsite runoff around construction areas, where the velocity is greater than 2.0 feet / sec, and the shear stress is 1.55 psf or less. For ditch lines with a shear stress above 1.55 psf, Permanent Soil Reinforcement Mat or Rip Rap shall be utilized.
  13. Unless otherwise approved by the Roadside Environmental Field Operations Engineer, provide matting for erosion control on all slopes (cut and fill) that are 3:1 or steeper and a height of five feet or higher.
  14. Along all slopes (cut and fill) that are 30 feet or higher, place parallel rows of 12-inch Excelsior Wattles at a spacing height of 15 feet.
  15. The minimum and maximum length to width ratio of all Sediment Basins shall be 2:1 and 6:1, respectively.
  16. 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.
  17. During construction, provide temporary sediment basins that dewater from the surface at all permanent stormwater devices.
  18. Utilize Coir Wattles with Polyacrylamide (PAM) and / or TRSC-As with matting and PAM in temporary and permanent, existing and proposed ditches at a spacing of 50 feet 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.
  19. Place device utilizing PAM at all sediment basin inlets.
  20. At a maximum spacing of 200 feet and as directed, utilize Coir Fiber Wattle drainage breaks in silt fence.
  21. Do not place erosion control devices that require excavation (i.e. basins, silt ditches, etc.) in wetlands or buffer zones.
  22. Within the entire project limits, provide disturbed and undisturbed drainage areas in MicroStation Format.
  23. 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.
  24. All perimeter Sediment Basins shall be placed outside of fill slopes.

### C. Intermediate Phase

Intermediate Erosion Control Plans shall only 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. Intermediate 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 such as skimmer basin, coir fiber wattle with Polyacrylamide (PAM), etc.
- B. Provide matting summary sheet(s): matting for erosion control and permanent soil reinforcement 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 IIIA certified individual responsible for designing and / or reviewing Erosion and Sedimentation Control Plans

## IV. Special Provisions

- A. Erosion Control Special Provisions are available at the following website:

**[http://www.ncdot.org/doh/operations/dp\\_chief\\_eng/roadside/soil\\_water/special\\_provisions/](http://www.ncdot.org/doh/operations/dp_chief_eng/roadside/soil_water/special_provisions/)**

- 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 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. Plans shall address any environmental issues raised during the permitting process.
- D. Sufficient time shall be allowed for the Design-Build Team to make any changes to the Erosion and Sedimentation Control Plans 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. 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 Division of Solid Waste Management (NCDENR). 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 DSWM (DENR) concurrently to the Design-Build Unit and the Resident Engineer. For Reclamation Procedures, see:

**[http://www.ncdot.org/doh/operations/dp\\_chief\\_eng/roadside/fieldops/downloads/Files/ContractedReclamationProcedures.pdf](http://www.ncdot.org/doh/operations/dp_chief_eng/roadside/fieldops/downloads/Files/ContractedReclamationProcedures.pdf)**

- G. 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.
- H. An accepted Erosion and Sedimentation Control Plan shall not exempt the Design-Build Team from making every effort to contain sediment onsite.
- I. Any Erosion Control Design revisions made during the construction of the project shall be submitted to NCDOT Roadside Environmental Unit by the 15<sup>th</sup> of the month via the Design-Build Unit. 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.
- J. The Design-Build Team shall comply with the *North Carolina Administrative Code Title 15 A Department of Environment and Natural Resources Chapter 4, Sediment Control*.
- K. A pre-design 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 NCDOT Roadside Environmental Unit. Erosion and Sedimentation Control Plan submittals shall only be reviewed and accepted by NCDOT Roadside Environmental Unit after the Erosion Control Pre-Design Meeting. The Design Build Team shall be required to submit a tentative Erosion and Sedimentation Control Plan submittal schedule at the pre-design meeting.

- L. At a minimum, the Design Build Team shall bring one erosion control plan sheet with a Clearing & Grubbing erosion control design to the Erosion and Sedimentation Control Plan pre-design meeting.
- M. 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.
- N. 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. When the project conditions no longer warrant, in the sole discretion of the Department, inspections by the erosion and sedimentation control designer may cease.
- O. 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
- P. Erosion & Sediment Control / Stormwater Certification shall be required according to the Project Special Provision found elsewhere in this RFP.

- Q. Prior to installation of any erosion control devices, the Design-Build Team shall verify boundaries of jurisdictional areas in the field and delineate with Safety Fence or flagging. For guidance on Safety Fence and flagging in jurisdictional areas, see:

**[http://www.ncdot.org/doh/operations/dp\\_chief\\_eng/roadside/fieldops/downloads/](http://www.ncdot.org/doh/operations/dp_chief_eng/roadside/fieldops/downloads/)**

- R. 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 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.
- S. 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)
- T. 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 and stone outlets may be provided.
- U. Ground Cover Stabilization Requirements - NCG010000 (7 - 14 Days)

Ground cover stabilization shall comply with the timeframe guidelines specified by the North Carolina Department of Environment and Natural Resources Division of Water Resources NCG-010000 General Construction Permit that became effective on August 3, 2011. 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 NCG-010000.

## V. 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.

### **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**

50# German or Browntop Millet  
500# Fertilizer  
4000# Limestone

#### **September 1 - February 28**

50# Rye Grain or Wheat  
500# Fertilizer  
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 approval from, the NCDOT Roadside Environmental Unit prior to eliminating limestone.

Upon obtaining 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**

10# Centipede \*  
 50# Tall Fescue Cultivars \*\*  
 25# Bermudagrass (hulled)  
 500# Fertilizer  
 4000# Limestone

**September 1 - February 28**

10# Centipede \*  
 50# Tall Fescue Cultivars \*\*  
 35# Bermudagrass (unhulled)  
 500# Fertilizer  
 4000# Limestone

\* On cut and fill slopes 2:1 or steeper, the Design-Build Team shall apply centipede, at a rate of five pounds per acre.

**Riparian and Wetland Locations****March 1 – August 31**

18# Creeping Red Fescue Cultivars \*\*\*  
 6# Indiangrass  
 8# Little Bluestem  
 4# Switchgrass  
 25# Browntop Millet  
 500# Fertilizer  
 4000# Limestone

**September 1 – February 28**

18# Creeping Red Fescue Cultivars \*\*  
 6# Indiangrass  
 8# Little Bluestem  
 4# Switchgrass  
 35# Rye Grain  
 500# Fertilizer  
 4000# Limestone

**Waste and Borrow Locations****March 1 – August 31**

75# Tall Fescue Cultivars \*\*  
 25# Bermudagrass (hulled)  
 500# Fertilizer  
 4000# Limestone

**September 1 - February 28**

75# Tall Fescue Cultivars \*\*  
 35# Bermudagrass (unhulled)  
 500# Fertilizer  
 4000# Limestone



**\*\* Approved Tall Fescue Cultivars**

06 Dust	Escalade	Justice	Serengeti
2 <sup>nd</sup> Millennium	Essential	Kalahari	Shelby
3 <sup>rd</sup> Millennium	Evergreen 2	Kitty Hawk 2000	Sheridan
Apache III	Faith	Legitimate	Signia
Avenger	Falcon IV	Lexington	Silver Hawk
Barlexas	Falcon NG	LSD	Silverstar
Barlexas II	Falcon V	Magellan	Shennandoah Elite
Bar Fa	Fat Cat	Matador	Sidewinder
Barrera	Festnova	Millennium SRP	Skyline
Barrington	Fidelity	Monet	Solara
Barrobusto	Finelawn Elite	Mustang 4	Southern Choice II
Barvado	Finelawn Xpress	Ninja 2	Speedway
Biltmore	Finesse II	Ol' Glory	Spyder LS
Bingo	Firebird	Olympic Gold	Sunset Gold
Bizem	Firecracker LS	Padre	Taccoa
Blackwatch	Firenza	Patagonia	Tahoe II
Blade Runner II	Five Point	Pedigree	Talladega
Bonsai	Focus	Picasso	Tanzania
Braveheart	Forte	Piedmont	Tarheel
Bravo	Garrison	Plantation	Terrano
Bullseye	Gazelle II	Proseeds 5301	Titan Ltd
Cannavaro	Gold Medallion	Prospect	Titanium LS
Catalyst	Grande 3	Pure Gold	Tracer
Cayenne	Greenbrooks	Quest	Traverse SRP
Cessane Rz	Greenkeeper	Raptor II	Trio
Chipper	Gremlin	Rebel Exeda	Tulsa Time
Cochise IV	Greystone	Rebel Sentry	Turbo
Constitution	Guardian 21	Rebel IV	Turbo RZ
Corgi	Guardian 41	Regiment II	Tuxedo RZ
Corona	Hemi	Regenerate	Ultimate
Coyote	Honky Tonk	Rendition	Umbrella
Darlington	Hot Rod	Rhambler 2 SRP	Van Gogh
Davinci	Hunter	Rembrandt	Venture
Desire	Inferno	Reunion	Watchdog
Dominion	Innovator	Riverside	Wolfpack II
Dynamic	Integrity	RNP	Xtremegreen
Dynasty	Jaguar 3	Rocket	
Endeavor	Jamboree	Scorpion	

**\*\*\* Approved Creeping Red Fescue Cultivars**

Aberdeen

Boreal

Epic

Cindy Lou

From January 1 – December 31, the Design-Build Team shall apply an additional 20# of *Sericea Lespedeza* on cut and fill slopes 2:1 or steeper.

Fertilizer shall be 10-20-20 analysis or a different analysis that provides a 1-2-2 ratio applied at a rate that provides the same amount of plant food as a 10-20-20 analysis and as directed.

**Soil Analysis**

If vegetation establishment indicates a deficiency in soil nutrients or an incurred pH level is present, the Design-Build Team shall take soil samples and apply additional soil amendments to the affected area and as directed.

**Fertilizer Topdressing**

In accordance with the requirements noted below, the Design-Build Team shall apply a minimum of one Fertilizer Topdressing application to all permanently seeded areas immediately prior to completion of the project, twice during every growing season from April 1<sup>st</sup> through September 30<sup>th</sup>, and at other times as directed.

Fertilizer used for topdressing shall be 10-20-20 analysis applied at a rate of 500 pounds per acre; or a different analysis that provides a 1-2-2 ratio applied at a rate that provides the same amount of plant food as a 10-20-20 analysis and as directed.

Fertilizer used for waste and borrow areas shall be 16-8-8 grade applied at a rate of 500 pounds per acre; or a different analysis that provides a 2-1-1 ratio applied at a rate that provides the same amount of plant food as a 16-8-8 analysis and as directed.

**Supplemental Seeding**

For all supplemental seeding, the kinds of seed and proportions shall be the same as specified above for *Long Term Stabilization*, 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**

The minimum mowing height shall be four inches.

**ENVIRONMENTAL INCENTIVES**

The Design-Build Team will be eligible for an incentive in the amount of \$100,000 if construction operations have been performed in accordance with all environmental regulations and the Specifications, and no violations have been issued. Violations are defined as:

<b>Violation</b>	<b>Issuing Entity</b>
Immediate Corrective Action (ICA)	Department
Continuance of an ICA (CICA)	Department
Notice of Violation (NOV)	Regulatory Agencies
Cease and Desist (C & D)	Corp of Engineers

The incentive payment shall be paid at the completion of the project as long as the Design-Build Team does not receive any violations at any time during project construction.

**EROSION CONTROL LIQUIDATED DAMAGES**

The Design-Build Team's first NOV or C&D violation shall result in the forfeiture of the entire \$100,000 incentive noted above or the remaining portion thereof. If \$25,000 is not available in the \$100,000 incentive noted above, the first NOV or C&D violation shall result in the forfeiture of the remaining portion plus Liquidated Damages in the amount necessary to equal \$25,000 when added to the remaining portion of the incentive. All subsequent NOV and C&D violations shall result in Liquidated Damages in the amount of \$25,000 per violation.

Each ICA and CICA violation shall result in a \$12,500 reduction from the monies remaining in the aforementioned incentive. If monies are not available in the \$100,000 incentive noted above, each ICA and CICA violation shall result in Liquidated Damages in the amount of \$12,500 per violation.

All Liquidated Damages shall be deducted from the lump sum amount for the project due the Design-Build Team.

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 2012 *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.

## **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.

**PUBLIC INFORMATION SCOPE OF WORK** (2-5-15)

NCDOT will take the lead role on this project and be responsible for a portion of the public information efforts through the Department's Communications Office and Public Involvement Group. Unless noted otherwise elsewhere in this RFP, the NCDOT responsibilities include:

- Organizing public meetings, including venue selection, reservation and fee
- Providing media announcements
- 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

The Design-Build Team shall coordinate with the Department to promote public awareness for this project. The amount of public involvement required for this project is directly based on the Design-Build Team's Transportation Management Plan and construction details. The Design-Build Team's responsibilities shall include:

- 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
- Attending and / or speaking at public meetings
- Hand delivery of time sensitive informational materials

The Design-Build Team shall hold an initial project coordination meeting with NCDOT at least one month prior to start of construction to discuss project impacts to the public. This information will be used by the Department to create a Public Information Plan.

