

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

PROPOSAL

INCLUDES ADDENDUM No.1 DATED 12-08-2020

DATE AND TIME OF BID OPENING: **DECEMBER 15, 2020 AT 2:00 PM**

CONTRACT ID C204561
WBS 15BPR.24

FEDERAL-AID NO. STATE FUNDED
COUNTY BRUNSWICK
T.I.P. NO.
MILES 0.360
ROUTE NO. NC 904
LOCATION BRIDGE #13 OVER THE INTRACOASTAL WATERWAY ON NC-904.

TYPE OF WORK BRIDGE PRESERVATION.

NOTICE:

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

BIDS WILL BE RECEIVED AS SHOWN BELOW:

THIS IS A STRUCTURE PROPOSAL

5% BID BOND OR BID DEPOSIT REQUIRED

**PROPOSAL FOR THE CONSTRUCTION OF
CONTRACT No. C204561 IN BRUNSWICK COUNTY, NORTH CAROLINA**

Date _____ 20 _____

**DEPARTMENT OF TRANSPORTATION,
RALEIGH, NORTH CAROLINA**

The Bidder has carefully examined the location of the proposed work to be known as Contract No. C204561 has carefully examined the plans and specifications, which are acknowledged to be part of the proposal, the special provisions, the proposal, the form of contract, and the forms of contract payment bond and contract performance bond; and thoroughly understands the stipulations, requirements and provisions. The undersigned bidder agrees to bound upon his execution of the bid and subsequent award to him by the Board of Transportation in accordance with this proposal to provide the necessary contract payment bond and contract performance bond within fourteen days after the written notice of award is received by him. The undersigned Bidder further agrees to provide all necessary machinery, tools, labor, and other means of construction; and to do all the work and to furnish all materials, except as otherwise noted, necessary to perform and complete the said contract in accordance with *the 2018 Standard Specifications for Roads and Structures* by the dates(s) specified in the Project Special Provisions and in accordance with the requirements of the Engineer, and at the unit or lump sum prices, as the case may be, for the various items given on the sheets contained herein.

The Bidder shall provide and furnish all the materials, machinery, implements, appliances and tools, and perform the work and required labor to construct and complete State Highway Contract No. C204561 in Brunswick County, for the unit or lump sum prices, as the case may be, bid by the Bidder in his bid and according to the proposal, plans, and specifications prepared by said Department, which proposal, plans, and specifications show the details covering this project, and hereby become a part of this contract.

The published volume entitled *North Carolina Department of Transportation, Raleigh, Standard Specifications for Roads and Structures, January 2018* with all amendments and supplements thereto, is by reference incorporated into and made a part of this contract; that, except as herein modified, all the construction and work included in this contract is to be done in accordance with the specifications contained in said volume, and amendments and supplements thereto, under the direction of the Engineer.

If the proposal is accepted and the award is made, the contract is valid only when signed either by the Contract Officer or such other person as may be designated by the Secretary to sign for the Department of Transportation. The conditions and provisions herein cannot be changed except over the signature of the said Contract Officer.

The quantities shown in the itemized proposal for the project are considered to be approximate only and are given as the basis for comparison of bids. The Department of Transportation may increase or decrease the quantity of any item or portion of the work as may be deemed necessary or expedient.

An increase or decrease in the quantity of an item will not be regarded as sufficient ground for an increase or decrease in the unit prices, nor in the time allowed for the completion of the work, except as provided for the contract.

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



State Contract Officer

DocuSigned by:

Ronald E. Davenport, Jr.

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12/8/2020

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PROJECT SPECIAL PROVISIONS**GENERAL****CONTRACT TIME AND LIQUIDATED DAMAGES:**

(7-1-95) (Rev. 12-18-07)

108

SP1 G10 A

The date of availability for this contract is **March 15, 2021**.

The completion date for this contract is **May 1, 2022**.

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

The liquidated damages for this contract are **One Thousand Dollars (\$ 1,000.00)** per calendar day.

INTERMEDIATE CONTRACT TIME NUMBER 1 AND LIQUIDATED DAMAGES:

(2-20-07)

108

SP1 G14 A

The Contractor shall complete the required work of installing, maintaining, and removing the traffic control devices for lane closures and restoring traffic to the existing traffic pattern. The Contractor shall not close or narrow a lane of traffic on **NC 904 (Causeway Drive)** during the following time restrictions:

DAY AND TIME RESTRICTIONS**Week before Memorial Day to Week after Labor Day (Summer)****Monday thru Thursday, 5:00 A.M. to 9:00 P.M.****From Friday at 5:00 A.M. to Sunday at 9:00 P.M.****Week after Labor Day to Week Before Memorial Day (Off-Season)****Monday thru Thursday, 6:00 A.M. to 9:00 A.M. & 4:00 P.M. to 7:00 P.M.****From Friday at 6:00 A.M. to Sunday at 7:00 P.M.**

In addition, the Contractor shall not close or narrow a lane of traffic on **NC 904 (Causeway Drive)**, detain and/or alter the traffic flow on or during holidays, holiday weekends, special events, or any other time when traffic is unusually heavy, including the following schedules:

HOLIDAY AND HOLIDAY WEEKEND LANE CLOSURE RESTRICTIONS

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

2. For **New Year's Day**, between the hours of **6:00 A.M.** December 31st and **9:00 P.M.** January 2nd. If New Year's Day is on a Friday, Saturday, Sunday or Monday, then until **9:00 P.M.** the following Tuesday.
3. For **Easter**, between the hours of **6:00 A.M.** Thursday and **9:00 P.M.** Monday.
4. For **Memorial Day**, between the hours of **5:00 A.M.** Friday and **9:00 P.M.** Tuesday.
5. For **Independence Day**, between the hours of **5:00 A.M.** the day before Independence Day and **9:00 P.M.** the day after Independence Day.

If **Independence Day** is on a Friday, Saturday, Sunday or Monday, then between the hours of **5:00 A.M.** the Thursday before Independence Day and **9:00 P.M.** the Tuesday after Independence Day.
6. For **Labor Day**, between the hours of **5:00 A.M.** Friday and **9:00 P.M.** Tuesday.
7. For **Thanksgiving**, between the hours of **6:00 A.M.** Tuesday and **9:00 P.M.** Monday.
8. For **Christmas**, between the hours of **6:00 A.M.** the Friday before the week of Christmas Day and **9:00 P.M.** the following Tuesday after the week of Christmas Day.

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

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

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

The liquidated damages are **One Thousand Two Hundred and Fifty Dollars (\$ 1,250.00)** per hour.

MAJOR CONTRACT ITEMS:

(2-19-02)

104

SP1 G28

The following listed items are the major contract items for this contract (see Article 104-5 of the *2018 Standard Specifications*):

Line #	Description
23	Rail Retrofit

SPECIALTY ITEMS:

(7-1-95)(Rev. 1-17-12)

108-6

SP1 G37

Items listed below will be the specialty items for this contract (see Article 108-6 of the 2018 Standard Specifications).

Line #	Description
11	Long-Life Pavement Markings
12	Permanent Pavement Markers

FUEL PRICE ADJUSTMENT:

(11-15-05) (Rev. 2-18-14)

109-8

SP1 G43

Revise the 2018 Standard Specifications as follows:

Page 1-87, Article 109-8, Fuel Price Adjustments, add the following:

The base index price for DIESEL #2 FUEL is \$ **1.1914** per gallon. Where any of the following are included as pay items in the contract, they will be eligible for fuel price adjustment.

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

Description	Units	Fuel Usage Factor Diesel
Unclassified Excavation	Gal/CY	0.29
Borrow Excavation	Gal/CY	0.29
Class IV Subgrade Stabilization	Gal/Ton	0.55
Aggregate Base Course	Gal/Ton	0.55
Sub-Ballast	Gal/Ton	0.55
Asphalt Concrete Base Course, Type _____	Gal/Ton	2.90
Asphalt Concrete Intermediate Course, Type _____	Gal/Ton	2.90
Asphalt Concrete Surface Course, Type _____	Gal/Ton	2.90
Open-Graded Asphalt Friction Course	Gal/Ton	2.90
Permeable Asphalt Drainage Course, Type _____	Gal/Ton	2.90
Sand Asphalt Surface Course, Type _____	Gal/Ton	2.90
Aggregate for Cement Treated Base Course	Gal/Ton	0.55
Portland Cement for Cement Treated Base Course	Gal/Ton	0.55
___ " Portland Cement Concrete Pavement	Gal/SY	0.245
Concrete Shoulders Adjacent to ___ " Pavement	Gal/SY	0.245

SCHEDULE OF ESTIMATED COMPLETION PROGRESS:

(7-15-08) (Rev. 6-19-18)

108-2

SP1 G58

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

	<u>Fiscal Year</u>	<u>Progress (% of Dollar Value)</u>
2021	(7/01/20 - 6/30/21)	36% of Total Amount Bid
2022	(7/01/21 - 6/30/22)	64% of Total Amount Bid

The Contractor shall also furnish his own progress schedule in accordance with Article 108-2 of the *2018 Standard Specifications*. Any acceleration of the progress as shown by the Contractor's progress schedule over the progress as shown above shall be subject to the approval of the Engineer.