The Design-Build Team shall inform the Department at least twenty-one (21) calendar days in advance of any construction activity that will have significant impact on the public, including, but not limited to, the start of construction, major traffic shifts, road closures, ramp closures, detours, night work and project completion.

NCDOT will develop, with the assistance of 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 effected by the project
- County / City school systems
- Any other organization as deemed necessary by the Department.

The minimum public information requirements solely associated with the Transportation Management Plans shall include, but not be 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 delivering time sensitive informational material provided by the NCDOT directly to portions of the target audience. If the Design-Build Team informs the Department of the aforementioned activities less than twenty-one (21) calendar days in advance, the Design-Build Team shall hand deliver the informational materials to the impacted target audiences.

The Department will be responsible for establishing, creating, maintaining and updating the project website for this project. However, throughout the project duration, the Design-Build Team shall coordinate with Danielle Bingham ([dkbingham@ncdot.gov](mailto:dkbingham@ncdot.gov)), the Web Content Coordinator in the NCDOT Communications Office, to ensure the accuracy of the aforementioned project website. At a minimum, the Design-Build Team shall designate a contact for public information inquiries / coordination. Throughout construction, this contact shall provide weekly updates to the NCDOT Communications Office, including, but not limited to, traffic control phasing, graphic illustrations, project pictures, etc.

The Design-Build shall discuss in the Technical Proposal their approach to providing the public with communication access to project personnel to inquire as to traffic impacts, including vehicular and pedestrian.

The Design-Build Team shall include in their Lump Sum Bid price for the project, all costs associated with their involvement in the Public Information Scope of Work.

**\*\*\* STANDARD SPECIAL PROVISIONS \*\*\*****RAILROAD GRADE CROSSING**

(7-1-95) (Rev. 1-15-13)

107-9

DB1 G17R

Provide at least two weeks advance notice to the Railroad's local Roadmaster or Track Supervisor when the use of slow-moving or stopped equipment is required over at-grade railroad crossings.

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

08/31/2013

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 <http://www.ncagr.gov/plantindustry/> to determine those specific project sites located in the quarantined area or for any regulated article used on this project originating in a quarantined county.

**Regulated Articles Include**

1. Soil, sand, gravel, compost, peat, humus, muck, and decomposed manure, separately or with other articles. This includes movement of articles listed above that may be associated with cut / waste, ditch pulling, and shoulder cutting
2. Plants with roots including grass sod
3. Plant crowns and roots
4. Bulbs, corms, rhizomes, and tubers of ornamental plants
5. Hay, straw, fodder, and plant litter of any kind
6. Clearing and grubbing debris
7. Used agricultural cultivating and harvesting equipment
8. Used earth-moving equipment

9. Any other products, articles, or means of conveyance, of any character, if determined by an inspector to present a hazard of spreading imported fire ant, gypsy moth, witchweed or other noxious weeds

### **GIFTS FROM VENDORS AND CONTRACTORS**

(12-15-09)

DB1 G152

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

- (1) have a contract with a governmental agency; or
- (2) have performed under such a contract within the past year; or
- (3) anticipate bidding on such a contract in the future.

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

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

### **LIABILITY INSURANCE**

(3-19-14)

DB1 G160

Revise the 2012 *Standard Specifications for Roads and Structures* as follows:

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

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

### **STATE HIGHWAY ADMINISTRATOR TITLE CHANGE**

07-31-12)

DB1 G185

Revise the 2012 *Standard Specifications for Roads and Structures* as follows:

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



**SUBLETTING OF CONTRACT**

(12-19-2014)

108-6

DB1 G186

Revise the 2012 *Standard Specifications for Roads and Structures* as follows:

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

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

**SELECT GRANULAR MATERIAL**

(9-1-11)

DB2 R80

Revise the 2012 *Standard Specifications for Roads and Structures* as follows:

**Page 2-28, Article 265-2 MATERIALS,** add the following:

Use only Class III select material for select granular material.

**BRIDGE APPROACH FILLS**

(9-1-11)

DB4 R01

**Description**

Bridge approach fills include bridge approach fills for sub regional tier bridges and reinforced bridge approach fills. Construct bridge approach fills in accordance with the contract and Roadway Standard Drawing Nos. 422.10 or 422.11. Define “geosynthetics” as geotextiles or geomembranes.

**Materials**

Refer to Division 10 of the 2012 *Standard Specifications for Roads and Structures*.

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

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

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

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

### **Construction Methods**

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

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

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

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

Use solvent cement to connect PVC pipes so joints do not leak. Connect perforated pipes to outlet pipes just behind wing walls. Provide drain pipes and drains with positive drainage

towards outlets. Place pipe sleeves in or under wing walls for outlet pipes so positive drainage is maintained. Use sleeves that can withstand wing wall loads.

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

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

#### **PREPARATION OF SUBGRADE AND BASE**

(9-1-11)

DB5 R05

On mainline portions and ramps of this project, prepare the subgrade and base beneath the pavement structure in accordance with the applicable sections of the 2012 *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.

#### **CLASS IV AGGREGATE STABILIZATION**

(10-02-14)

510

DB05 R12

#### **Description**

As directed by the Engineer, stabilize sandy subgrade material with Class IV aggregate to prevent rutting of the subgrade prior to paving directly on the subgrade. Remove material as needed in cut areas prior to placing the Class IV aggregate.

#### **Materials**

Refer to Division 10

<b>Item</b>	<b>Section</b>
Select Material, Class IV	1016

Use Class IV Select Material for Class IV Aggregate Stabilization.

## Construction Methods

### Class IV Aggregate Stabilization

As directed by the Engineer, place aggregate by end dumping aggregate on approved subgrade soils to provide a working platform and reduce wheel rutting of subgrade material. Place the Class IV aggregate stabilization to a thickness of 2 to 3 inches.

### Maintenance

Maintain aggregate stabilization in an acceptable condition and minimize the use of heavy equipment on aggregate in order to avoid damaging the subgrade. Provide and maintain drainage ditches and drains as required to prevent entrapping water in aggregate stabilization.

### AGGREGATE BASE COURSE

(10-02-14)

520

DB05 R14

Revise the 2012 *Standard Specifications for Roads and Structures* as follows:

**Page 5-10, Article 520-5 HAULING AND PLACING AGGREGATE BASE MATERIAL,** add the following sentence to the end of the first paragraph starting on line 21:

In addition, as approved by the Engineer, place by end dumping aggregate on approved sandy subgrade soils to provide a working platform and reduce wheel rutting of the subgrade. When allowed, end dumping will be limited to a uniformly spread thickness of 2 to 3 inches prior to placing the remaining aggregate thickness with a mechanical spreader.

### ASPHALT PAVEMENTS - SUPERPAVE

1/23/14

605, 609, 610, 650, 660

DB 6 R01

Revise the 2012 *Standard Specifications for Roads and Structures* as follows:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**\*\* NOTE \*\* Deleted reference to Page 6-50, Table 660-1 MATERIAL APPLICATION RATES AND TEMPERATURES**

**\*\* NOTE \*\*** Deleted *Asphalt Paver-Fixed Mobile String Line* Standard Special Provision

**PORTLAND CEMENT CONCRETE PAVEMENT**

(02-05-15)

700, 710

SPI 7-17

Revise the 2012 *Standard Specifications for Roads and Structures* as follows:

**Page 7-1, Article 700-1, DESCRIPTION**, lines 16-17, replace fifth paragraph with:

Submit for approval a Process Control Plan addressing all operations necessary in the production and placement of concrete pavement a minimum of 30 calendar days prior to placing concrete pavement.

**Page 7-2, Subarticle 700-5(A)(1)**, lines 29-31, replace first paragraph with:

A descending air temperature at the location of the concrete paving operation and away from artificial heat reaches 35°F. Paving may resume when the weather forecast is projected to reach a high of 40°F on that day's operation and the morning ambient temperature is above 32°F.

**Page 7-2, Subarticle 700-5(A), General**, lines 38 and 40, replace "3500 psi" with "3000 psi."

**Page 7-4, Subarticle 700-8(B), Cold Weather**, lines 38-42, replace the first paragraph with the following:

When the air temperature is projected to drop below 35°F for more than four hours, insulate the Portland cement concrete pavement to prohibit the concrete surface temperature from dropping below 35°F during the curing period.

**Page 7-5, Subarticle 700-9(A), General**, line 9, first sentence of the first paragraph, replace "methods herein" with "curing methods herein".

**Page 7-5, Subarticle 700-9(A), General**, lines 12-15, delete the third paragraph and replace with the following:

Curing shall be required until the concrete compressive strength has exceeded 3,000 psi using the maturity method in accordance with Article 700-13.

**Page 7-6, Subarticle 700-11(A), General**, lines 20-29, delete the first and last sentence of the second paragraph. Add the following as the last sentence of the second paragraph on lines 25-26. Move third paragraph (lines 27-29) to between the first and second paragraph before line 20.

To estimate the time of sawing, it is recommended to use the latest version of FHWA's High Performance Paving software entitled HIPERPAV.

**Page 7-8, Subarticle 700-11(G), Verification of Dowel Bar Alignment**, line 7, in the second sentence of the second paragraph on the page replace “vertical tilt,” with “vertical tilt, and total misalignment”. Line 25, in the fourth sentence of the seventh paragraph on the page replace “greater misalignment” with “total misalignment”. Lines 26-27, delete the last sentence of the seventh paragraph on the page. Line 29, in the first sentence of the sixth paragraph on the page replace “score of 10” with “score of 12”.

**Page 7-8, Subarticle 700-11(G), TABLE 700-1, TOLERANCE FOR DOWEL BAR ALIGNMENT<sup>A</sup>**, replace with the following:

<b>TABLE 700-1 TOLERANCE FOR DOWEL BAR ALIGNMENT<sup>A</sup></b>	
<b>Misalignment Category, inches</b>	<b>Weight</b>
$0 \leq d \leq 0.6$	0
$0.6 < d \leq 0.8$	2
$0.8 < d \leq 1.00$	4
$1.00 < d \leq 1.50$	5
$1.50 \leq d$	10

**A.** Where **d** is the individual dowel bar misalignment.

**Page 7-9, Subarticle 700-12, (B) Age of Pavement**, line 6, delete “14 calendar days old.” and replace with “7 calendar days old and concrete is dry based on sealant manufacturer’s recommendations.”

**Page 7-9, Article 700-13, USE OF NEW PAVEMENT OR SHOULDER**, line 31, in the first sentence of the first paragraph replace “3,500 psi, unless otherwise permitted.” with “3,000 psi.” Line 36, add the following as the third sentence of the second paragraph:

Install loggers in slabs after every 2 lots approximately 4 inches from the concrete surface.

**Page 7-10, Article 700-13, USE OF NEW PAVEMENT OR SHOULDER**, lines 6-11, replace the second paragraph on the page with the following:

Validate the strength-maturity relationship and the correlation between cylinders and beams during the first day’s production by casting cylinders and beams and performing strength tests. Use the TTF developed during the mix design process to verify the production strength-maturity relationship. Validate the strength-maturity relationship and the correlation between cylinders and beams by casting cylinders and beams and performing strength tests least every 30 calendar days, or when the TTF varies by more than 10% from the latest approved maturity curve or there is a material change from the approved concrete mix design. If the verification sample’s compressive strength when tested at TTF is less than 3,000 psi, immediately suspend early opening of traffic on pavement that has not obtained TTF until a new strength-maturity relationship is developed.



**Page 7-13, Article 710-6, FINISHING**, lines 5-10, replace the second paragraph on the page with the following:

Produce the final surface finish on all mainline pavement, auxiliary lanes, and ramps by mechanical equipment for longitudinally tined grooves while the concrete is plastic. The tining shall be done with a mechanical device such as a wire comb. The comb shall have a single row of tines. Each shall have a nominal width of 5/64 inch to 1/8 inch. The nominal spacing of the tines shall be  $3/4 \pm 1/8$  inch center-to-center. The nominal depth of tined groove in the plastic concrete shall be  $1/8 \pm 1/32$  inch.

Longitudinal tining shall be accomplished by equipment with automated horizontal and vertical controls to ensure straight, uniform depth tined grooves. The texture geometry shall be the same as imparted throughout the length of the tining comb. A 2-inch to 3-inch wide strip of pavement surface shall be protected from tining for the length of and centered about longitudinal joints.

The tining operation shall be done so that the desired surface texture will be achieved while minimizing displacement of the larger aggregate particles and before the surface permanently sets. Where abutting pavement is to be placed, the tining shall extend as close to the edge as possible without damaging the edge. If abutting pavement is not to be placed, the 6-inch area nearest the edge or one foot from the face of the curb shall not be tined. Hand-operated tining equipment that produces an equivalent texture may be used only on small or irregularly shaped areas. Tines shall be thoroughly cleaned at the end of each day's use and damaged or worn tines replaced.

When surface corrections for pavement smoothness are made in the hardened concrete, no additional texturing will be required.

**Page 7-13, Article 710-7, FINAL SURFACE TESTING**, lines 41-42, replace the third and fourth sentences of the fourth paragraph with the following:

The profile data shall be filtered with a cutoff wavelength of 250 feet. The interval at which relative profile elevations are reported shall be a maximum of one inch.

**Page 7-14, Article 710-7, FINAL SURFACE TESTING**, line 38, in the first sentence of the ninth paragraph on the page, replace “(DVD-R or CD-R)” with “(USB flash drive, external hard drive or DVD)”.

**Page 7-15, Subarticle 710-7(B), Localized Roughness**, line 33, in the third sentence of the first paragraph, replace “125 in/mile” with “150 in/mile”.

**ASPHALT BINDER CONTENT OF ASPHALT PLANT MIXES**

(6-07-12)

DB6 R15

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

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

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

**ASPHALT PLANT MIXTURES**

(07-01-95)

DB6 R20

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

**FINAL SURFACE TESTING - ASPHALT PAVEMENTS**

(9-1-11)

DB6 R45

On the mainline, auxiliary lanes, and -Y- Lines with two or more layers of asphalt and greater than 2500 feet in length, perform smoothness acceptance testing of the longitudinal profile of the finished pavement surface using an Inertial Profiler in accordance with Article 610-13 and Article 710-7 of the 2012 *Standard Specifications for Roads and Structures*. The North Carolina Hearne Straightedge will not be permitted.

Replace Tables 610-7 and 710-1 of the 2012 *Standard Specifications for Roads and Structures* with the following Table:

<b>MRI VALUES PER 0.10-MILE SECTION</b>	
<b>MRI after Completion (Inches Per Mile)</b>	<b>Price Adjustment Per Lane (0.10-Mile Section)</b>
70.0 and Under	Acceptable (No pay adjustment)
70.1-90.0	PA = 650 – (10 * MRI)
Over 90.1	Corrective Action Required

**Page 6-34, Replace Table 610-8 with the following:**

<b>Adjustment Schedule for Cumulative Straightedge Index (CSI) (Obtained by adding SE Index of up to 25 consecutive 100-foot sections)</b>		
<b>*CSI</b>	<b>ACCEPTANCE CATEGORY</b>	<b>CORRECTIVE ACTION</b>
0-0	Acceptable	None
1-0 or 2-0	Acceptable	None
3-0 or 4-0	Acceptable	None
Any Other Number	Unacceptable	Required

**\*Either Before or After Corrective Actions**

**Page 6-35, Replace the 14<sup>th</sup> paragraph of Article 610-13(B) with the following:**

Correct any deviation that exceeds a 0.3 inch blanking band such that the deviation is reduced to 0.2 inches or less.

**Page 6-35, Replace the 16<sup>th</sup>, 17<sup>th</sup>, 18<sup>th</sup>, and 19<sup>th</sup> paragraphs of Article 610-13(B) with the following:**

Take corrective actions as specified if the CSI indicates “Required” corrective action. The CSI after corrective action should meet or exceed “Acceptable” requirements.

Where corrective action is required, the test section(s) requiring corrective action will be retested, unless the Engineer directs the retesting of the entire lot.

Test sections and / or lots that are initially tested by the Design-Build Team which indicate excessive deviations such that corrective action is required, may be re-rolled with asphalt rollers while the mix is still warm and in a workable condition, to possibly correct the problem. In this instance, reevaluation of the test section(s) must be completed within 24 hours of pavement placement and these test results will serve as the initial test results.

### **SUBSURFACE DRAINAGE**

(9-1-11)

DB8 R05

Revise the 2012 *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 five feet of subgrade.

**GUARDRAIL ANCHOR UNITS, TYPE M-350**

(9-1-11)

DB8 R60

**Description**

Furnish and install guardrail anchor units in accordance with the details in the plans developed by the Design-Build Team, the applicable requirements of Section 862 of the 2012 *Standard Specifications for Roads and Structures*, and at locations shown in the plans developed by the Design-Build Team.

**Materials**

The Design Build Team may, at his option, furnish any one of the following guardrail anchor units or approved equal.

The guardrail anchor unit (SRT-350) as manufactured by:

TRINITY INDUSTRIES, INC.  
2525 N. STEMMONS FREEWAY  
DALLAS, TEXAS 75207  
TELEPHONE: 800 644-7976

The guardrail anchor unit (FLEAT) as manufactured by:

ROAD SYSTEMS, INC.  
3616 OLD HOWARD COUNTY AIRPORT  
BIG SPRINGS, TEXAS 79720  
TELEPHONE: 915-263-2435

The guardrail anchor unit (REGENT) as manufactured by:

ENERGY ABSORPTION SYSTEMS, INC.  
ONE EAST WACKER DRIVE  
CHICAGO, ILLINOIS 60601-2076  
TELEPHONE: 888-32-ENERGY

Prior to installation the Design Build Team shall submit to the Engineer:

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

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

### **Construction**

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

### **GUARDRAIL ANCHOR UNITS, TYPE 350**

(12-19-14)

DB8 R65

### **Description**

Furnish and install guardrail anchor units in accordance with the details in the plans developed by the Design-Build Team, the applicable requirements of Section 862 of the 2012 *Standard Specifications for Roads and Structures*, and at locations shown in the plans developed by the Design-Build Team.

### **Materials**

The Design-Build Team may at their option, furnish any one of the guardrail anchor units or approved equal.

Guardrail anchor unit (X-Tension) as manufactured by:

Barrier Systems, Inc.  
c/o Transportation Equipment Services Inc.  
420 Boardwalk Dr.  
Youngsville, NC 27596  
Telephone: 877-499-8727

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

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

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

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

Prior to installation the Design-Build Team shall submit to the Engineer:

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

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

### **Construction**

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

### **IMPACT ATTENUATOR UNITS, TYPE 350**

(9-1-11)

DB8 R75

### **Description**

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 may at their option, furnish any one of the impact attenuator units or approved equal:

## NON-GATING IMPACT ATTENUATOR UNITS:

The impact attenuator unit (QUADGUARD) as manufactured by:

ENERGY ABSORPTION SYSTEMS, INC.  
ONE EAST WACKER DRIVE  
CHICAGO, ILLINOIS 60601-2076  
TELEPHONE: 312-467-6750

The impact attenuator unit (TRACC) as manufactured by:

TRINITY INDUSTRIES, INC.  
2525 N. STEMMONS FREEWAY  
DALLAS, TEXAS 75207  
TELEPHONE: 1-800-644-7976

## GATING IMPACT ATTENUATOR UNITS:

The impact attenuator unit (BRAKEMASTER) as manufactured by:

ENERGY ABSORPTION SYSTEMS, INC.  
ONE EAST WACKER DRIVE  
CHICAGO, ILLINOIS 60601-2076  
TELEPHONE: 312-467-6750

The impact attenuator unit (CAT) as manufactured by:

TRINITY INDUSTRIES, INC.  
2525 N. STEMMONS FREEWAY  
DALLAS, TEXAS 75207  
TELEPHONE: 1-800-644-7976

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 NCHRP Report 350, Test Level 3, in accordance with Section 106-2 of the 2012 *Standard Specifications for Roads and Structures*.
2. Certified working drawings and assembling instructions from the manufacturer for each impact attenuator unit in accordance with Section 105-2 of the 2012 *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 one of the NON-GATING Impact Attenuator Units listed in the Materials Section herein.

If the median width is greater than 40 feet, the Design-Build Team may use any of the GATING or NON-GATING Impact Attenuator Units listed in the Materials Section herein.

## **PREFORMED SCOUR HOLE WITH LEVEL SPREADER APRON**

(08-24-09)

DB8 R105

## Description

Construct and maintain preformed scour holes with spreader aprons at the locations shown on the plans developed by the Design-Build Team and in accordance with the details in the plans developed by the Design-Build Team. Work includes excavation, shaping and maintaining the hole and apron, furnishing and placing filter fabric, rip rap (class as specified in the plans developed by the Design-Build Team) and permanent soil reinforcement matting.

## Materials

Item	Section
Plain rip rap	1042
Filter Fabric	1056

The permanent soil reinforcement matting shall be permanent erosion control reinforcement mat and shall be constructed of synthetic or a combination of coconut and synthetic fibers evenly distributed throughout the mat between a bottom UV stabilized netting and a heavy duty UV stabilized top net. The matting shall be stitched together with UV stabilized polypropylene thread to form a permanent three dimensional structure. The mat shall have the following minimum physical properties:

<i>Property</i>	<i>Test Method</i>	<i>Value Unit</i>
Light Penetration	ASTM D6567	9 %
Thickness	ASTM D6525	0.40 in
Mass Per Unit Area	ASTM D6566	0.55 lb/sy
Tensile Strength	ASTM D6818	385 lb/ft
Elongation ( Maximum)	ASTM D6818	49 %
Resiliency	ASTM D1777	>70 %
UV Stability *	ASTM 4355	≥80 %
Porosity (Permanent Net)	ECTC Guidelines	≥85 %
Maximum Permissible Shear Stress (Vegetated)	Performance Bench Test	≥8.0 lb/ft <sup>2</sup>
Maximum Allowable Velocity (Vegetated)	Performance Bench Test	≥16.0 ft/s



\*ASTM D1682 Tensile Strength and % strength retention of material after 1000 hours of exposure.

A certification (Type 1, 2, or 3) from the manufacturer showing:

- (A) the chemical and physical properties of the mat used, and
- (B) conformance of the mat with this specification will be required.

### **Construction Methods**

All areas to be protected with the mat shall be brought to final grade and seeded in accordance with Section 1660 of the 2012 *Standard Specifications for Roads and Structures*. The surface of the soil shall be smooth, firm, stable and free of rocks, clods, roots or other obstructions that would prevent the mat from lying in direct contact with the soil surface. Areas where the mat is to be placed will not need to be mulched.

### **STREET SIGNS AND MARKERS AND ROUTE MARKERS**

(07-01-95)

DB9 R01

Move any existing street signs, markers, and route markers out of the construction limits of the project and install the street signs and markers and route markers so that they will be visible to the traveling public if there is sufficient right of way for these signs and markers outside of the construction limits.

Near the completion of the project and when so directed by the Engineer, move the signs and markers and install them in their proper location in regard to the finished pavement of the project.

Stockpile any signs or markers that cannot be relocated due to lack of right of way, or any signs and markers that will no longer be applicable after the construction of the project, at locations directed by the Engineer for removal by others.

The Design-Build Team shall be responsible to the owners for any damage to any street signs and markers or route markers during the above described operations.

### **MATERIALS**

(2-21-12) (Rev. 2-23-15)

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

DB10 R01

Revise the 2012 *Standard Specifications for Roads and Structures* as follows:

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

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

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

If any change is made to the mix design, submit a new mix design (with the exception of an approved pozzolan source change).

If any major change is made to the mix design, also submit new test results showing the mix design conforms to the criteria. Define a major change to the mix design as:

- (1) A source change in coarse aggregate, fine aggregate or cement.
- (2) A pozzolan class or type change (e.g. Class F fly ash to Class C fly ash).
- (3) A quantitative change in coarse aggregate (applies to an increase or decrease greater than 5%), fine aggregate (applies to an increase or decrease greater than 5%), water (applies to an increase only), cement (applies to a decrease only), or pozzolan (applies to an increase or decrease greater than 5%).

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

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

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

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

<b>Item</b>	<b>Section</b>
Type IL Blended Cement	1024-1

**Page 10-1, Subarticle 1000-3(A), Composition and Design, lines 25-27,** replace the second paragraph with the following:

Fly ash may be substituted for cement in the mix design up to 30% at a rate of 1.0 pound of fly ash to each pound of cement replaced.

**Page 10-2, Subarticle 1000-3(A), Composition and Design, lines 12-21,** delete the third paragraph through the sixth paragraph beginning with “If any change is made to the mix design, submit...” through “...(applies to a decrease only).”

**Page 10-6, Subarticle 1000-4(I), Use of Fly Ash, lines 36-2,** replace the first paragraph with the following:

Fly ash may be substituted for cement in the mix design up to 30% at a rate of 1.0 pound of fly ash to each pound of cement replaced. Use Table 1000-1 to determine the maximum allowable water-cementitious material (cement + fly ash) ratio for the classes of concrete listed.