MINORITY BUSINESS ENTERPRISE AND WOMEN BUSINESS ENTERPRISE:

(10-16-07)(Rev. 2-19-19)

102-15(J)

SP1 G66

Description

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

Definitions

Additional MBE/WBE Subcontractors - Any MBE/WBE submitted at the time of bid that will not be used to meet the Combined MBE /WBE Goal. No submittal of a Letter of Intent is required.

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

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

Contract Goal Requirement - The approved participation at time of award, but not greater than the advertised Combined MBE/WBE contract goal.

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

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

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

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

Regular Dealer - A firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials or supplies required for the performance of the contract are bought, kept in stock, and regularly sold to the public in the usual course of business. A regular dealer engages in, as its principal business and in its own name, the purchase and sale or lease of the products in question. A regular dealer in such bulk items as steel, cement, gravel, stone, and

petroleum products need not keep such products in stock, if it owns and operates distribution equipment for the products. Brokers and packagers are not regarded as manufacturers or regular dealers within the meaning of this section.

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

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

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

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

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

Forms and Websites Referenced in this Provision

Payment Tracking System - On-line system in which the Contractor enters the payments made to MBE and WBE subcontractors who have performed work on the project.
<https://apps.dot.state.nc.us/Vendor/PaymentTracking/>

DBE-IS Subcontractor Payment Information - Form for reporting the payments made to all MBE/WBE firms working on the project. This form is for paper bid projects only.
<https://connect.ncdot.gov/business/Turnpike/Documents/Form%20DBE-IS%20Subcontractor%20Payment%20Information.pdf>

RF-1 MBE/WBE Replacement Request Form - Form for replacing a committed MBE or WBE.
<http://connect.ncdot.gov/projects/construction/Construction%20Forms/DBE%20MBE%20WBE%20Replacement%20Request%20Form.pdf>

SAF Subcontract Approval Form - Form required for approval to sublet the contract.
<http://connect.ncdot.gov/projects/construction/Construction%20Forms/Subcontract%20Approval%20Form%20Rev.%202012.zip>

JC-1 Joint Check Notification Form - Form and procedures for joint check notification. The form acts as a written joint check agreement among the parties providing full and prompt disclosure of the expected use of joint checks.
<http://connect.ncdot.gov/projects/construction/Construction%20Forms/Joint%20Check%20Notification%20Form.pdf>

Letter of Intent - Form signed by the Contractor and the MBE/WBE subcontractor, manufacturer or regular dealer that affirms that a portion of said contract is going to be performed by the signed MBE/WBE for the estimated amount (based on quantities and unit prices) listed at the time of bid. <http://connect.ncdot.gov/letting/LetCentral/Letter%20of%20Intent%20to%20Perform%20as%20a%20Subcontractor.pdf>

Listing of MBE and WBE Subcontractors Form - Form for entering MBE/WBE subcontractors on a project that will meet the Combined MBE/WBE goal. This form is for paper bids only. [http://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/09%20MBE-WBE%20Subcontractors%20\(State\).docx](http://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/09%20MBE-WBE%20Subcontractors%20(State).docx)

Subcontractor Quote Comparison Sheet - Spreadsheet for showing all subcontractor quotes in the work areas where MBEs and WBEs quoted on the project. This sheet is submitted with good faith effort packages. <http://connect.ncdot.gov/business/SmallBusiness/Documents/DBE%20Subcontractor%20Quote%20Comparison%20Example.xls>

Combined MBE/WBE Goal

The Combined MBE/WBE Goal for this project is **0.0 %**

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

(A) Minority Business Enterprises **0.0 %**

- (1) *If the anticipated MBE participation is more than zero*, the Contractor shall exercise all necessary and reasonable steps to ensure that MBEs participate in at least the percent of the contract as set forth above.
- (2) *If the anticipated MBE participation is zero*, the Contractor 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 **0.0 %**

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

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

Directory of Transportation Firms (Directory)

Real-time information is available about firms doing business with the Department and firms that are certified through NCUCP in the Directory of Transportation Firms. Only firms identified in the Directory as MBE and WBE certified shall be used to meet the Combined MBE/WBE Goal. The Directory can be found at the following link.

<https://www.ebs.nc.gov/VendorDirectory/default.html>

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

Listing of MBE/WBE Subcontractors

At the time of bid, bidders shall submit all MBE and WBE participation that they anticipate to use during the life of the contract. Only those identified to meet the Combined MBE/WBE Goal will be considered committed, even though the listing shall include both committed MBE/WBE subcontractors and additional MBE/WBE subcontractors. Any additional MBE/WBE subcontractor participation above the goal will follow the banking guidelines found elsewhere in this provision. All other additional MBE/WBE subcontractor participation submitted at the time of bid will be used toward the Department's overall race-neutral goals. Only those firms with current MBE and WBE certification at the time of bid opening will be acceptable for listing in the bidder's submittal of MBE and WBE participation. The Contractor shall indicate the following required information:

(A) Electronic Bids

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

- (1) Submit the names and addresses of MBE and WBE firms identified to participate in the contract. If the bidder uses the updated listing of MBE and WBE firms shown in the electronic submittal file, the bidder may use the dropdown menu to access the name and address of the firms.
- (2) Submit the contract line numbers of work to be performed by each MBE and WBE firm. When no figures or firms are entered, the bidder will be considered to have no MBE or WBE participation.
- (3) The bidder shall be responsible for ensuring that the MBE and WBE are certified at the time of bid by checking the Directory of Transportation Firms. If the firm is not certified at the time of the bid-letting, that MBE's or WBE's participation will not count towards achieving the Combined MBE/WBE goal.

(B) Paper Bids

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

MBE or WBE Prime Contractor

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

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

Written Documentation – Letter of Intent

The bidder shall submit written documentation for each MBE/WBE that will be used to meet the Combined MBE/WBE Goal of the contract, indicating the bidder’s commitment to use the

MBE/WBE in the contract. This documentation shall be submitted on the Department's form titled *Letter of Intent*.

The documentation shall be received in the office of the State Contractor Utilization Engineer or at DBE@ncdot.gov no later than 10:00 a.m. of the sixth calendar day following opening of bids, unless the sixth day falls on an official state holiday. In that situation, it is due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day.

If the bidder fails to submit the Letter of Intent from each committed MBE and WBE to be used toward the Combined MBE/WBE Goal, or if the form is incomplete (i.e. both signatures are not present), the MBE/WBE participation will not count toward meeting the Combined MBE/WBE Goal. If the lack of this participation drops the commitment below the Combined MBE/WBE Goal, the Contractor shall submit evidence of good faith efforts for the goal, completed in its entirety, to the State Contractor Utilization Engineer or DBE@ncdot.gov no later than 10:00 a.m. on the eighth calendar day following opening of bids, unless the eighth day falls on an official state holiday. In that situation, it is due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day.

Banking MBE/WBE Credit

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

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

Submission of Good Faith Effort

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

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

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

solicited. Documentation of MBE/WBE quotations shall be a part of the good faith effort submittal. This documentation may include written subcontractor quotations, telephone log notations of verbal quotations, or other types of quotation documentation.

Consideration of Good Faith Effort for Projects with a Combined MBE/WBE Goal More Than Zero

Adequate good faith efforts mean that the bidder took all necessary and reasonable steps to achieve the goal which, by their scope, intensity, and appropriateness, could reasonably be expected to obtain sufficient MBE/WBE participation. Adequate good faith efforts also mean that the bidder actively and aggressively sought MBE/WBE participation. Mere *pro forma* efforts are not considered good faith efforts.