**Page 10-7, Table 1000-3, MAXIMUM WATER-CEMENTITIOUS MATERIAL RATIO,** delete the table.

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

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

TABLE 1005-1 AGGREGATE GRADATION - COARSE AGGREGATE													
Percentage of Total by Weight Passing													
Std. Size #	2"	1 1/2"	1"	3/4"	1/2"	3/8"	#4	#8	#10	#16	#40	#200	Remarks
4	100	90-100	20-55	0-15	-	0-5	-	-	-	-	-	A	Asphalt Plant Mix
46/7M	100	95-100	-	35-70	-	0-30	0-5	-	-	-	-	A	Asphalt Plant Mix
5	-	100	90-100	20-55	0-10	0-5	-	-	-	-	-	A	AST, Sediment Control Stone
57	-	100	95-100	-	25-60	-	0-10	0-5	-	-	-	A	AST, Str. Concrete, Shoulder Drain, Sediment Control Stone
57M	-	100	95-100	-	25-45	-	0-10	0-5	-	-	-	A	AST, Concrete Pavement
6M	-	-	100	90-100	20-55	0-20	0-8	-	-	-	-	A	AST
67	-	-	100	90-100	-	20-55	0-10	0-5	-	-	-	A	AST, Str. Concrete, Asphalt Plant Mix
78M	-	-	-	100	98-100	75-100	20-45	0-15	-	-	-	A	Asphalt Plant Mix, AST, Str. Cone, Weep Hole Drains
14M	-	-	-	-	-	100	35-70	5-20	-	0-8	-	A	Asphalt Plant Mix, AST, Weep Hole Drains, Str. Concrete
9	-	-	-	-	-	100	85-100	10-40	-	0-10	-	A	AST
ABC	-	100	75-97	-	55-80	-	35-55	-	25-45	-	14-30	4-12 <sup>B</sup>	Aggregate Base Course, Aggregate Stabilization
ABC (M)	-	100	75-100	-	45-79	-	20-40	-	0-25	-	-	0-12 <sup>B</sup>	Maintenance Stabilization
Lightweight <sup>C</sup>	-	-	-	-	100	80-100	5-40	0-20	-	0-10	-	0-2.5	AST

A. See Subarticle 1005-4(A).

B. See Subarticle 1005-4(B).

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

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

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

**Page 10-46, Table 1024-1, POZZOLANS FOR USE IN PORTLAND CEMENT CONCRETE,** replace with the following:

<b>TABLE 1024-1 POZZOLANS FOR USE IN PORTLAND CEMENT CONCRETE</b>	
<b>Pozzolan</b>	<b>Rate</b>
Class F Fly Ash	20% - 30% by weight of required cement content with 1.0 pound Class F fly ash per pound of cement replaced
Ground Granulated Blast Furnace Slag	35% - 50% by weight of required cement content with 1.0 pound slag per pound of cement replaced
Microsilica	4% - 8% by weight of required cement content with 1.0 pound microsilica per pound of cement replaced

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

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

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

All fencing material and accessories shall meet Section 106.

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

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

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

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

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

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

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

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

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

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

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

(B) At least 3 panels prepared as specified in 5.5.10 of AASHTO M 300, Bullet Hole Immersion Test.

(C) At least 3 panels of 4"x6"x1/4" for the Elcometer Adhesion Pull Off Test, ASTM D4541.

(D) A certified test report from an approved independent testing laboratory for the Salt Fog Resistance Test, Cyclic Weathering Resistance Test, and Bullet Hole Immersion Test as specified in AASHTO M 300.

(E) A certified test report from an approved independent testing laboratory that the product has been tested for slip coefficient and meets AASHTO M253, Class B.

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

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

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

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

For epoxy resin systems used for embedding dowel bars, threaded rods, rebar, anchor bolts and other fixtures in hardened concrete, the manufacturer shall submit test results showing that the bonding system will obtain 125% of the specified required yield strength of the fixture. Furnish



certification that, for the particular bolt grade, diameter and embedment depth required, the anchor system will not fail by adhesive failure and that there is no movement of the anchor bolt. For certification and anchorage, use 3,000 psi as the minimum Portland cement concrete compressive strength used in this test. Use adhesives that meet Section 1081.

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

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

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

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

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

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

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

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

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

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

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

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

#### **1081-4 EPOXY RESIN ADHESIVE FOR BONDING TRAFFIC MARKINGS**

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

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

##### **(B) Classification**

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

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

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

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

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

**(C) Requirements**

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

**(D) Prequalification**

Refer to Subarticle 1081-1(E).

**(E) Acceptance**

Refer to Subarticle 1081-1(F).

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

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

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

The epoxy shall meet Article 1081-4.

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

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

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

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

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

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

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

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

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

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

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

**SELECT MATERIAL, CLASS III, TYPE 3**

12-02-11

DB10 R005

Revise the 2012 *Standard Specifications for Roads and Structures* as follows:

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

**Type 3 Select Material**

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

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

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

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

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

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

Subdrain coarse aggregate shall meet Class V select material.

**SHOULDER AND SLOPE BORROW**

1/22/13

1019

DB10 R10

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

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

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

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

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

### **GROUT PRODUCTION AND DELIVERY**

(3-17-15)

1003

DB10 R20

Revise the 2012 *Standard Specifications for Roads and Structures* as follows:

Replace Section 1003 with the following:

### **SECTION 1003** **GROUT PRODUCTION AND DELIVERY**

#### **1003-1 DESCRIPTION**

This section addresses cement grout to be used for structures, foundations, retaining walls, concrete barriers, embankments, pavements and other applications in accordance with the contract. Produce non-metallic grout composed of Portland cement and water and at the Design Build Team's option or as required, aggregate and pozzolans. Include chemical admixtures as required or needed. Provide sand cement or neat cement grout as required. Define "sand cement grout" as grout with only fine aggregate and "neat cement grout" as grout without aggregate.

The types of grout with their typical uses are as shown below:

**Type 1** – A cement grout with only a 3-day strength requirement and a fluid consistency that is typically used for filling subsurface voids.

**Type 2** – A nonshrink grout with strength, height change and flow conforming to ASTM C1107 that is typically used for foundations, ground anchors and soil nails.

**Type 3** – A nonshrink grout with high early strength and freeze-thaw durability requirements that is typically used in pile blockouts, grout pockets, shear keys, dowel holes and recesses for concrete barriers and structures.

**Type 4** – A neat cement grout with low strength, a fluid consistency and high fly ash content that is typically used for slab jacking.

**Type 5** – A low slump, low mobility sand cement grout with minimal strength that is typically used for compaction grouting.

## 1003-2 MATERIALS

Refer to Division 10.

Item	Section
Chemical Admixtures	1024-3
Fine Aggregate	1014-1
Fly Ash	1024-5
Ground Granulated Blast Furnace Slag	1024-6
Portland Cement	1024-1
Silica Fume	1024-7
Water	1024-4

Do not use grout that contains soluble chlorides or more than 1% soluble sulfate. At the Design Build Team's option, use an approved packaged grout instead of the materials above except for water. Use packaged grouts that are on the NCDOT Approved Products List.

Use admixtures for grout that are on the NCDOT Approved Products List or other admixtures in accordance with Subarticle 1024-3(E) except do not use concrete additives or unclassified or other admixtures in Type 4 or 5 grout. Use Class F fly ash for Type 4 grout and Type II Portland cement for Type 5 grout.

Use well graded rounded aggregate with a gradation, liquid limit (LL) and plasticity index (PI) that meet Table 1003-1 for Type 5 grout. Fly ash may be substituted for a portion of the fines in the aggregate. Do not use any other pozzolans in Type 5 grout.

**TABLE 1003-1  
AGGREGATE REQUIREMENTS FOR TYPE 5 GROUT**

<b>Gradation</b>		<b>Maximum Liquid Limit</b>	<b>Maximum Plasticity Index</b>
<b>Sieve Designation per AASHTO M 92</b>	<b>Percentage Passing (% by weight)</b>		
3/8"	100	N/A	N/A
No. 4	70 – 95		
No. 8	50 – 90		
No. 16	30 – 80		
No. 30	25 – 70		
No. 50	20 – 50		
No. 100	15 – 40		
No. 200	10 – 30	25	10

### 1003-3 COMPOSITION AND DESIGN

When using an approved packaged grout, a grout mix design submittal is not required. Otherwise, submit proposed grout mix designs for each grout mix to be used in the work. Mixes for all grout shall be designed by a Certified Concrete Mix Design Technician or an Engineer licensed by the State of North Carolina. Mix proportions shall be determined by a testing laboratory approved by the Department. Base grout mix designs on laboratory trial batches that meet Table 1003-2 and this section. With permission, the Design Build Team may use a quantity of chemical admixture within the range shown on the current list of approved admixtures maintained by the Materials and Tests Unit.

Submit grout mix designs in terms of saturated surface dry weights on Materials and Tests Form 312U at least 35 days before proposed use. Adjust batch proportions to compensate for surface moisture contained in the aggregates at the time of batching. Changes in the saturated surface dry mix proportions will not be permitted unless revised grout mix designs have been submitted to the Engineer and approved.

Accompany Materials and Tests Form 312U with a listing of laboratory test results of compressive strength, density and flow or slump and if applicable, aggregate gradation, durability and height change. List the compressive strength of at least three 2" cubes at the age of 3 and 28 days.

The Engineer will review the grout mix design for compliance with the contract and notify the Design Build Team as to its acceptability. Do not use a grout mix until written notice has been received. Acceptance of the grout mix design or use of approved packaged grouts does not relieve the Design Build Team of his responsibility to furnish a product that meets the contract. Upon written request from the Design Build Team, a grout mix design accepted and used satisfactorily on any Department project may be accepted for use on other projects.



Perform laboratory tests in accordance with the following test procedures:

<b>Property</b>	<b>Test Method</b>
Aggregate Gradation <sup>A</sup>	AASHTO T 27
Compressive Strength	AASHTO T 106
Density (Unit Weight)	AASHTO T 121, AASHTO T 133 <sup>B</sup> , ANSI/API RP <sup>C</sup> 13B-1 <sup>B</sup> (Section 4, Mud Balance)
Durability	AASHTO T 161 <sup>D</sup>
Flow	ASTM C939 (Flow Cone)
Height Change	ASTM C1090 <sup>E</sup>
Slump	AASHTO T 119

**A.** Applicable to grout with aggregate.

**B.** Applicable to Neat Cement Grout.

**C.** American National Standards Institute/American Petroleum Institute Recommended Practice.

**D.** Procedure A (Rapid Freezing and Thawing in Water) required.

**E.** Moist room storage required.

#### **1003-4 GROUT REQUIREMENTS**

Provide grout types in accordance with the contract. Use grouts with properties that meet Table 1003-2. The compressive strength of the grout will be considered the average compressive strength test results of three 2" cubes at each age. Make cubes that meet AASHTO T 106 from the grout delivered for the work or mixed on-site. Make cubes at such frequencies as the Engineer may determine and cure them in accordance with AASHTO T 106.

<b>TABLE 1003-2 GROUT REQUIREMENTS</b>					
<b>Type of Grout</b>	<b>Minimum Compressive Strength at</b>		<b>Height Change at 28 days</b>	<b>Flow<sup>A</sup>/Slump<sup>B</sup></b>	<b>Minimum Durability Factor</b>
	<b>3 days</b>	<b>28 days</b>			
1	3,000 psi	—	—	10 – 30 sec	—
2	Table 1 <sup>C</sup>			Fluid Consistency <sup>C</sup>	—
3	5,000 psi	—	0 – 0.2%	Per Accepted Grout Mix Design/ Approved Packaged Grout	80
4 <sup>D</sup>	600 psi	1,500 psi	—	10 – 26 sec	—
5	—	500 psi	—	1 – 3"	—

**A.** Applicable to Type 1 through 4 grouts.

**B.** Applicable to Type 5 grout.

**C.** ASTM C1107.

**D.** Use Type 4 grout with proportions by volume of 1 part cement and 3 parts fly ash.

### **1003-5 TEMPERATURE REQUIREMENTS**

When using an approved packaged grout, follow the manufacturer's instructions for grout and air temperature at the time of placement. Otherwise, the grout temperature at the time of placement shall be not less than 50°F or more than 90°F. Do not place grout when the air temperature measured at the location of the grouting operation in the shade away from artificial heat is below 40°F.

### **1003-6 ELAPSED TIME FOR PLACING GROUT**

Agitate grout continuously before placement. Regulate the delivery so the maximum interval between the placing of batches at the work site does not exceed 20 minutes. Place grout before exceeding the times in Table 1003-3. Measure the elapsed time as the time between adding the mixing water to the grout mix and placing the grout.

<b>TABLE 1003-3</b> <b>ELAPSED TIME FOR PLACING GROUT</b> <b>(with continuous agitation)</b>		
<b>Air or Grout Temperature, Whichever is Higher</b>	<b>Maximum Elapsed Time</b>	
	<b>No Retarding Admixture Used</b>	<b>Retarding Admixture Used</b>
90°F or above	30 minutes	1 hour 15 minutes
80°F through 89°F	45 minutes	1 hour 30 minutes
79°F or below	60 minutes	1 hour 45 minutes

### 1003-7 MIXING AND DELIVERY

Use grout free of any lumps and undispersed cement. When using an approved packaged grout, mix grout in accordance with the manufacturer's instructions. Otherwise, comply with Articles 1000-8 through 1000-12 to the extent applicable for grout instead of concrete.

### **TEMPORARY SHORING**

(3-17-15)

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 5 feet from the edge of pavement of an open travelway. This Standard Special Provision does not apply to pipe, inlet or utility installation 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 is required if temporary shoring is located in the clear zone in accordance with the *AASHTO Roadside Design Guide*.

A. Cantilever and Braced Shoring

Cantilever shoring consists of steel sheet piles or H-piles with timber lagging. Braced shoring consists of sheet piles or H-piles with timber lagging and bracing such as beams, plates, walers, struts, rakers, etc. Define “piles” as sheet piles or H-piles.

B. Anchored Shoring

Anchored shoring consists of sheet piles with walers or H-piles with timber lagging anchored with ground or helical anchors. Driven anchors may be accepted at the discretion of the Engineer. A ground anchor consists of a grouted steel bar or multi-strand tendon with an anchorage. A helical anchor consists of a lead section with a central steel shaft and at least one helix steel plate followed by extensions with only central shafts (no helixes) and an anchorage. Anchorages consist of steel bearing plates with washers and hex nuts for bars or steel wedge plates and wedges for strands. Use a prequalified Anchored Wall Contractor to install ground anchors. Define “anchors” as ground, helical or driven anchors.

C. Temporary MSE Walls

Temporary MSE walls include temporary geosynthetic and wire walls. Define “temporary wall” as a temporary MSE wall. 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 Drawings* 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 2012 *Standard Specifications for Roads and Structures*.

Item	Section
Anchor Pins	1056-2
Concrete Barrier Materials	1170-2
Flowable Fill, Excavatable	1000-6
Geotextiles	1056
Grout	1003
Portland Cement Concrete	1000
Select Material	1016
Steel Plates	1072-2
Steel Beam Guardrail Materials	862-2
Steel Sheet Piles and H-Piles	1084
Untreated Timber	1082-2
Welded Wire Reinforcement	1070-3
Wire Staples	1060-8(D)

Provide Type 6 material certifications for shoring material in accordance with Article 106-3 of the 2012 *Standard Specifications for Roads and Structures*. Use Class IV select material (standard size No. ABC) for temporary guardrail. Use neat cement grout or Type 2 grout for ground anchors. Use Class A concrete that meets Article 450-2 of the 2012 *Standard Specifications for Roads and Structures* or Type 1 grout for drilled-in piles. Provide untreated timber with a thickness of at least 3" and a bending stress of at least 1,000 psi 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" above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Load, transport, unload and store anchor materials so materials are kept clean and free of damage. Bent, damaged or defective materials will be rejected.

#### (1) Ground Anchors

Use high-strength deformed steel bars that meet AASHTO M 275 or seven-wire strands that meet ASTM A886 or Article 1070-5 of the 2012 *Standard Specifications for Roads and Structures*. Splice bars in accordance with Article 1070-9 of the 2012 *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. Helical anchors without an ICC-ES report may be approved at the discretion of the Engineer. 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

Handle and store geogrids in accordance with Article 1056-2 of the 2012 *Standard Specifications for Roads and Structures*. Define “machine direction” (MD) and “cross-machine direction” (CD) for geogrids in accordance with ASTM D4439.

Use geogrids with a roll width of at least 4 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/SoilsLaboratory.aspx](http://connect.ncdot.gov/resources/Materials/Pages/SoilsLaboratory.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 MD and CD or short-term design strengths for a 3-year design life in the MD based on material type. Define material type from the website above for shoring backfill as follows:

<b>Material Type</b>	<b>Shoring Backfill</b>
Borrow	A-2-4 Soil
Fine Aggregate	Class II, Type 1 or Class III Select Material
Coarse Aggregate	Class V or VI Select Material

(4) Welded Wire Grid and Metallic Strip Reinforcement

Provide welded wire grid and metallic strip reinforcement supplied by the Wire Wall Vendor or a manufacturer approved or licensed by the vendor. Use welded wire grid reinforcement (“mesh”, “mats” and “ladders”) that meet Article 1070-3 of the 2012 *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 is 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 4 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 8 copies of working drawings and 3 copies of design calculations and a PDF copy of each for temporary shoring designs in accordance with Article 105-2 of the 2012 *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.

Use a prequalified MSE Wall Design Consultant to design temporary walls. Provide temporary wall designs sealed by a Design Engineer approved as a Geotechnical Engineer (key person) for the MSE Wall Design Consultant. 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 ( $\gamma$ ) = 120 lb/cf;

(b) Friction Angle ( $\Phi$ )	Shoring Backfill
30°	A-2-4 Soil
34°	Class II, Type 1 or Class III Select Material
38°	Class V or VI Select Material

(c) Cohesion (c) = 0 lb/sf.

(2) Traffic Surcharge

Design temporary shoring for a traffic surcharge of 250 lb/sf if traffic will be above and within H of shoring. This traffic surcharge does not apply to construction traffic. Design temporary shoring for any construction surcharge if construction traffic will be above and within H of shoring. 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 grout or concrete 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 lb/ft applied 18" 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 ( $P_{HI}$ ) in accordance with Figure 3.11.6.3-2(a) of the AASHTO LRFD specifications.

Extend cantilever, braced and anchored shoring at least 32" above top of shoring if shoring is designed for traffic impact. Otherwise, extend shoring at least 6" above top of shoring.

Design cantilever, braced and anchored shoring for a maximum deflection of 3" if the horizontal distance to the closest edge of pavement or structure is less than H. Otherwise, design shoring for a maximum deflection of 6". 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 5 feet behind the critical failure surface. Do not extend anchors beyond right-of-way or easement limits. If existing or future obstructions such as foundations, guardrail posts, pavements, pipes, inlets or utilities will interfere with anchors, maintain a clearance of at least 6" 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" except for walls on structures or rock as determined by the Engineer. Use a uniform reinforcement length throughout the wall height of at least 0.7H or 6 feet, whichever is longer. Extend the reinforced zone at least 6" 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 3-year design life and shoring backfill to be used in the reinforced zone.

Do not use more than 4 different reinforcement strengths for each temporary geosynthetic wall. Design temporary geotextile walls for a reinforcement coverage ratio ( $R_c$ ) of 1.0 and temporary geogrid walls for an  $R_c$  of at least 0.8. For geogrid reinforcement with an  $R_c$  of less than 1.0, use a maximum horizontal clearance between geogrids of 3 feet and stagger reinforcement so geogrids are centered over gaps in the reinforcement layer below.

For temporary geosynthetic walls, use "L" shaped welded wire facing with 18" to 24" 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 3 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 3 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 2012 *Standard Specifications for Roads and Structures* and Standard Drawing No. 1170.01 of the 2012 *Roadway Standard Drawings*. Use temporary guardrail in accordance with Section 862 of the 2012 *Standard Specifications for Roads and Structures* and Standard Drawing Nos. 862.01, 862.02 and 862.03 of the 2012 *Roadway Standard Drawings*.

**(A) Tolerances**

Construct shoring with the following tolerances:

- (1) Horizontal wires of welded wire facing are level in all directions,
- (2) Shoring location is within 6" of horizontal and vertical alignment shown in the accepted submittals, and
- (3) Shoring plumbness (batter) is not negative and within 2° 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 2012 *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 grout or concrete to the elevations shown in the accepted submittals, remove any fluids and fill remaining portions of holes with flowable fill. Cure grout or concrete at least 7 days before excavating.

Notify the Engineer if refusal is reached before pile excavation or driven piles attain the minimum required embedment. When this occurs, a revised design submittal may be required.

**(2) Excavation**

Excavate in front of piles from the top down in accordance with the accepted submittals. For H-piles with timber lagging and braced and anchored shoring, excavate in staged horizontal lifts with a maximum height of 5 feet. Remove flowable fill and material in between H-piles as needed to install timber lagging. Position lagging with at least 3" 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 3 helix plate diameters past the location of the first helix of the previous anchor.

(4) Anchor Testing

Proof test and lock-off anchors in accordance with the accepted submittals and Article 6.5.5 of the *AASHTO LRFD Bridge Construction Specifications* except for the acceptance criteria in Article 6.5.5.5. For the AASHTO LRFD specifications, "ground anchor" refers to a ground or helical anchor and "tendon" refers to a bar, strand or shaft.

(a) Anchor Acceptance

Anchor acceptance is based in part on the following criteria.

- (i) For ground and helical anchors, total movement is less than 0.04" between the 1 and 10 minute readings or less than 0.08" between the 6 and 60 minute readings.

- (ii) For ground anchors, total movement at maximum test load exceeds 80% of the theoretical elastic elongation of the unbonded length.

(b) Anchor Test Results

Submit 2 copies 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 3" of shoring backfill. Overlap adjacent geotextile reinforcement and retention and separation geotextiles at least 18" with seams oriented perpendicular to the wall face. Hold geotextiles in place with wire staples or anchor pins as needed.

Place reinforcement within 3" of locations shown in the plans developed by the Design-Build Team and accepted submittals, and in slight tension 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 8" to 10" 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 2012 *Standard Specifications for Roads and Structures*. Use only hand operated compaction equipment to compact backfill within 3 feet of welded wire facing. At a distance greater than 3 feet, compact shoring backfill with at least 4 passes of an 8 ton to 10 ton vibratory roller in a direction parallel to the wall face. Smooth wheeled or rubber tired rollers are also acceptable for compacting 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 8" 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 2012 *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 5 feet of finished grade, remove top facing and incorporate top reinforcement layer into fill when placing fill in front of wall. Temporary walls remain in place permanently unless otherwise required.

#### **TRUCK MOUNTED CHANGEABLE MESSAGE SIGNS**

06/27/2012)

1101.02

DB11 R10

Revise the 2012 *Roadway Standard Drawings* as follows:

**Drawing No. 1101.02, Sheet 12, TEMPORARY LANE CLOSURES**, replace General Note #11 with the following:

11- TRUCK MOUNTED CHANGEABLE MESSAGE SIGNS (TMCMS) USED ON SHADOW VEHICLES FOR "IN LANE" ACTIVITIES SHALL BE A MINIMUM OF 43" X 73". THE DISPLAY PANEL SHALL HAVE FULL MATRIX CAPABILITY WITH THE CAPABILITY TO PROVIDE 2 MESSAGE LINES WITH 7 CHARACTERS PER LINE WITH A MINIMUM CHARACTER HEIGHT OF 18". FOR ADDITIONAL MESSAGING, CONTACT THE WORK ZONE TRAFFIC CONTROL SECTION.

12- TMCMS USED FOR ADVANCED WARNING ON VEHICLES LOCATED ON THE SHOULDER MAY BE SMALLER THAN 43" X 73". THE DISPLAY PANEL SHALL HAVE THE CAPABILITY TO PROVIDE 2 MESSAGE LINES WITH 7 CHARACTERS PER LINE WITH A MINIMUM CHARACTER HEIGHT OF 18". FOR ADDITIONAL MESSAGING, CONTACT THE WORK ZONE TRAFFIC CONTROL SECTION.

**Drawing No. 1101.02, Sheet 13, TEMPORARY LANE CLOSURES**, replace General Note #12 with the following:

12- TRUCK MOUNTED CHANGEABLE MESSAGE SIGNS (TMCMS) USED ON SHADOW VEHICLES FOR "IN LANE" ACTIVITIES SHALL BE A MINIMUM OF 43" X 73". THE DISPLAY PANEL SHALL HAVE FULL MATRIX CAPABILITY WITH THE CAPABILITY TO PROVIDE 2 MESSAGE LINES WITH 7 CHARACTERS PER LINE

WITH A MINIMUM CHARACTER HEIGHT OF 18". FOR ADDITIONAL MESSAGING, CONTACT THE WORK ZONE TRAFFIC CONTROL SECTION.

13- TMCMS USED FOR ADVANCED WARNING ON VEHICLES LOCATED ON THE SHOULDER MAY BE SMALLER THAN 43" X 73". THE DISPLAY PANEL SHALL HAVE THE CAPABILITY TO PROVIDE 2 MESSAGE LINES WITH 7 CHARACTERS PER LINE WITH A MINIMUM CHARACTER HEIGHT OF 18". FOR ADDITIONAL MESSAGING, CONTACT THE WORK ZONE TRAFFIC CONTROL SECTION.

### **ON-THE-JOB TRAINING**

(3-27-13)

Z-10

#### **Description**

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

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

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

#### **Minorities and Women**

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

#### **Assigning Training Goals**

The Department, through the OJT Program Manager, will assign training goals for a calendar year based on the contractors' past three years' activity and the contractors' anticipated upcoming year's activity with the Department. At the beginning of each year, all contractors eligible will be contacted by the Department to determine the number of trainees that will be assigned for the upcoming calendar year. At that time the Contractor shall enter into an agreement with the Department to provide a self-imposed on-the-job training program for the calendar year. This agreement will include a specific number of annual training goals agreed to by both parties. The number of training assignments may range from 1 to 15 per contractor per calendar year.

The Contractor shall sign an agreement to fulfill their annual goal for the year.

### **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 Article 108-13(E), of the *North Carolina Department of Transportation Standard Specifications for Roads and Structures*, dated January 2012 and as amended by the Standard Special Provision, Division One found elsewhere in this RFP.

**\*\*\* STANDARD SPECIAL PROVISIONS \*\*\*****NCDOT GENERAL SEED SPECIFICATIONS FOR SEED QUALITY**

(5-7-11)

Z-3

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

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

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

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

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

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

Seed of Pensacola Bahiagrass shall not contain more than 7% inert matter, Kentucky Bluegrass, Centipede and Fine or Hard Fescue shall not contain more than 5% inert matter whereas a maximum of 2% inert matter will be allowed on all other kinds of seed. In addition, all seed shall not contain more than 2% other crop seed nor more than 1% total weed seed. The germination rate as tested by the North Carolina Department of Agriculture shall not fall below 70%, which includes both dormant and hard seed. Seed shall be labeled with not more than 7%, 5% or 2% inert matter (according to above specifications), 2% other crop seed and 1% total weed seed.