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

- (A) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising, written notices, use of verifiable electronic means through the use of the NCDOT Directory of Transportation Firms) the interest of all certified MBEs/WBEs that are also prequalified subcontractors. The bidder must solicit this interest within at least 10 days prior to bid opening to allow the MBEs/WBEs to respond to the solicitation. Solicitation shall provide the opportunity to MBEs/WBEs within the Division and surrounding Divisions where the project is located. The bidder must determine with certainty if the MBEs/WBEs are interested by taking appropriate steps to follow up initial solicitations.
- (B) Selecting portions of the work to be performed by MBEs/WBEs in order to increase the likelihood that the Combined MBE/WBE Goal will be achieved.
 - (1) Where appropriate, break out contract work items into economically feasible units to facilitate MBE/WBE participation, even when the prime contractor might otherwise prefer to perform these work items with its own forces.
 - (2) Negotiate with subcontractors to assume part of the responsibility to meet the advertised goal when the work to be sublet includes potential for MBE/WBE participation (2nd and 3rd tier subcontractors).
- (C) Providing interested certified MBEs/WBEs that are also prequalified subcontractors with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.
- (D) (1) Negotiating in good faith with interested MBEs/WBEs. It is the bidder's responsibility to make a portion of the work available to MBE/WBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available MBE/WBE subcontractors and suppliers, so as to facilitate MBE/WBE participation. Evidence of such negotiation includes the names,

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

- (2) A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including MBE/WBE subcontractors, and would take a firm's price and capabilities as well as the advertised goal into consideration. However, the fact that there may be some additional costs involved in finding and using MBEs/WBEs is not in itself sufficient reason for a bidder's failure to meet the contract goal, as long as such costs are reasonable. Also, the ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidding contractors are not, however, required to accept higher quotes from MBEs/WBEs if the price difference is excessive or unreasonable.
- (E) Not rejecting MBEs/WBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The bidder's standing within its industry, membership in specific groups, organizations, or associates and political or social affiliations (for example, union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the bidder's efforts to meet the project goal.
- (F) Making efforts to assist interested MBEs/WBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or bidder.
- (G) Making efforts to assist interested MBEs/WBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.
- (H) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; Federal, State, and local minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of MBEs/WBEs. Contact within 7 days from the bid opening the Business Opportunity and Work Force Development Unit at BOWD@ncdot.gov to give notification of the bidder's inability to get MBE or WBE quotes.
- (I) Any other evidence that the bidder submits which shows that the bidder has made reasonable good faith efforts to meet the advertised goal.

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

- (1) Whether the bidder's documentation reflects a clear and realistic plan for achieving the Combined MBE/WBE Goal.
- (2) The bidders' past performance in meeting the contract goal.
- (3) The performance of other bidders in meeting the advertised goal. For example, when the apparent successful bidder fails to meet the goal, but others meet it, you

may reasonably raise the question of whether, with additional reasonable efforts the apparent successful bidder could have met the goal. If the apparent successful bidder fails to meet the advertised goal, but meets or exceeds the average MBE and WBE participation obtained by other bidders, the Department may view this, in conjunction with other factors, as evidence of the apparent successful bidder having made a good faith effort.

If the Department does not award the contract to the apparent lowest responsive bidder, the Department reserves the right to award the contract to the next lowest responsive bidder that can satisfy to the Department that the Combined MBE/WBE Goal can be met or that an adequate good faith effort has been made to meet the advertised goal.

Non-Good Faith Appeal

The State Contractual Services Engineer will notify the contractor verbally and in writing of non-good faith. A contractor may appeal a determination of non-good faith made by the Goal Compliance Committee. If a contractor wishes to appeal the determination made by the Committee, they shall provide written notification to the State 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 the Combined MBE/WBE Goal

(A) Participation

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

(B) Joint Checks

Prior notification of joint check use shall be required when counting MBE/WBE participation for services or purchases that involves the use of a joint check. Notification shall be through submission of Form JC-1 (*Joint Check Notification Form*) and the use of joint checks shall be in accordance with the Department's Joint Check Procedures.

(C) Subcontracts (Non-Trucking)

A MBE/WBE may enter into subcontracts. Work that a MBE subcontracts to another MBE firm may be counted toward the anticipated MBE participation. The same holds true for work that a WBE subcontracts to another WBE firm. Work that a MBE/WBE subcontracts to a non-MBE/WBE firm does not count toward the contract goal requirement. It should be noted that every effort shall be made by MBE and WBE contractors to subcontract to the same certification (i.e., MBEs to MBEs and WBEs to WBEs), in order to fulfill the MBE or WBE participation breakdown. This, however, may not always be possible due to the limitation of firms in the area. If the MBE or WBE firm shows a good faith effort has

been made to reach out to similarly certified firms and there is no interest or availability, and they can get assistance from other certified firms, the Engineer will not hold the prime responsible for meeting the individual MBE or WBE breakdown. If a MBE or WBE contractor or subcontractor subcontracts a significantly greater portion of the work of the contract than would be expected on the basis of standard industry practices, it shall be presumed that the MBE or WBE is not performing a commercially useful function.

(D) Joint Venture

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

(E) Suppliers

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

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

Commercially Useful Function

(A) MBE/WBE Utilization

The Contractor may count toward its contract goal requirement only expenditures to MBEs and WBEs that perform a commercially useful function in the work of a contract. A MBE/WBE performs a commercially useful function when it is responsible for

execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. To perform a commercially useful function, the MBE/WBE shall also be responsible with respect to materials and supplies used on the contract, for negotiating price, determining quality and quantity, ordering the material and installing (where applicable) and paying for the material itself. To determine whether a MBE/WBE is performing a commercially useful function, the Department will evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the contract is commensurate with the work it is actually performing and the MBE/WBE credit claimed for its performance of the work, and any other relevant factors. If it is determined that a MBE or WBE is not performing a Commercially Useful Function, the contractor may present evidence to rebut this presumption to the Department.

(B) MBE/WBE Utilization in Trucking

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

- (1) The MBE/WBE shall be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract, and there shall not be a contrived arrangement for the purpose of meeting the Combined MBE/WBE Goal.
- (2) The MBE/WBE shall itself own and operate at least one fully licensed, insured, and operational truck used on the contract.
- (3) The MBE/WBE receives credit for the total value of the transportation services it provides on the contract using trucks it owns, insures, and operates using drivers it employs.
- (4) The MBE may subcontract the work to another MBE firm, including an owner-operator who is certified as a MBE. The same holds true that a WBE may subcontract the work to another WBE firm, including an owner-operator who is certified as a WBE. When this occurs, the MBE or WBE who subcontracts work receives credit for the total value of the transportation services the subcontracted MBE or WBE provides on the contract. It should be noted that every effort shall be made by MBE and WBE contractors to subcontract to the same certification (i.e., MBEs to MBEs and WBEs to WBEs), in order to fulfill the participation breakdown. This, however, may not always be possible due to the limitation of firms in the area. If the MBE or WBE firm shows a good faith effort has been made to reach out to similarly certified transportation service providers and there is no interest or availability, and they can get assistance from other certified providers, the Engineer will not hold the prime responsible for meeting the individual MBE or WBE participation breakdown.
- (5) The MBE/WBE may also subcontract the work to a non-MBE/WBE firm, including from an owner-operator. The MBE/WBE who subcontracts the work to a non-

MBE/WBE is entitled to credit for the total value of transportation services provided by the non-MBE/WBE subcontractor not to exceed the value of transportation services provided by MBE/WBE-owned trucks on the contract. Additional participation by non-MBE/WBE subcontractors receives credit only for the fee or commission it receives as a result of the subcontract arrangement. The value of services performed under subcontract agreements between the MBE/WBE and the Contractor will not count towards the MBE/WBE contract requirement.

- (6) A MBE/WBE may lease truck(s) from an established equipment leasing business open to the general public. The lease must indicate that the MBE/WBE has exclusive use of and control over the truck. This requirement does not preclude the leased truck from working for others during the term of the lease with the consent of the MBE/WBE, so long as the lease gives the MBE/WBE absolute priority for use of the leased truck. This type of lease may count toward the MBE/WBE's credit as long as the driver is under the MBE/WBE's payroll.
- (7) Subcontracted/leased trucks shall display clearly on the dashboard the name of the MBE/WBE that they are subcontracted/leased to and their own company name if it is not identified on the truck itself. Magnetic door signs are not permitted.

MBE/WBE Replacement

When a Contractor has relied on a commitment to a MBE or WBE subcontractor (or an approved substitute MBE or WBE subcontractor) to meet all or part of a contract goal requirement, the contractor shall not terminate the MBE/WBE subcontractor for convenience. This includes, but is not limited to, instances in which the Contractor seeks to perform the work of the terminated subcontractor with another MBE/WBE subcontractor, a non-MBE/WBE subcontractor, or with the Contractor's own forces or those of an affiliate.

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

A committed MBE/WBE subcontractor may only be terminated after receiving the Department's written approval based upon a finding of good cause for the proposed termination and/or substitution. For purposes of this section, good cause shall include the following circumstances:

- (a) The listed MBE/WBE subcontractor fails or refuses to execute a written contract;
- (b) The listed MBE/WBE subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards. Provided, however, that good cause does not exist if the failure or refusal of the MBE/WBE subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the prime contractor;

- (c) The listed MBE/WBE subcontractor fails or refuses to meet the prime contractor's reasonable, nondiscriminatory bond requirements;
- (d) The listed MBE/WBE subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;
- (e) The listed MBE/WBE subcontractor is ineligible to work on public works projects because of suspension and debarment proceedings pursuant to 2 CFR Parts 180, 215 and 1,200 or applicable state law;
- (f) The listed MBE/WBE subcontractor is not a responsible contractor;
- (g) The listed MBE/WBE voluntarily withdraws from the project and provides written notice of withdrawal;
- (h) The listed MBE/WBE is ineligible to receive MBE/WBE credit for the type of work required;
- (i) A MBE/WBE owner dies or becomes disabled with the result that the listed MBE/WBE contractor is unable to complete its work on the contract;
- (j) Other documented good cause that compels the termination of the MBE/WBE subcontractor. Provided, that good cause does not exist if the prime contractor seeks to terminate a MBE/WBE it relied upon to obtain the contract so that the prime contractor can self-perform the work for which the MBE/WBE contractor was engaged or so that the prime contractor can substitute another MBE/WBE or non-MBE/WBE contractor after contract award.