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

#### FURTHER SPECIFICATIONS FOR EACH SEED GROUP ARE GIVEN BELOW:

Minimum 85% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 83% pure live seed will not be approved.

Sericea Lespedeza  
Oats (seeds)

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

Tall Fescue (all approved varieties)	Bermudagrass
Kobe Lespedeza	Browntop Millet
Korean Lespedeza	German Millet - Strain R
Weeping Lovegrass	Clover – Red / White / Crimson
Carpetgrass	

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

Common or Sweet Sundangrass

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

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

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

Centipedegrass  
Crownvetch  
Pensacola Bahiagrass  
Creeping Red Fescue

Japanese Millet  
Reed Canary Grass  
Zoysia

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

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

**STANDARD SPECIAL PROVISION****ERRATA**

(02-24-15) (Rev.3-2-15)

Z-4

Revise the 2012 *Standard Specifications for Roads and Structures* as follows:

**Division 2**

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

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

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

**Division 3**

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

**Division 4**

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

**Division 6**

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

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

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

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

**Division 7**

**Page 7-1, Article 700-3, CONCRETE HAULING EQUIPMENT,** line 33, replace “competition” with “completion”.

**Division 8**

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

**Division 10**

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

**Division 12**

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

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

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

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

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

**Division 15**

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

**Page 15-6, Subarticle 1510-3(B), after line 21**, replace the allowable leakage formula with the following:  $W = LD\sqrt{P} \div 148,000$

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

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

**Division 17**

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

Revise the 2012 *Roadway Standard Drawings* as follows:

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

**MINIMUM WAGES**

(07-21-09)

Z-5

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

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

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

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

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

The determination of the intent of the application of these Acts to the project's contract shall be the Design-Build Team's responsibility.

The Design-Build Team shall have no claim against the Department of Transportation for any changes in the minimum wage laws, State or Federal. It is the responsibility of the Design-Build Team to be fully informed of all Federal and State Laws affecting the project's contract.



**\*\*\* STANDARD SPECIAL PROVISIONS \*\*\***

(7-9-12)

**DIVISION ONE OF STANDARD SPECIFICATIONS**

**Division One of the 2012 NCDOT Standard Specifications for Roads and Structures (Standard Specifications) shall apply except as follows:**

**Definitions:** Throughout Division One of the *Standard Specifications*, the term “Contractor” is replaced with “Design-Build Team”, the term “Bidder” is replaced with “Proposer,” the term “Bid” is replaced by “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 102-4, 102-8(B), 102-9(C)(2), 103-2(B), and 103-4(B) of the *Standard Specifications* are deleted from Design-Build Contracts.

**Modifications:** The remainder of this Standard Special Provision includes modifications to Division One of the *Standard Specifications*.

**SECTION 101  
DEFINITION OF TERMS**

**Page 1-3, Article 101-3, replace and add certain definitions as follows:**

**ADDITIONAL WORK**

Additional work is that which results from a change or alteration to the contract and for which there are contract unit prices in the original contract or an executed supplemental agreement.

**ADVERTISEMENT**

The public advertisement inviting Statements of Qualifications for the design and construction of specific projects.

**AWARD**

The decision of the Department of Transportation to accept the proposal of the selected Design-Build Team for work which is subject to the furnishing of payment and performance bonds, and such other conditions as may be otherwise provided by law, the Request for Proposals, and the *Standard Specifications*.

**CONTRACT**

The executed agreement between the Department and the successful proposer, covering the performance of, and compensation for, the work. The term contract is all inclusive with reference to all written agreements affecting a contractual relationship and all documents referred to therein. The contract shall include, but not be limited to, the Request for Proposals, the

Technical Proposal, the Price Proposal, the printed contract form and attachments, contract bonds, plans and associated special provisions prepared by the Design-Build Team, standard specifications and supplemental specifications standard special provisions and project special provisions contained in the Request for Proposals or as developed by the Design-Build Team and accepted by the Department, and all executed supplemental agreements. The contract shall constitute one instrument.

**DATE OF AVAILABILITY**

That date 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 his 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 otherwise noted 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:

Randy A. Garris, PE  
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.

## **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.

## **PROPOSAL (OR 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.

## **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.

## **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 Transport 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 requirements of the Request for Proposals, 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 Proposals will be received for the 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 bid 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 date and time 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 with the proposal are necessary parts thereof and shall not be detached, taken apart, or altered.

The names and identity of each prospective Proposer that receives a copy of the Request for Qualifications for the purposes of submitting a Statement of Qualifications shall be made public, except that a potential Proposer who obtains a Request for Qualifications may, at the time of ordering, request that his name remain confidential.

One copy of the Final Request for Proposals will be furnished to each prospective Proposer. Additional copies may be purchased for the sum of \$25 each. The copy of the Final Request for

Proposals marked with the Proposer's name and prequalification number shall be returned to the Department as the Proposer's Price Proposal.

**Page 1-14, Article 102-7, 4<sup>th</sup> paragraph, delete the first two sentences and replace with the following:**

The Proposer is cautioned that 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 Price Proposal. 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 proposal 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 proposal.
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 bid 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 and notarized.
  - 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.
  - f. The Price Proposal execution shall be notarized by a notary public whose commission is in effect on the date of execution. Such notarization shall be applicable both to the Price Proposal and to the Non-Collusion Affidavit, Debarment Certification and Gift Ban Certification that is part of the signature sheets.
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 envelope and shall have been delivered to and received by the Department prior to the time specified in the Request for Proposals.

**Page 1-18, Article 102-10, 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 notice of award is received by him, give payment and performance bonds with good and sufficient surety as required for the faithful performance of the contract and for the protection of all persons supplying labor and materials in the prosecution of the work.

**Page 1-18, Article 102-10, delete the end of the Article beginning with, and inclusive of, the 6<sup>th</sup> paragraph.**

**Pages 1-19, delete Article 102-12 and replace with the following:**

**102-12 WITHDRAWAL OR REVISION OF BIDS**

A Design-Build Team will not be permitted to withdraw its Technical and Price Proposals 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 shortlisted Proposers will be opened and read publicly on the date and time indicated in the Request for Proposals. The scores of the previously conducted evaluation of the Technical Proposals will also be read publicly in accordance with the procedures outlined in the Request for Proposals. Proposers, their authorized agents, and other interested parties are invited to be present.

**Page 1-19, Article 102-14, replace the 1<sup>st</sup> paragraph with the following:**

**102-14 REJECTION OF BIDS**

Any Price Proposal submitted which fails to comply with any of the requirements of Articles 102-8, 102-9 or 102-10, or with the requirements of the project scope and specifications shall be considered irregular and may be rejected. A Price Proposal that does not contain costs for all proposal items shall be considered irregular and may be rejected.

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

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

**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 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 bid prices, 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 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 line items.

**Page 1-24, Subarticle 103-4(A), first paragraph, replace the 4<sup>th</sup> and 5<sup>th</sup> sentences with the following:**

Where award is to be made, the notice of award will be issued within 75 days after the submittal of Price Proposals, except with the consent of the responsible Proposer with the lowest adjusted price the decision to award the contract to such bidder may be delayed for as long a time as may be agreed upon by the Department and such Proposer. In the absence of such agreement, the Proposer may withdraw his Price Proposal at the expiration of the 75 days without penalty if no notice of award has been issued.

**Page 1-25, Article 103-6, delete the 1<sup>st</sup> and 2<sup>nd</sup> paragraphs and replace with the following:**

Checks that have been furnished as a bid deposit will be retained until after the contract bonds have been furnished by the successful proposer, at which time the checks that were furnished as a bid deposit will be returned.

## **SECTION 104 SCOPE OF WORK**

**Page 1-26, delete Article 104-1 and replace with the following:**

### **104-1 INTENT OF CONTRACT**

The intent of the contract is to prescribe the work or improvements that the Design-Build Team undertakes to perform, in full compliance with the contract documents. In case the method of construction or character of any part of the work is not covered by the contract, this section shall apply. The Design-Build Team shall perform all work in accordance with the contract or as may be modified by written orders, and shall do such special, additional, extra, and incidental work as may be considered necessary to complete the work to the full intent of the contract. Unless otherwise provided elsewhere in the contract, the Design-Build Team shall furnish all implements, machinery, equipment, tools, materials, supplies, transportation, and labor necessary for the design, prosecution and completion of the work.

**Page 1-26, Article 104-3, replace “plans or details of construction” with “contract” in all instances within this Article.**



**Page 1-35, Article 104-10, replace the first paragraph 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. All existing and constructed guardrail / guiderail within the project limits shall be included in this maintenance. 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. The Design-Build Team shall perform weekly inspections of guardrail and guiderail and shall report damages to the Engineer on the same day of the weekly inspection. Where damaged guardrail or guiderail is repaired or replaced as a result of maintaining the project in accordance with this Article, such repair or replacement shall be performed within 7 consecutive calendar days of such inspection report.

**Page 1-35, Article 104-10, add the following after the last paragraph:**

The Design-Build Team will not be compensated for performance of weekly inspections and damage reports for the guardrail / guiderail. Other maintenance activities for existing guardrail / guiderail will be handled in accordance with Articles 104-7 and 104-8.

**SECTION 105  
CONTROL OF WORK**

**Pages 1-40, delete Article 105-2 and replace with the following:**

**105-2 PLANS AND WORKING DRAWINGS**

All plans shall be supplemented by such approved working drawings as are necessary to adequately control the work. Working drawings furnished by the Design-Build Team and approved by the Engineer shall consist of such detailed drawings as may be required to adequately control the work. They may include stress sheets, shop drawings, erection drawings, falsework drawings, cofferdam drawings, bending diagrams for reinforcing steel, catalog cuts, or any other supplementary drawings or similar data required of the Design-Build Team. When working drawings are approved by the Engineer, such approval shall not operate to relieve the Design-Build Team of any of his responsibility under the contract for the successful completion of the work.

Changes on shop drawings after approval and/or distribution shall be subject to the approval of the Engineer and he shall be furnished a record of such changes.

**Page 1-41, Article 105-3, add the following after the 3<sup>rd</sup> paragraph:**

The Design-Build Team shall bear all the costs of providing the burden of proof that the nonconforming work is reasonable and adequately addresses the design purpose. The Design-

Build Team shall bear all risk for continuing with nonconforming work in question until it is accepted.

The Engineer may impose conditions for acceptance of the nonconforming work. The Design-Build Team shall bear all costs for fulfilling the conditions.

The decisions whether the product satisfies the design purpose, whether the nonconforming work is reasonably acceptable and the conditions for acceptance are at the sole discretion of the Engineer.

**Pages 1-41, delete Article 105-4 and replace with the following:**

**105-4           COORDINATION OF PLANS, SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS, AND SPECIAL PROVISIONS**

The Request for Proposals, all construction Plans, the Standard Specifications, Supplemental Specifications and Special Provisions and all supplementary documents are essential parts of the contract and a requirement occurring in one is as binding as though occurring in all. They are complementary and describe and provide the complete contract.

In case of discrepancy or conflict, the order in which they govern shall be as follows:

- (A) Request for Proposals, in which Project Special Provisions govern Standard Special Provisions
- (B) Technical Proposal from the Design-Build Team
- (C) Accepted Plans and Details from the Design-Build Team, or sealed plans provided by the Department, as applicable
- (D) Standard Drawings
- (E) Standard Specifications

Where dimensions on the plans are given or can be computed from other given dimensions they shall govern over scaled dimensions.

The Design-Build Team shall take no advantage of any error or omission in the plans, estimated quantities, or specifications. In the event the Design-Build Team discovers an error or omission, he shall immediately notify the Engineer.

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

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

**Page 1-44, delete Article 105-9 and replace with the following:**

**105-9           CONSTRUCTION STAKES, LINES, AND GRADES**

The Design-Build Team shall be responsible for all surveying, construction staking and layout required in the performance of the work. He will be responsible for the accuracy of lines, slopes, grades and other engineering work which he provides under this contract.

## **SECTION 106 CONTROL OF MATERIAL**

**Page 1-49, Article 106-2, add the following after the second paragraph:**

Prior to beginning construction, the Design-Build Team shall provide a Table of Quantities as described in Article 101-3 of these specifications.

The Table of Quantities Work Items shall correspond to Pay Items as defined in the Standard Specifications. These Work Items have associated Materials and Conversion Factors. For non-standard Work Items, a Generic Work Item with the correct Unit of Measure and in an appropriate category will be used. For example, “GENERIC TRAFFIC CONTROL ITEM – EA” or “GENERIC RETAINING WALL ITEM – LF”. For these Generic Work Items, Materials must be defined and appropriate conversion factors submitted.

An initial Table of Quantities shall be submitted no later than 30 calendar days after the date of award. The Table of Quantities shall be updated and resubmitted within 14 days of when a set of Plans is sealed as Release for Construction (RFC) Plans, and whenever there are substantial changes to the Quantities on previously incorporated RFC Plans.

**Page 1-51, 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 1-61, 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 1-64. Article 108-2, replace the 2<sup>nd</sup> paragraph with the following:**

The Design-Build Team shall submit a Progress Schedule for review within thirty (30) calendar days of receiving Notice of Award. The Department will review the Progress Schedule within twenty-one (21) calendar days of receipt. The Design-Build Team shall make any necessary corrections and adjustments to the Progress Schedule as necessitated by the Department’s review within seven (7) calendar days. The Department will review the revised Progress Schedule within seven (7) calendar days of receipt.

**Page 1-64, Subarticle 108-2(A)(1), add the following:**

- (k) Utility relocation and construction

**Page 1-65, 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 1-65, 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 (2 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 1-65, 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 any proposed subcontractors associated with the design of the project.

A preconstruction conference shall be held at least 10 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 notice before he 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, he shall be responsible for coordinating with the Engineer in scheduling their attendance and for notifying them. 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 requirement, the Design-Build Team shall submit copies of completed and signed DBE subcontracts, purchase orders, or invoices to the Department.

The Design-Build Team shall submit a traffic control plan in accordance with Article 1101-5 and the Request for Proposals. The Design-Build Team shall designate an employee who is competent and experienced in traffic control to implement and monitor the traffic control plan. 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 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, traffic control and safety plans 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 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 traffic control and safety plans. The Design-Build Team shall not designate its superintendent as the responsible person for either the traffic control plan or the safety plan, unless approved by the Engineer.

If the project requires that 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 it will use 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 1-65, Article 108-4, add the following sentence to the end of this article:**

The Design-Build Team shall record the proceedings of these conferences and distribute the final minutes of the conferences to all attendees.

**Page 1-65, Article 108-5, delete the first sentence of the second paragraph and delete the first word of the second sentence of the second paragraph.**

**Page 1-66, Article 108-6, replace “40%” with “30%” in the 1st paragraph.**

**Page 1-66, Article 108-6, replace “35%” with “25%” in the 2<sup>nd</sup> paragraph.**

**Pages 1-68, 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 Article 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 1-71, Article 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 1-71, delete Subarticle 108-10(B)(1) in its entirety.**

**Page 1-75, Article 108-13, delete bullet (E)(2) in its entirety.**

**SECTION 109  
MEASUREMENT AND PAYMENT**

**Page 1-76, Article 109-2, delete the last sentence of the 1<sup>st</sup> paragraph and replace with the following:**

Payment to the Design-Build Team will be made only for the work completed, certified and accepted in accordance with the terms of the contract.

**Pages 1-81, delete Article 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 1-82, 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 1-84, Article 109-10, add the following as bullets (E) and (F) under the 1<sup>st</sup> paragraph.**

**(E)** As-Constructed Drawings and other documents required elsewhere in this RFP.

**(F)** Documents or guarantees to support any warranty provided by the Design Build Team.

**ITEMIZED PROPOSAL FOR CONTRACT No. C203609**

October 3, 2014 1:30 pm

Page 1 of 1

County: Pitt

Line #	Item Number #	Sec #	Description	Quantity	Unit Cost	Amount
ROADWAY ITEMS						
0001	0000900000-N	SP	GENERIC MISCELLANEOUS ITEM DESIGN AND CONSTRUCTION	Lump Sum	L.S.	

1330/Oct03/Q1.0/D 900000 /E1

Total Amount Of Bid For Entire Project: ***\$159,647,247.47***



## Contract Item Sheets For C203609

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
-----------	------------	----------	-------------	------------------	-------------------	---------------

**ROADWAY ITEMS**

0001	0000900000-N	SP	GENERIC MISCELLANEOUS ITEM DESIGN & CONSTRUCTION	Lump Sum LS	0.00	159,647,247.47
------	--------------	----	---	----------------	------	----------------

TOTAL AMOUNT OF BID FOR ENTIRE PROJECT

**\$159,647,247.47**

0903/May11/Q1/D900000/E1

**FUEL USAGE FACTOR CHART AND ESTIMATE OF QUANTITIES**

Description of Work	Units	Fuel Usage Factor Diesel #2	Estimate of Quantities
Unclassified Excavation	Gal / CY	0.29	<u>79,182</u> CY
Borrow Excavation	Gal / CY	0.29	<u>5,200,000</u> CY
Class IV Subgrade Stabilization			
Aggregate Base Course	Gal / Ton	0.55	<u>465,947</u> Tons
Sub-Ballast			
Aggregate for Cement Treated Base Course			
Portland Cement for Cement Treated Base Course	Gal / Ton	0.55	<u>N/A</u> Tons
Asphalt Concrete Base Course	Gal / Ton	2.90	<u>378,829</u> Tons
Asphalt Concrete Intermediate Course			
Asphalt Concrete Surface Course			
Open-Graded Asphalt Friction Course			
Permeable Asphalt Drainage Course			
Sand Asphalt Surface Course, Type SA-1			
<b>Portland Cement Concrete Pavement:</b>			
Thru Lanes and Shoulders (> 11")	Gal / SY	0.327	<u>N/A</u> SY
Thru Lanes and Shoulders (9" to 11")		0.272	<u>N/A</u> SY
Thru Lanes and Shoulders (< 9")		0.245	<u>N/A</u> SY
* Structural Concrete (Cast-in-Place Only)	Gal / CY	0.98	<u>13,978</u> CY


\* 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 2012 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.

 vice president  
Signature, Title

4/27/2015  
Dated

Drew M. Johnson, Vice President  
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 and Price Proposal.)

## LISTING OF MBE &amp; WBE SUBCONTRACTORS

Sheet 1 of 3

FIRM NAME AND ADDRESS	MBE or WBE	ITEM NO.	ITEM DESCRIPTION	* AGREED UPON UNIT PRICE	** DOLLAR VOLUME OF ITEM
Brynnaton Construction, Inc. 164 American Drive Cobbato, NC 28129	WBE		Guardrail		\$1,419,121.96
Seal Brothers Contracting, LLC 3018 West Pine St. Mount Airy, NC 27030	WBE		Fence		\$49,373.44
			Silt Fence		\$445,068.57
Sadler Landscaping, LLC 953 Black Rock Rd. Merry Hill, NC 27957	WBE		Seeding : Mulching		\$202,972.30
Traffic Control Safety Services, Inc. P.O. Box 24511 Winston Salem, NC 27114	WBE		Portable Single Faced Barrier		\$324,191.00
Atlas Geo-Constructors, Inc. 5184 Bidsville Road Suite 100, Box 232 Walkerton, NC 27081	WBE		Sandwall		\$200,000.00
Hight-Mason Enterprises, Inc. P.O. Box 1378, Mount Airy, NC 27030	WBE		STD Form Reinforcing Steel		\$279,000.00
Contract No. <u>C203609</u>		County <u>Pitt</u>	Firm <u>Barnhill Contracting Co.</u>		

This form must be completed in order for the Bid to be considered responsive and be publicly read.

Bidders with no MBE and / or WBE participation must so indicate this on the form by entering the word or number zero.



## LISTING OF MBE &amp; WBE SUBCONTRACTORS

Sheet 3 of 3

FIRM NAME AND ADDRESS	MBE or WBE	ITEM NO.	ITEM DESCRIPTION	* AGREED UPON UNIT PRICE	** DOLLAR VOLUME OF ITEM
Hines Trucking 241 Stallings Rd. Louisburg, NC 27549-8207	MBE		Haul Asphalt		\$1,098,250.00
			Haul Stone; borrow		\$6,194,000.00
Vistabution LLC 11437 John Allen Rd. Raleigh, NC 27614	MBE		Demolition of Structures		\$137,241.00

## COST OF CONSTRUCTION WORK ONLY

\$ 148,577,247.47\*\* Dollar Volume of MBE Subcontractor \$ 7,429,491.00

\* The Dollar Volume shown in this column shall be the Actual Price Agreed Upon by the Prime Contractor and the MBE and / or WBE subcontractor, and these prices will be used to determine the percentage of the MBE and / or WBE participation in the contract.

MBE Percentage of Total Construction Cost  
(Including Right of Way Acquisition Costs)

5.00 %

\*\* Dollar Volume of WBE Subcontractor \$ 8,743,527.27

WBE Percentage of Total Construction Cost  
(Including Right of Way Acquisition Services)

5.88 %

\*\* Must have entry even if figure to be entered is zero.

**This form must be completed in order for the Bid to be considered responsive and be publicly read.  
Bidders with no MBE and / or WBE participation must so indicate this on the form by entering the word or number zero.**

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

**CORPORATION**

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating N.C.G.S. § 133-24 within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

**SIGNATURE OF CONTRACTOR**

Barnhill Contracting Company  
Full name of Corporation

P.O. Box 7948, 800 Tiffany Blvd., Suite 200, Rocky Mt., NC 27804  
Address as prequalified

Attest

Helen W. Spain  
Secretary/Assistant Secretary  
Select appropriate title

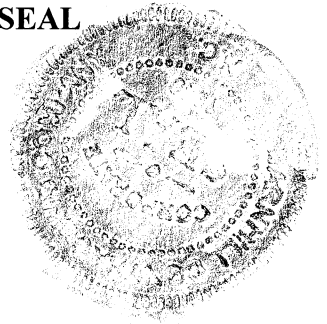
By

[Signature]  
President/Vice President/Assistant Vice President  
Select appropriate title

Helen W. Spain  
Print or type Signer's name

Drew M. Johnson, P.E.  
Print or type Signer's name

**CORPORATE SEAL**



**AFFIDAVIT MUST BE NOTARIZED**

Subscribed and sworn to before me this the  
27th day of April, 2015

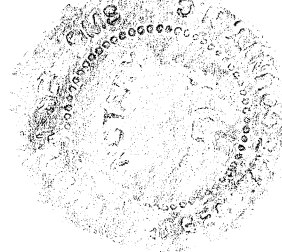
Judith Sessoms / Judith Sessoms  
Signature of Notary Public

Of Nash County

State of North Carolina

My Commission Expires 8-9-2015

**NOTARY SEAL**



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

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

*N.C.G.S. § 133-32* and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

**SIGNATURE OF CONTRACTOR**

\_\_\_\_\_  
Full Name of Partnership

\_\_\_\_\_  
Address as Prequalified

By

\_\_\_\_\_  
Signature of Witness

\_\_\_\_\_  
Signature of Partner

\_\_\_\_\_  
Print or type Signer's name

\_\_\_\_\_  
Print or type Signer's name

**AFFIDAVIT MUST BE NOTARIZED**

Subscribed and sworn to before me this the  
day of \_\_\_\_\_ 20\_\_\_\_.

\_\_\_\_\_  
Signature of Notary Public

of \_\_\_\_\_ County

State of \_\_\_\_\_

My Commission Expires: \_\_\_\_\_

**NOTARY SEAL**

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

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

*N.C.G.S. § 133-32* and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

**SIGNATURE OF CONTRACTOR**

\_\_\_\_\_  
Full Name of Firm

\_\_\_\_\_  
Address as Prequalified

\_\_\_\_\_  
Signature of Witness

\_\_\_\_\_  
Signature of Member/Manager/Authorized Agent  
*Select appropriate title*

\_\_\_\_\_  
Print or type Signer's name

\_\_\_\_\_  
Print or type Signer's Name

**AFFIDAVIT MUST BE NOTARIZED**

Subscribed and sworn to before me this the

**NOTARY SEAL**

\_\_\_\_ day of \_\_\_\_\_ 20\_\_.

\_\_\_\_\_  
Signature of Notary Public

of \_\_\_\_\_ County

State of \_\_\_\_\_

My Commission Expires: \_\_\_\_\_



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

NOTARY SEAL

*Affidavit must be notarized for Line (2)*

Subscribed and sworn to before me this

\_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_

\_\_\_\_\_  
Signature of Notary Public  
of \_\_\_\_\_ County

State of \_\_\_\_\_

My Commission Expires: \_\_\_\_\_

NOTARY SEAL

*Affidavit must be notarized for Line (3)*

Subscribed and sworn to before me this

\_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_

\_\_\_\_\_  
Signature of Notary Public  
of \_\_\_\_\_ County

State of \_\_\_\_\_

My Commission Expires: \_\_\_\_\_

NOTARY SEAL

*Affidavit must be notarized for Line (4)*

Subscribed and sworn to before me this

\_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_

\_\_\_\_\_  
Signature of Notary Public  
of \_\_\_\_\_ County

State of \_\_\_\_\_

My Commission Expires: \_\_\_\_\_

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

**INDIVIDUAL DOING BUSINESS UNDER A FIRM NAME**

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

*N.C.G.S. § 133-32* and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

**SIGNATURE OF CONTRACTOR**

Name of Contractor

\_\_\_\_\_  
Individual name

Trading and doing business as

\_\_\_\_\_  
Full name of Firm

\_\_\_\_\_  
Address as Prequalified

\_\_\_\_\_  
Signature of Witness

\_\_\_\_\_  
Signature of Contractor, Individually

\_\_\_\_\_  
Print or type Signer's name

\_\_\_\_\_  
Print or type Signer's name

**AFFIDAVIT MUST BE NOTARIZED**

Subscribed and sworn to before me this the  
 \_\_\_\_ day of \_\_\_\_\_ 20\_\_.