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

(A) Performance Related Replacement

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

If a replacement MBE/WBE is not found that can perform at least the same amount of work as the terminated MBE/WBE, the Contractor shall submit a good faith effort documenting the steps taken. Such documentation shall include, but not be limited to, the following:

- (1) Copies of written notification to MBE/WBEs that their interest is solicited in contracting the work defaulted by the previous MBE/WBE or in subcontracting other items of work in the contract.
- (2) Efforts to negotiate with MBE/WBEs for specific subbids including, at a minimum:
 - (a) The names, addresses, and telephone numbers of MBE/WBEs who were contacted.
 - (b) A description of the information provided to MBE/WBEs regarding the plans and specifications for portions of the work to be performed.
- (3) A list of reasons why MBE/WBE quotes were not accepted.

- (4) Efforts made to assist the MBE/WBEs contacted, if needed, in obtaining bonding or insurance required by the Contractor.
- (B) Decertification Replacement
- (1) When a committed MBE/WBE is decertified by the Department after the SAF (*Subcontract Approval Form*) has been received by the Department, the Department will not require the Contractor to solicit replacement MBE/WBE participation equal to the remaining work to be performed by the decertified firm. The participation equal to the remaining work performed by the decertified firm will count toward the contract goal requirement.
 - (2) When a committed MBE/WBE is decertified prior to the Department receiving the SAF (*Subcontract Approval Form*) for the named MBE/WBE firm, the Contractor shall take all necessary and reasonable steps to replace the MBE/WBE subcontractor with another MBE/WBE subcontractor to perform at least the same amount of work to meet the Combined MBE/WBE goal requirement. If a MBE/WBE firm is not found to do the same amount of work, a good faith effort must be submitted to NCDOT (see A herein for required documentation).

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

Changes in the Work

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

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

When the Engineer makes changes that result in an alteration of plans or details of construction, and a portion or all of the work had been expected to be performed by a committed MBE/WBE, the Contractor shall seek participation by MBEs/WBEs unless otherwise approved by the Engineer.

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

Reports and Documentation

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

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

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

Reporting Minority and Women Business Enterprise Participation

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

- (A) Withholding of money due in the next partial pay estimate; or
- (B) Removal of an approved contractor from the prequalified bidders' list or the removal of other entities from the approved subcontractors list.

While each contractor (prime, subcontractor, 2nd tier subcontractor) is responsible for accurate accounting of payments to MBEs/WBEs, it shall be the prime contractor's responsibility to report all monthly and final payment information in the correct reporting manner.

Failure on the part of the Contractor to submit the required information in the time frame specified may result in the disqualification of that contractor and any affiliate companies from further bidding until the required information is submitted.

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

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

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

The Contractor shall report the accounting of payments through the Department's Payment Tracking System.

Failure to Meet Contract Requirements

Failure to meet contract requirements in accordance with Subarticle 102-15(J) of the *2018 Standard Specifications* may be cause to disqualify the Contractor.

CONTRACTOR'S LICENSE REQUIREMENTS:

(7-1-95)

102-14

SP1 G88

If the successful bidder 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).

RESTRICTIONS ON ITS EQUIPMENT AND SERVICES:

(11-17-20)

SP01 G090

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

USE OF UNMANNED AIRCRAFT SYSTEM (UAS):

(8-20-19)

SP1 G092

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

Prior to beginning operations, the Contractor shall complete the NCDOT UAS – Flight Operation Approval Form and submit it to the Engineer for approval. All UAS operations shall be approved by the Engineer prior to beginning the operations.

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

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

MAINTENANCE OF THE PROJECT:

(11-20-07) (Rev. 1-17-12)

104-10

SP1 G125

Revise the *2018 Standard Specifications* as follows:

Page 1-39, Article 104-10 Maintenance of the Project, line 25, add the following after the first sentence of the first paragraph:

All guardrail/guiderail within the project limits shall be included in this maintenance.

Page 1-39, Article 104-10 Maintenance of the Project, line 30, add the following as the last sentence of the first paragraph:

The Contractor shall perform weekly inspections of guardrail and guiderail and shall report damages to the Engineer on the same day of the weekly inspection. *Where damaged guardrail or guiderail is repaired or replaced as a result of maintaining the project in accordance with this article, such repair or replacement shall be performed within 7 consecutive calendar days of such inspection report.*

Page 1-39, Article 104-10 Maintenance of the Project, lines 42-44, replace the last sentence of the last paragraph with the following:

The Contractor will not be directly compensated for any maintenance operations necessary, except for maintenance of guardrail/guiderail, as this work will be considered incidental to the work covered by the various contract items. The provisions of Article 104-7, Extra Work, and Article 104-8, Compensation and Record Keeping will apply to authorized maintenance of guardrail/guiderail. Performance of weekly inspections of guardrail/guiderail, and the damage reports required as described above, will be considered to be an incidental part of the work being paid for by the various contract items.

ELECTRONIC BIDDING:

(2-19-19)

101, 102, 103

SP1 G140

Revise the *2018 Standard Specifications* as follows:

Page 1-4, Article 101-3, DEFINITIONS, BID (OR PROPOSAL) *Electronic Bid*, line 1, replace “Bid Express®” with “the approved electronic bidding provider”.

Page 1-15, Subarticle 102-8(B), Electronic Bids, lines 39-40, replace “to Bid Express®” with “via the approved electronic bidding provider”.

Page 1-15, Subarticle 102-8(B)(1), Electronic Bids, line 41, delete “from Bid Express®”

Page 1-17, Subarticle 102-9(C)(2), Electronic Bids, line 21, replace “Bid Express® miscellaneous folder within the .ebs” with “electronic submittal”.

Page 1-29, Subarticle 103-4(C)(2), Electronic Bids, line 32, replace “.ebs miscellaneous data file of Expedite” with “electronic submittal file”

TWELVE MONTH GUARANTEE:

(7-15-03)

108

SP1 G145

- (A) The Contractor shall guarantee materials and workmanship against latent and patent defects arising from faulty materials, faulty workmanship or negligence for a period of twelve months following the date of final acceptance of the work for maintenance and shall replace such defective materials and workmanship without cost to the Department. The Contractor will not be responsible for damage due to faulty design, normal wear and tear, for negligence on the part of the Department, and/or for use in excess of the design.
- (B) Where items of equipment or material carry a manufacturer's guarantee for any period in excess of twelve months, then the manufacturer's guarantee shall apply for that particular piece of equipment or material. The Department's first remedy shall be through the manufacturer although the Contractor is responsible for invoking the warranted repair work with the manufacturer. The Contractor's responsibility shall be limited to the term of the manufacturer's guarantee. NCDOT would be afforded the same warranty as provided by the Manufacturer.

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

Appropriate provisions of the payment and/or performance bonds shall cover this guarantee for the project.

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

OUTSOURCING OUTSIDE THE USA:

(9-21-04) (Rev. 5-16-06)

SP1 G150

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

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

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

PROJECT SPECIAL PROVISIONS**ROADWAY****PRICE ADJUSTMENT - ASPHALT BINDER FOR PLANT MIX:**

(11-21-00)

620

SP6 R25

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

The base price index for asphalt binder for plant mix is **\$ 404.64** per ton.

This base price index represents an average of F.O.B. selling prices of asphalt binder at supplier's terminals on **October 1, 2020**.

FINAL SURFACE TESTING NOT REQUIRED:

(5-18-04) (Rev. 2-16-16)

610

SP6 R45

Final surface testing is not required on this project in accordance with Section 610-13, *Final Surface Testing and Acceptance*.