\_\_\_\_\_  
 Signature of Notary Public  
 of \_\_\_\_\_ County  
 State of \_\_\_\_\_  
 My Commission Expires: \_\_\_\_\_

**NOTARY SEAL**

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

**INDIVIDUAL DOING BUSINESS IN HIS OWN NAME**

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

*N.C.G.S. § 133-32* and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

**SIGNATURE OF CONTRACTOR**

Name of Contractor \_\_\_\_\_

Print or type Individual name

\_\_\_\_\_  
 Address as Prequalified

\_\_\_\_\_  
 Signature of Contractor, Individually

\_\_\_\_\_  
 Print or type Signer's Name

\_\_\_\_\_  
 Signature of Witness

\_\_\_\_\_  
 Print or type Signer's name

**AFFIDAVIT MUST BE NOTARIZED**

Subscribed and sworn to before me this the  
 \_\_\_\_ day of \_\_\_\_\_ 20\_\_.

\_\_\_\_\_  
 Signature of Notary Public  
 of \_\_\_\_\_ County  
 State of \_\_\_\_\_  
 My Commission Expires: \_\_\_\_\_

**NOTARY SEAL**

**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.: C 203609

County: Pitt

ACCEPTED BY THE  
DEPARTMENT OF TRANSPORTATION

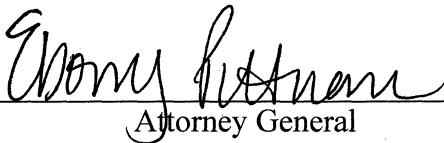


Contract Officer



Date

Execution of Contract and Bonds  
Approved as to Form:



Attorney General

Signature Sheet (Bid - Acceptance by Department)

## CONTRACT PAYMENT BOND

Date of Payment Bond Execution May 7, 2015

Name of Principal Contractor Barnhill Contracting Company

Name of Surety: Travelers Casualty and Surety Company of America

Name of Contracting Body: North Carolina Department of Transportation  
1591 Mail Service Center, Raleigh, North Carolina 27699-1591

Amount of Bond: \$159,647,247.47 One Hundred Fifty-Nine Million, Six Hundred  
Forty-Seven Thousand, Two Hundred Forty-Seven and 47/100 Dollars

Contract ID No.: C203609, WBS #34411.3.R7

County Name: Pitt

KNOW ALL MEN BY THESE PRESENTS, That we, the PRINCIPAL CONTRACTOR (hereafter, PRINCIPAL) and SURETY above named, are held and firmly bound unto the above named Contracting Body, hereinafter called the Contracting Body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the principal entered into a certain contract with the Contracting Body, numbered as shown above and hereto attached:

NOW THEREFORE, if the principal shall promptly make payment to all persons supplying labor and material in the prosecution of the work provided for in said contract, and any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the surety being hereby waived, then this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bound parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Contract No. C203609  
County: Pitt

Bond No. 106248482

Rev 5-17-11

### CONTRACT PAYMENT BOND

*Affix Seal of Surety Company*

Travelers Casualty and Surety Company of America

Print or type Surety Company Name

By Shirley A. Johnson, Attorney-in-fact

Print, stamp or type name of Attorney-in-Fact

Shirley A. Johnson  
Signature of Attorney-in-Fact

Tara J. Smithwick  
Signature of Witness

Tara J. Smithwick

Print or type Signer's name

5417 S. Miami Blvd., Durham NC 27703

Address of Attorney-in-Fact



Contract No. C203609  
County: Pitt

Bond No. 106248482

Rev 5-17-11

**CONTRACT PAYMENT BOND**

**CORPORATION**

SIGNATURE OF CONTRACTOR (Principal)

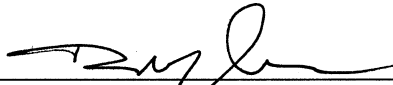
Barnhill Contracting Company

\_\_\_\_\_  
Full name of Corporation

P. O. Box 7948, Rocky Mount, North Carolina 27804

\_\_\_\_\_  
Address as prequalified

By

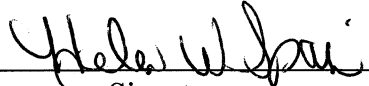
  
\_\_\_\_\_  
Signature of ~~President, Vice President, Assistant Vice President~~  
Select appropriate title

Drew M. Johnson, P. E.

Print or type Signer's name

*Affix Corporate Seal*

Attest

  
\_\_\_\_\_  
Signature of ~~Secretary, Assistant Secretary~~  
Select appropriate title

Helen W. Spain

Print or type Signer's name



## POWER OF ATTORNEY

Farmington Casualty Company  
 Fidelity and Guaranty Insurance Company  
 Fidelity and Guaranty Insurance Underwriters, Inc.  
 St. Paul Fire and Marine Insurance Company  
 St. Paul Guardian Insurance Company

St. Paul Mercury Insurance Company  
 Travelers Casualty and Surety Company  
 Travelers Casualty and Surety Company of America  
 United States Fidelity and Guaranty Company

Attorney-In Fact No. 228067

Certificate No. 006110769

**KNOW ALL MEN BY THESE PRESENTS:** That Farmington Casualty Company, St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company are corporations duly organized under the laws of the State of Connecticut, that Fidelity and Guaranty Insurance Company is a corporation duly organized under the laws of the State of Iowa, and that Fidelity and Guaranty Insurance Underwriters, Inc., is a corporation duly organized under the laws of the State of Wisconsin (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint

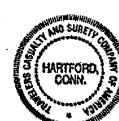
Barry C. Curtis, Cathy N. Hall, Shirley A. Johnson, Tara J. Smithwick, Sandra B. Fisher, Melinda Braddy, Robert M. Good, and Katherine James Robertson

of the City of Durham, State of North Carolina, their true and lawful Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

IN WITNESS WHEREOF, the Companies have caused this instrument to be signed and their corporate seals to be hereto affixed, this 3rd day of October, 2014.

Farmington Casualty Company  
 Fidelity and Guaranty Insurance Company  
 Fidelity and Guaranty Insurance Underwriters, Inc.  
 St. Paul Fire and Marine Insurance Company  
 St. Paul Guardian Insurance Company

St. Paul Mercury Insurance Company  
 Travelers Casualty and Surety Company  
 Travelers Casualty and Surety Company of America  
 United States Fidelity and Guaranty Company



State of Connecticut  
 City of Hartford ss.

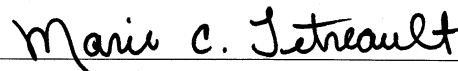
By: 

Robert L. Raney, Senior Vice President

On this the 3rd day of October, 2014, before me personally appeared Robert L. Raney, who acknowledged himself to be the Senior Vice President of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

In Witness Whereof, I hereunto set my hand and official seal.  
 My Commission expires the 30th day of June, 2016.



  
 Marie C. Tetreault, Notary Public

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, which resolutions are now in full force and effect, reading as follows:

**RESOLVED**, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

**FURTHER RESOLVED**, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

**FURTHER RESOLVED**, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

**FURTHER RESOLVED**, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, Kevin E. Hughes, the undersigned, Assistant Secretary, of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 7th day of May, 20 15

  
Kevin E. Hughes, Assistant Secretary



To verify the authenticity of this Power of Attorney, call 1-800-421-3880 or contact us at [www.travelersbond.com](http://www.travelersbond.com). Please refer to the Attorney-In-Fact number, the above-named individuals and the details of the bond to which the power is attached.

Contract No.: C203609  
County: Pitt

Bond No: 106248482

Rev 5-17-11

## CONTRACT PERFORMANCE BOND

Date of Performance Bond Execution: May 7, 2015

Name of Principal Contractor: Barnhill Contracting Company

Name of Surety: Travelers Casualty and Surety Company of America

Name of Contracting Body: North Carolina Department of Transportation  
1591 Mail Service Center, Raleigh, North Carolina 27699-1591

Amount of Bond: \$159,647,247.47 One Hundred Fifty-Nine Million, Six Hundred  
Forty-Seven Thousand, Two Hundred Forty-Seven and 47/100 Dollars

Contract ID No.: C203609, WBS #34411.3.R7

County Name: Pitt

KNOW ALL MEN BY THESE PRESENTS, That we, the PRINCIPAL CONTRACTOR (hereafter, PRINCIPAL) and SURETY above named, are held and firmly bound unto the above named Contracting Body, hereinafter called the Contracting Body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the principal entered into a certain contract with the Contracting Body, numbered as shown above and hereto attached:

NOW THEREFORE, if the principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term of said contract and any extensions thereof that may be granted by the Contracting Body, with or without notice to the Surety, and during the life of any guaranty required under the contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the surety being hereby waived, then this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bound parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Contract No.: C203609  
County: Pitt

Bond No: 106248482

Rev 5-17-11

### CONTRACT PERFORMANCE BOND

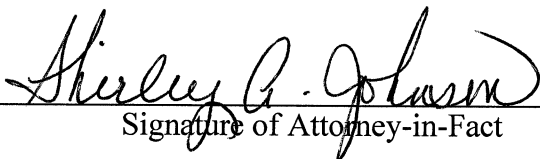
*Affix Seal of Surety Company*


Travelers Casualty and Surety Company of America

Print or type Surety Company Name

By Shirley A. Johnson, Attorney-in-fact

Print, stamp or type name of Attorney-in-Fact

  
Signature of Attorney-in-Fact

  
Signature of Witness

Tara J. Smithwick

Print or type Signer's name

5417 S. Miami Blvd., Durham NC 27703

Address of Attorney-in-Fact

Contract No.: C203609  
County: Pitt

Bond No: 106248482

Rev 5-17-11

**CONTRACT PERFORMANCE BOND**  
**CORPORATION**

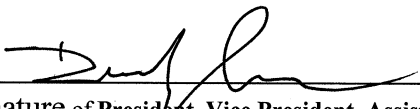
SIGNATURE OF CONTRACTOR (Principal)

Barnhill Contracting Company

\_\_\_\_\_  
Full name of Corporation

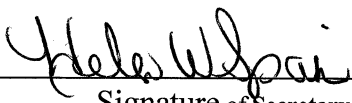
P. O. Box 7948, Rocky Mount, North Carolina 27804

\_\_\_\_\_  
Address as prequalified

By   
Signature of ~~President, Vice President, Assistant Vice President,~~  
*Select appropriate title*

Drew M. Johnson, P. E.  
Print or type Signer's name

*Affix Corporate Seal*

Attest   
Signature of ~~Secretary, Assistant Secretary~~  
*Select appropriate title*

Helen W. Spain  
Print or type Signer's name



## POWER OF ATTORNEY

Farmington Casualty Company  
 Fidelity and Guaranty Insurance Company  
 Fidelity and Guaranty Insurance Underwriters, Inc.  
 St. Paul Fire and Marine Insurance Company  
 St. Paul Guardian Insurance Company

St. Paul Mercury Insurance Company  
 Travelers Casualty and Surety Company  
 Travelers Casualty and Surety Company of America  
 United States Fidelity and Guaranty Company

Attorney-In Fact No. 228067

Certificate No. 006110770

**KNOW ALL MEN BY THESE PRESENTS:** That Farmington Casualty Company, St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company are corporations duly organized under the laws of the State of Connecticut, that Fidelity and Guaranty Insurance Company is a corporation duly organized under the laws of the State of Iowa, and that Fidelity and Guaranty Insurance Underwriters, Inc., is a corporation duly organized under the laws of the State of Wisconsin (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint

Barry C. Curtis, Cathy N. Hall, Shirley A. Johnson, Tara J. Smithwick, Sandra B. Fisher, Melinda Braddy, Robert M. Good, and Katherine James Robertson

of the City of Durham, State of North Carolina, their true and lawful Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

IN WITNESS WHEREOF, the Companies have caused this instrument to be signed and their corporate seals to be hereto affixed, this 3rd day of October, 2014.

Farmington Casualty Company  
 Fidelity and Guaranty Insurance Company  
 Fidelity and Guaranty Insurance Underwriters, Inc.  
 St. Paul Fire and Marine Insurance Company  
 St. Paul Guardian Insurance Company

St. Paul Mercury Insurance Company  
 Travelers Casualty and Surety Company  
 Travelers Casualty and Surety Company of America  
 United States Fidelity and Guaranty Company



State of Connecticut  
 City of Hartford ss.

By:

Robert L. Raney, Senior Vice President

On this the 3rd day of October, 2014, before me personally appeared Robert L. Raney, who acknowledged himself to be the Senior Vice President of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

In Witness Whereof, I hereunto set my hand and official seal.  
 My Commission expires the 30th day of June, 2016.



Marie C. Tetreault  
 Marie C. Tetreault, Notary Public

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, which resolutions are now in full force and effect, reading as follows:

**RESOLVED**, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

**FURTHER RESOLVED**, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

**FURTHER RESOLVED**, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

**FURTHER RESOLVED**, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, Kevin E. Hughes, the undersigned, Assistant Secretary, of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 7th day of May, 2015.

  
Kevin E. Hughes, Assistant Secretary



To verify the authenticity of this Power of Attorney, call 1-800-421-3880 or contact us at [www.travelersbond.com](http://www.travelersbond.com). Please refer to the Attorney-In-Fact number, the above-named individuals and the details of the bond to which the power is attached.