ASPHALT CONCRETE PLANT MIX PAVEMENTS:

(2-20-18) (Rev.1-15-19)

610, 1012

SP6 R65

Revise the *2018 Standard Specifications* as follows:

Page 6-14, Table 609-3, LIMITS OF PRECISION FOR TEST RESULTS, replace with the following:

Mix Property	Limits of Precision
25.0 mm sieve (Base Mix)	± 10.0%
19.0 mm sieve (Base Mix)	± 10.0%
12.5 mm sieve (Intermediate & Type P-57)	± 6.0%
9.5 mm sieve (Surface Mix)	± 5.0%
4.75 mm sieve (Surface Mix)	± 5.0%
2.36 mm sieve (All Mixes, except S4.75A)	± 5.0%
1.18 mm sieve (S4.75A)	± 5.0%
0.075 mm sieve (All Mixes)	± 2.0%
Asphalt Binder Content	± 0.5%
Maximum Specific Gravity (G_{mm})	± 0.020
Bulk Specific Gravity (G_{mb})	± 0.030
TSR	± 15.0%
QA retest of prepared QC Gyratory Compacted Volumetric Specimens	± 0.015
Retest of QC Core Sample	± 1.2% (% Compaction)
Comparison QA Core Sample	± 2.0% (% Compaction)
QA Verification Core Sample	± 2.0% (% Compaction)

Density Gauge Comparison of QC Test	± 2.0% (% Compaction)
QA Density Gauge Verification Test	± 2.0% (% Compaction)

Page 6-17, Table 610-1, MIXING TEMPERATURE AT THE ASPHALT PLANT, replace with the following:

Binder Grade	JMF Temperature
PG 58-28; PG 64-22	250 - 290°F
PG 76-22	300 - 325°F

Page 6-17, Subarticle 610-3(C), Job Mix Formula (JMF), lines 38-39, delete the fourth paragraph.

Page 6-18, Subarticle 610-3(C), Job Mix Formula (JMF), line 12, replace “SF9.5A” with “S9.5B”.

Page 6-18, Table 610-3, MIX DESIGN CRITERIA, replace with the following:

Mix Type	Design ESALs millions ^A	Binder PG Grade	Compaction Levels		Max. Rut Depth (mm)	Volumetric Properties ^B			
			G _{mm} @			VMA	VTM	VFA	%G _{mm}
			N _{ini}	N _{des}		% Min.	%	Min.-Max.	@ N _{ini}
S4.75A	< 1	64 - 22	6	50	11.5	16.0	4.0 - 6.0	65 - 80	≤ 91.5
S9.5B	0 - 3	64 - 22	6	50	9.5	16.0	3.0 - 5.0	70 - 80	≤ 91.5
S9.5C	3 - 30	64 - 22	7	65	6.5	15.5	3.0 - 5.0	65 - 78	≤ 90.5
S9.5D	> 30	76 - 22	8	100	4.5	15.5	3.0 - 5.0	65 - 78	≤ 90.0
I19.0C	ALL	64 - 22	7	65	-	13.5	3.0 - 5.0	65 - 78	≤ 90.5
B25.0C	ALL	64 - 22	7	65	-	12.5	3.0 - 5.0	65 - 78	≤ 90.5
Design Parameter						Design Criteria			
All Mix Types	Dust to Binder Ratio (P _{0.075} / P _{bc})					0.6 - 1.4 ^C			
	Tensile Strength Ratio (TSR) ^D					85% Min. ^E			

A. Based on 20 year design traffic.

B. Volumetric Properties based on specimens compacted to N_{des} as modified by the Department.

C. Dust to Binder Ratio (P_{0.075} / P_{bc}) for Type S4.75A is 1.0 - 2.0.

D. NCDOT-T-283 (No Freeze-Thaw cycle required).

E. TSR for Type S4.75A & B25.0C mixes is 80% minimum.

Page 6-20, Table 610-5, BINDER GRADE REQUIREMENTS (BASED ON RBR%), replace with the following:

Mix Type	%RBR ≤ 20%	21% ≤ %RBR ≤ 30%	%RBR ≥ 30%
S4.75A, S9.5B, S9.5C, I19.0C, B25.0C	PG 64-22	PG 64-22 ^A	PG-58-28
S9.5D, OGFC	PG 76-22 ^B	n/a	n/a

A. If the mix contains any amount of RAS, the virgin binder shall be PG 58-28.

- B. Maximum Recycled Binder Replacement (%RBR) is 18% for mixes using PG 76-22 binder.

Page 6-20, Table 610-6, PLACEMENT TEMPERATURES FOR ASPHALT, replace with the following:

Asphalt Concrete Mix Type	Minimum Surface and Air Temperature
B25.0C	35°F
I19.0C	35°F
S4.75A, S9.5B, S9.5C	40°F ^A
S9.5D	50°F

- A. For the final layer of surface mixes containing recycled asphalt shingles (RAS), the minimum surface and air temperature shall be 50°F.

Page 6-21, Article 610-8, SPREADING AND FINISHING, lines 34-35, delete the second sentence and replace with the following:

Use an MTV for all surface mix regardless of binder grade on Interstate, US Routes, and NC Routes (primary routes) that have 4 or more lanes and median divided.

Page 6-21, Article 610-8, SPREADING AND FINISHING, lines 36-38, delete the fourth sentence and replace with the following:

Use MTV for all ramps, loops, Y-line that have 4 or more lanes and are median divided, full width acceleration lanes, full width deceleration lanes, and full width turn lanes that are greater than 1000 feet in length.

Page 6-23, Table 610-7, DENSITY REQUIREMENTS, replace with the following:

Mix Type	Minimum % G_{mm} (Maximum Specific Gravity)
S4.75A	85.0 ^A
S9.5B	90.0
S9.5C, S9.5D, I19.0C, B25.0C	92.0

- A. Compaction to the above specified density will be required when the S4.75A mix is applied at a rate of 100 lbs/sy or higher.

Page 6-24, Article 610-13, FINAL SURFACE TESTING, lines 35-36, delete the second sentence and replace with the following:

Final surface testing is not required on ramps, loops and turn lanes.

Page 6-26, Subarticle 610-13(A)(1), Acceptance for New Construction, lines 29-30, delete the second sentence and replace with the following:

Areas excluded from testing by the profiler may be tested using a 10-foot straightedge in accordance with Article 610-12.

Page 6-27, Subarticle 610-13(B), Option 2- North Carolina Hearne Straightedge, lines 41-46, delete the eighth and ninth sentence of this paragraph and replace with the following:

Take profiles over the entire length of the final surface travel lane pavement exclusive of structures, approach slabs, paved shoulders, tapers, or other irregular shaped areas of pavement, unless otherwise approved by the Engineer. Test in accordance with this provision all mainline travel lanes, full width acceleration or deceleration lanes and collector lanes.

Page 6-28, Subarticle 610-13(B), Option 2- North Carolina Hearne Straightedge, lines 1-2, delete these two lines.

Page 6-32, Article 610-16 MEASUREMENT AND PAYMENT, replace with the following:

Pay Item	Pay Unit
Asphalt Concrete Base Course, Type B25.0C	Ton
Asphalt Concrete Intermediate Course, Type I19.0C	Ton
Asphalt Concrete Surface Course, Type S4.75A	Ton
Asphalt Concrete Surface Course, Type S9.5B	Ton
Asphalt Concrete Surface Course, Type S9.5C	Ton
Asphalt Concrete Surface Course, Type S9.5D	Ton

Page 10-30, Table 1012-1, AGGREGATE CONSENSUS PROPERTIES, replace with the following:

**TABLE 1012-1
AGGREGATE CONSENSUS PROPERTIES^A**

Mix Type	Coarse Aggregate Angularity^B	Fine Aggregate Angularity % Minimum	Sand Equivalent % Minimum	Flat and Elongated 5 : 1 Ratio % Maximum
<i>Test Method</i>	<i>ASTM D5821</i>	<i>AASHTO T 304</i>	<i>AASHTO T 176</i>	<i>ASTM D4791</i>
S4.75A; S9.5B	75 / -	40	40	-
S9.5C; I19.0C; B25.0C	95 / 90	45	45	10
S9.5D	100 / 100	45	50	10
OGFC	100 / 100	45	45	10
UBWC	100 / 85	45	45	10

A. Requirements apply to the design aggregate blend.

B. 95 / 90 denotes that 95% of the coarse aggregate has one fractured face and 90% has 2 or more fractured faces.

PORTLAND CEMENT CONCRETE PRODUCTION AND DELIVERY:

(9-15-20)

1000, 1014, 1024

SP10 R01

Revise the 2018 Standard Specifications as follows:

Page 10-6, Table 1000-1, REQUIREMENTS FOR CONCRETE, replace with the following:

TABLE 1000-1 REQUIREMENTS FOR CONCRETE											
Class of Concrete	Min. Compressive Strength at 28 days	Maximum Water-Cement Ratio				Consistency Maximum Slump		Cement Content			
		Air-Entrained Concrete		Non-Air- Entrained Concrete		Vibrated	Non- Vibrated	Vibrated		Non-Vibrated	
		Rounded Aggregate	Angular Aggregate	Rounded Aggregate	Angular Aggregate			Min.	Max.	Min.	Max.
		Units	psi					inch	inch	lb/cy	lb/cy
AA	4500	0.381	0.426	---	---	3.5 ^A	---	639	715	---	---
AA Slip Form	4500	0.381	0.426	---	---	1.5	---	639	715	---	---
Drilled Pier	4500	---	---	0.450	0.450	---	5 - 7 dry 7 - 9 wet	---	---	640	800
A	3000	0.488	0.532	0.550	0.594	3.5 ^A	4.0	564	---	602	---
B	2500	0.488	0.567	0.559	0.630	1.5 machine placed 2.5 ^A hand placed	4.0	508	---	545	---
Sand Light- weight	4500	---	0.420	---	---	4.0 ^A	---	715	---	---	---
Latex Modified	3000 (at 7 days)	0.400	0.400	---	---	6.0	---	658	---	---	---
Flowable Fill excavatable	150 max. (at 56 days)	as needed	as needed	as needed	as needed	---	Flowable	---	---	40	100
Flowable Fill non- excavatable	125	as needed	as needed	as needed	as needed	---	Flowable	---	---	100	as needed
Pavement	4500 Design, field 650 flexural, design only	0.559	0.559	---	---	1.5 slip form 3.0 hand placed	---	526	---	---	---

Precast	See Table 1077-1	as needed	as needed	---	---	6.0	as needed	as needed	as needed	as needed	as needed
Prestressed	per contract	See Table 1078-1	See Table 1078-1	---	---	8.0	---	564	as needed	---	---

- A. The slump may be increased to 6 inches, provided the increase in slump is achieved by adding a chemical admixture conforming to Section 1024-3. In no case shall the water-cement ratio on the approved design be exceeded. Concrete exhibiting segregation and/or excessive bleeding will be rejected. Utilizing an Admixture to modify slump does not relinquish the contractor’s responsibility to ensure the final product quality and overall configuration meets design specifications. Caution should be taken when placing these modified mixes on steep grades to prevent unintended changes to the set slope.

POLYUREA PAVEMENT MARKING MATERIAL – TYPE 2 TYPICAL CERTIFIED MILL TEST REPORT:

3-19-19

1087

SP10 R06

Amend the *2018 Standard Specifications* as follows:

Page 10-184, Subarticle 1087-8 Material Certification, in accordance with Subarticle 106-3 provide a Type 2 Typical Certified Mill Test Report and a Type 3 Manufacturer’s Certification for Polyurea pavement marking material.

When tested, the material shall meet the physical and chemical characteristics provided by the manufacturer. NCDOT reserves the right to compare these test results to baseline test results gathered by the NCDOT Materials and Test Unit.

MATERIALS FOR PORTLAND CEMENT CONCRETE:

(9-15-20)

1000, 1024

SP10 R24

Revise the *2018 Standard Specifications* as follows:

Page 10-52, Article 1024-4, WATER, lines 3-6, delete and replace with the following:
 Test water from wells at all locations. Test public water supplies from all out of state locations and in the following counties: Beaufort, Bertie, Brunswick, Camden, Carteret, Chowan, Craven, Currituck, Dare, Gates, Hyde, New Hanover, Onslow, Pamlico, Pasquotank, Pender, Perquimans, Tyrell and Washington unless the Engineer waives the testing requirements.

Page 10-52, Table 1024-2, PHYSICAL PROPERTIES OF WATER, replace with the following:

TABLE 1024-2 PHYSICAL PROPERTIES OF WATER		
Property	Requirement	Test Method
Compression Strength, minimum percent of control at 3 and 7 days	90%	ASTM C1602

Time of set, deviation from control	From 1:00 hr. earlier to 1:30 hr. later	ASTM C1602
pH	4.5 to 8.5	ASTM D1293 *
Chloride Ion Content, Max.	250 ppm	ASTM D512 *
Total Solids Content (Residue), Max.	1,000 ppm	SM 2540B *
Resistivity, Min.	0.500 kohm-cm	ASTM D1125 *

*Denotes an alternate method is acceptable. Test method used shall be referenced in the test report.

STANDARD SPECIAL PROVISION
AVAILABILITY OF FUNDS – TERMINATION OF CONTRACTS

(5-20-08)

Z-2

General Statute 143C-6-11. (h) Highway Appropriation is hereby incorporated verbatim in this contract as follows:

(h) Amounts Encumbered. – Transportation project appropriations may be encumbered in the amount of allotments made to the Department of Transportation by the Director for the estimated payments for transportation project contract work to be performed in the appropriation fiscal year. The allotments shall be multiyear allotments and shall be based on estimated revenues and shall be subject to the maximum contract authority contained in *General Statute 143C-6-11(c)*. Payment for transportation project work performed pursuant to contract in any fiscal year other than the current fiscal year is subject to appropriations by the General Assembly. Transportation project contracts shall contain a schedule of estimated completion progress, and any acceleration of this progress shall be subject to the approval of the Department of Transportation provided funds are available. The State reserves the right to terminate or suspend any transportation project contract, and any transportation project contract shall be so terminated or suspended if funds will not be available for payment of the work to be performed during that fiscal year pursuant to the contract. In the event of termination of any contract, the contractor shall be given a written notice of termination at least 60 days before completion of scheduled work for which funds are available. In the event of termination, the contractor shall be paid for the work already performed in accordance with the contract specifications.

Payment will be made on any contract terminated pursuant to the special provision in accordance with Subarticle 108-13(D) of the *2018 Standard Specifications*.

STANDARD SPECIAL PROVISION**ERRATA**

(10-16-18) (Rev.1-15-19)

Z-4

Revise the *2018 Standard Specifications* as follows:

Division 6

Page 6-7, Article 609-1 DESCRIPTION, line 29, replace article number “609-10” with “609-9”.

Division 7

Page 7-27, Article 725-1 MEASUREMENT AND PAYMENT, line 4, replace article number “725-1” with “724-4”.

Page 7-28, Article 725-1 MEASUREMENT AND PAYMENT, line 10, replace article number “725-1” with “725-3”.

Division 10

Page 10-78, Article 1056-4 GEOTEXTILES, TABLE 1056-1, Permittivity, Type 2, replace “Table 6^D” with “Table 7^D” and **Permittivity, Type 3^B,** replace “Table 7^D” with “Table 8^D”.

Page 10-162, Article 1080-50 PAINT FOR VERTICAL MARKERS, line 1, replace article number “1080-50” with “1080-10”.

Page 10-162, Article 1080-61 EPOXY RESIN FOR REINFORCING STEEL, line 5, replace article number “1080-61” with “1080-11”.

Page 10-162, Article 1080-72 ABRASIVE MATERIALS FOR BLAST CLEANING STEEL, line 22, replace article number “1080-72” with “1080-12”.

Page 10-163, Article 1080-83 FIELD PERFORMANCE AND SERVICES, line 25, replace article number “1080-83” with “1080-13”.

Division 17

Page 17-15, Article 1715-4 MEASUREMENT AND PAYMENT, lines 42-44, replace the second sentence with the following:

An example is an installation of a single 1.25 inch HDPE conduit would be paid as:

Directional Drill (1)(1.25”) Linear Foot

STANDARD SPECIAL PROVISION**PLANT AND PEST QUARANTINES****(Imported Fire Ant, Gypsy Moth, Witchweed, Emerald Ash Borer, Guava Root Knot Nematode, And Other Noxious Weeds)**

(3-18-03) (Rev. 5-21-19)

Z-04a

Within Quarantined Area

This project may be within a county regulated for plant and/or pests. If the project or any part of the Contractor's operations is located within a quarantined area, thoroughly clean all equipment prior to moving out of the quarantined area. Comply with federal/state regulations by obtaining a certificate or limited permit for any regulated article moving from the quarantined area.

Originating in a Quarantined County

Obtain a certificate or limited permit issued by the N.C. Department of Agriculture/United States Department of Agriculture. Have the certificate or limited permit accompany the article when it arrives at the project site.

Contact

Contact the N.C. Department of Agriculture/United States Department of Agriculture at 1-800-206-9333, 919-707-3730, or <https://www.ncagr.gov/plantindustry/Plant/quaran/table2.htm> to determine those specific project sites located in the quarantined area or for any regulated article used on this project originating in a quarantined county.

Regulated Articles Include

1. Soil, sand, gravel, compost, peat, humus, muck, and decomposed manure, separately or with other articles. This includes movement of articles listed above that may be associated with cut/waste, ditch pulling, and shoulder cutting.
2. Plants with roots including grass sod.
3. Plant crowns and roots.
4. Bulbs, corms, rhizomes, and tubers of ornamental plants.
5. Hay, straw, fodder, and plant litter of any kind.
6. Clearing and grubbing debris.
7. Used agricultural cultivating and harvesting equipment.
8. Used earth-moving equipment.
9. Any other products, articles, or means of conveyance, of any character, if determined by an inspector to present a hazard of spreading imported fire ant, gypsy moth, witchweed, emerald ash borer, guava root knot nematode, or other noxious weeds.

STANDARD SPECIAL PROVISION

MINIMUM WAGES

(7-21-09)

Z-5

FEDERAL: The Fair Labor Standards Act provides that with certain exceptions every employer shall pay wages at the rate of not less than SEVEN DOLLARS AND TWENTY FIVE CENTS (\$7.25) per hour.

STATE: The North Carolina Minimum Wage Act provides that every employer shall pay to each of his employees, wages at a rate of not less than SEVEN DOLLARS AND TWENTY FIVE CENTS (\$7.25) per hour.

The minimum wage paid to all skilled labor employed on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS (\$7.25) per hour.

The minimum wage paid to all intermediate labor employed on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS (\$7.25) per hour.

The minimum wage paid to all unskilled labor on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS (\$7.25) per hour.

This determination of the intent of the application of this act to the contract on this project is the responsibility of the Contractor.

The Contractor shall have no claim against the Department of Transportation for any changes in the minimum wage laws, Federal or State. It is the responsibility of the Contractor to keep fully informed of all Federal and State Laws affecting his contract.

STANDARD SPECIAL PROVISION**TITLE VI AND NONDISCRIMINATION:**

(6-28-77)(Rev 6/19/2018)

Z-6

Revise the *2018 Standard Specifications* as follows:

Replace Article 103-4(B) with the following:

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

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

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

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

(a) Compliance with Regulations

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

(b) Nondiscrimination

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

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

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

(d) Information and Reports

The contractor shall provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the FHWA to be pertinent to ascertain compliance with such Acts,

Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor shall so certify to the Recipient or the FHWA, as appropriate, and shall set forth what efforts it has made to obtain the information.

(e) Sanctions for Noncompliance:

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

- (i) Withholding payments to the contractor under the contract until the contractor complies; and/or
- (ii) Cancelling, terminating, or suspending a contract, in whole or in part.

(f) Incorporation of Provisions

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

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

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

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

1. Post NCDOT's Notice of Nondiscrimination and the Contractor's own Equal Employment Opportunity (EEO) Policy in conspicuous locations accessible to all employees, applicants and subcontractors on the jobsite.
2. Physically incorporate the required Title VI clauses into all subcontracts on federally-assisted and state-funded NCDOT projects, and ensure inclusion by subcontractors into all lower-tier subcontracts.
3. Required Solicitation Language. The Contractor shall include the following notification in all solicitations for bids and requests for work or material, regardless of funding source:

“The North Carolina Department of Transportation, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§

2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award. In accordance with other related nondiscrimination authorities, bidders and contractors will also not be discriminated against on the grounds of sex, age, disability, low-income level, creed/religion, or limited English proficiency in consideration for an award.”

4. Physically incorporate the FHWA-1273, in its entirety, into all subcontracts and subsequent lower tier subcontracts on Federal-aid highway construction contracts only.
 5. Provide language assistance services (i.e., written translation and oral interpretation), free of charge, to LEP employees and applicants. Contact NCDOT OCR for further assistance, if needed.
 6. For assistance with these Title VI requirements, contact the NCDOT Title VI Nondiscrimination Program at 1-800-522-0453.
- (b) Subrecipients (e.g. cities, counties, LGAs, planning organizations) may be required to prepare and submit a Title VI Plan to NCDOT, including Title VI Assurances and/or agreements. Subrecipients must also ensure compliance by their contractors and subrecipients with Title VI. (23 CFR 200.9(b)(7))
- (c) If reviewed or investigated by NCDOT, the contractor or subrecipient agrees to take affirmative action to correct any deficiencies found within a reasonable time period, not to exceed 90 calendar days, unless additional time is granted by NCDOT. (23 CFR 200.9(b)(15))
- (d) The Contractor is responsible for notifying subcontractors of NCDOT’s External Discrimination Complaints Process.
1. Applicability
Title VI and related laws protect participants and beneficiaries (e.g., members of the public and contractors) from discrimination by NCDOT employees, subrecipients and contractors, regardless of funding source.
 2. Eligibility
Any person—or class of persons—who believes he/she has been subjected to discrimination based on race, color, national origin, Limited English Proficiency (LEP), sex, age, or disability (and religion in the context of employment, aviation, or transit) may file a written complaint. The law also prohibits intimidation or retaliation of any sort.
 3. Time Limits and Filing Options
Complaints may be filed by the affected individual(s) or a representative and must be filed no later than 180 calendar days after the following:
 - (i) The date of the alleged act of discrimination; or
 - (ii) The date when the person(s) became aware of the alleged discrimination; or
 - (iii) Where there has been a continuing course of conduct, the date on which that conduct was discontinued or the latest instance of the conduct.Title VI and related discrimination complaints may be submitted to the following entities:

- North Carolina Department of Transportation, Office of Civil Rights, Title VI Program, 1511 Mail Service Center, Raleigh, NC 27699-1511; toll free 1-800-522-0453
 - Federal Highway Administration, North Carolina Division Office, 310 New Bern Avenue, Suite 410, Raleigh, NC 27601, 919-747-7010
 - US Department of Transportation, Departmental Office of Civil Rights, External Civil Rights Programs Division, 1200 New Jersey Avenue, SE, Washington, DC 20590; 202-366-4070
4. Format for Complaints
Complaints must be in writing and signed by the complainant(s) or a representative, and include the complainant's name, address, and telephone number. Complaints received by fax or e-mail will be acknowledged and processed. Allegations received by telephone will be reduced to writing and provided to the complainant for confirmation or revision before processing. Complaints will be accepted in other languages, including Braille.
5. Discrimination Complaint Form
Contact NCDOT Civil Rights to receive a full copy of the Discrimination Complaint Form and procedures.
6. Complaint Basis
Allegations must be based on issues involving race, color, national origin (LEP), sex, age, disability, or religion (in the context of employment, aviation or transit). "Basis" refers to the complainant's membership in a protected group category.

**TABLE 103-1
COMPLAINT BASIS**

Protected Categories	Definition	Examples	Applicable Nondiscrimination Authorities
Race and Ethnicity	An individual belonging to one of the accepted racial groups; or the perception, based usually on physical characteristics that a person is a member of a racial group	Black/African American, Hispanic/Latino, Asian, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, White	Title VI of the Civil Rights Act of 1964; 49 CFR Part 21; 23 CFR 200; 49 U.S.C. 5332(b); 49 U.S.C. 47123. (<i>Executive Order 13166</i>)
Color	Color of skin, including shade of skin within a racial group	Black, White, brown, yellow, etc.	
National Origin (<i>Limited English Proficiency</i>)	Place of birth. Citizenship is not a factor. (<i>Discrimination based on language or a person's accent is also covered</i>)	Mexican, Cuban, Japanese, Vietnamese, Chinese	
Sex	Gender. The sex of an individual. <i>Note: Sex under this program does not include sexual orientation.</i>	Women and Men	1973 Federal-Aid Highway Act; 49 U.S.C. 5332(b); 49 U.S.C. 47123.
Age	Persons of any age	21-year-old person	Age Discrimination Act of 1975 49 U.S.C. 5332(b); 49 U.S.C. 47123.
Disability	Physical or mental impairment, permanent or temporary, or perceived.	Blind, alcoholic, para-amputee, epileptic, diabetic, arthritic	Section 504 of the Rehabilitation Act of 1973; Americans with Disabilities Act of 1990

<p>Religion (in the context of employment) <i>(Religion/ Creed in all aspects of any aviation or transit-related construction)</i></p>	<p>An individual belonging to a religious group; or the perception, based on distinguishable characteristics that a person is a member of a religious group. In practice, actions taken as a result of the moral and ethical beliefs as to what is right and wrong, which are sincerely held with the strength of traditional religious views. Note: Does not have to be associated with a recognized religious group or church; if an individual sincerely holds to the belief, it is a protected religious practice.</p>	<p>Muslim, Christian, Sikh, Hindu, etc.</p>	<p>Title VII of the Civil Rights Act of 1964; 23 CFR 230; FHWA-1273 Required Contract Provisions. <i>(49 U.S.C. 5332(b); 49 U.S.C. 47123)</i></p>
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(3) Pertinent Nondiscrimination Authorities

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

- (a) Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21.
- (b) The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- (c) Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 et seq.), (prohibits discrimination on the basis of sex);
- (d) Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 et seq.), as amended, (prohibits discrimination on the basis of disability) and 49 CFR Part 27;
- (e) The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 et seq.), (prohibits discrimination on the basis of age);
- (f) Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
- (g) The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- (h) Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131-12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;
- (i) The Federal Aviation Administration's Nondiscrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- (j) Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures Nondiscrimination against minority populations by discouraging programs, policies, and activities with

- disproportionately high and adverse human health or environmental effects on minority and low-income populations;
- (k) Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of Limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
 - (l) Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).
 - (m) Title VII of the Civil Rights Act of 1964 (42 U.S.C. § 2000e et seq., Pub. L. 88-352), (prohibits employment discrimination on the basis of race, color, religion, sex, or national origin).
- (4) **Additional Title VI Assurances**
- **The following Title VI Assurances (Appendices B, C and D) shall apply, as applicable*
- (a) Clauses for Deeds Transferring United States Property (1050.2A, Appendix B)
The following clauses will be included in deeds effecting or recording the transfer of real property, structures, or improvements thereon, or granting interest therein from the United States pursuant to the provisions of Assurance 4.

NOW, THEREFORE, the U.S. Department of Transportation as authorized by law and upon the condition that the North Carolina Department of Transportation (NCDOT) will accept title to the lands and maintain the project constructed thereon in accordance with the North Carolina General Assembly, the Regulations for the Administration of the Federal-Aid Highway Program, and the policies and procedures prescribed by the Federal Highway Administration of the U.S. Department of Transportation in accordance and in compliance with all requirements imposed by Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Nondiscrimination in Federally-assisted programs of the U.S. Department of Transportation pertaining to and effectuating the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252; 42 U.S.C. § 2000d to 2000d-4), does hereby remise, release, quitclaim and convey unto the NCDOT all the right, title and interest of the U.S. Department of Transportation in and to said lands described in Exhibit A attached hereto and made a part hereof.

(HABENDUM CLAUSE)

TO HAVE AND TO HOLD said lands and interests therein unto the North Carolina Department of Transportation (NCDOT) and its successors forever, subject, however, to the covenants, conditions, restrictions and reservations herein contained as follows, which will remain in effect for the period during which the real property or structures are used for a purpose for which Federal financial assistance is extended or for another purpose involving the provision of similar services or benefits and will be binding on the NCDOT, its successors and assigns.

The NCDOT, in consideration of the conveyance of said lands and interests in lands, does hereby covenant and agree as a covenant running with the land for itself, its successors and assigns, that (1) no person will on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination with regard to any facility located wholly or in part on, over, or under such lands hereby conveyed [,] [and]* (2) that the NCDOT will use the lands and interests in lands and interests in lands so conveyed, in compliance with all requirements imposed by or pursuant to Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, Effectuation of Title VI of the Civil Rights Act of 1964, and as said Regulations and Acts may be amended [, and (3) that in the event of breach of any of the above-mentioned nondiscrimination conditions, the Department will have a right to enter or re-enter said lands and facilities on said land, and that above described land and facilities will thereon revert to and vest in and become the absolute property of the U.S. Department of Transportation and its assigns as such interest existed prior to this instruction].*

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary in order to make clear the purpose of Title VI.)

(b) Clauses for Transfer of Real Property Acquired or Improved Under the Activity, Facility, or Program (1050.2A, Appendix C)

The following clauses will be included in deeds, licenses, leases, permits, or similar instruments entered into by the North Carolina Department of Transportation (NCDOT) pursuant to the provisions of Assurance 7(a):

1. The (grantee, lessee, permittee, etc. as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree [in the case of deeds and leases add "as a covenant running with the land"] that:
 - (i.) In the event facilities are constructed, maintained, or otherwise operated on the property described in this (deed, license, lease, permit, etc.) for a purpose for which a U.S. Department of Transportation activity, facility, or program is extended or for another purpose involving the provision of similar services or benefits, the (grantee, licensee, lessee, permittee, etc.) will maintain and operate such facilities and services in compliance with all requirements imposed by the Acts and Regulations (as may be amended) such that no person on the grounds of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities.
2. With respect to licenses, leases, permits, etc., in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will have the right to terminate the (lease, license, permit, etc.) and to enter, re-enter, and repossess said lands and facilities thereon, and hold the same as if the (lease, license, permit, etc.) had never been made or issued. *
3. With respect to a deed, in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will have the right to enter or re-enter the lands and facilities thereon, and the above described lands and facilities will there upon revert to and vest in and become the absolute property of the NCDOT and its assigns. *

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)

(c) Clauses for Construction/Use/Access to Real Property Acquired Under the Activity, Facility or Program (1050.2A, Appendix D)

The following clauses will be included in deeds, licenses, permits, or similar instruments/ agreements entered into by the North Carolina Department of Transportation (NCDOT) pursuant to the provisions of Assurance 7(b):

1. The (grantee, licensee, permittee, etc., as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree (in the case of deeds and leases add, "as a covenant running with the land") that (1) no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities, (2) that in the construction of any improvements on, over, or under such land, and the furnishing of services thereon, no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination, (3) that the (grantee, licensee, lessee, permittee, etc.) will use the premises in compliance with all other requirements imposed by or pursuant to the Acts and Regulations, as amended, set forth in this Assurance.
2. With respect to (licenses, leases, permits, etc.), in the event of breach of any of the above Non-discrimination covenants, the NCDOT will have the right to terminate the (license, permit, etc., as appropriate) and to enter or re-enter and repossess said land and the facilities thereon, and hold the same as if said (license, permit, etc., as appropriate) had never been made or issued. *
3. With respect to deeds, in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will there upon revert to and vest in and become the absolute property of the NCDOT and its assigns. *

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)

STANDARD SPECIAL PROVISION**ON-THE-JOB TRAINING**

(10-16-07) (Rev. 4-21-15)

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.



DocuSigned by:
Matthew V. Springer
 BC60F6E8B584403...
 8/27/2020

POLYUREA PAVEMENT MARKING MEDIA AND THICKNESS:
 (08-27-20)

Amend the *NCDOT 2018 Standard Specifications* as follows:

Page 12-8, Subarticle 1205-5(B), lines 14-16, replace with the following:

Produce polyurea pavement marking lines that have a minimum dry thickness of 20 mils above the pavement surface when placed on concrete and asphalt pavements. Produce polyurea pavement marking lines that have a minimum dry thickness of 30 mils above the pavement surface on textured surfaces such as OGFC and on surfaces where the polyurea will be placed over a previously removed pavement marking.

Page 12-9, replace **Table 1205-4 Minimum Reflectometer Requirement for Polyurea** with the following:

TABLE 1205-4 MINIMUM REFLECTOMETER REQUIREMENTS FOR POLYUREA		
Item	Color	Reflectivity
Standard Glass Beads	White	375 mcd/lux/m ²
	Yellow	250 mcd/lux/m ²

The installer may choose to use an AASHTO Type 4/Type 1 or AASHTO Type 3/Type 1 double drop system, but no price adjustment will be made, and these systems will be incidental to the polyurea pavement marking.

Pay Item

Pay Unit

Polyurea Pavement Marking Lines, ___", ___mils
 (Standard Glass Beads)

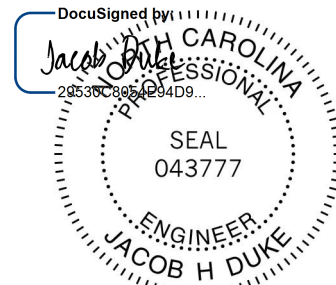
Linear Foot

PROJECT SPECIAL PROVISION

STRUCTURES

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SCOPE OF WORK

This work shall consist of furnishing all labor, equipment, and materials to: repair the existing bridge deck surface of spans one to six with latex modified – very early strength concrete overlay and spans seven to twenty one and approach slabs with silane deck treatment; repair/replace existing joints; retrofit the bridge rails; mill and resurface the approach roadway; perform bearing replacement; superstructure and substructure concrete repairs as directed in the plans; galvanic cathodic protection treatment; integral pile jacketing and water line removal.

Work includes: existing bridge deck surface preparation; removing bridge deck surface by milling, scarification, and hydro-demolition methods, as appropriate; bridge deck joint demolition and reconstruction; installation of foam joint seals; superstructure and substructure repairs using concrete repair, shotcrete repair, epoxy resin injection, epoxy coating of top of caps and beam ends including debris removal; bridge jacking for bearing replacement; rail retrofit the 2-bar metal rail all spans; incidental milling; temporary work platforms; seeding and mulching all grassed areas disturbed; existing water line removal including removal of hanger assemblies and all necessary accessories and all incidentals necessary to complete the project as specified and indicated on the plans.

Work will be performed on the existing bridges at the following location in Brunswick County:

- Bridge #090013 – Brunswick '13 carrying NC 904 over the Intercostal Waterway.

Contractor shall provide all necessary access, understructure platforms, scaffolding, ladders, etc., provide all staging areas, materials storage, waste disposal, provide environmental controls to limit loss of materials from sawing equipment and chipping equipment; and any other incidental necessary to complete the work.

Existing dimensions and bridge condition are from the best information available. The contractor shall field verify the information shown in the plans prior to commencing repairs or ordering material. Notify the engineer of any discrepancies.

The contractor shall be responsible for fulfilling all requirements of the NCDOT Standard Specifications for Roads and Structures dated January 2018, except as specified herein.

SUBMITTAL OF WORKING DRAWINGS**(6-28-17)****1.0 GENERAL**

Submit working drawings in accordance with Article 105-2 of the *Standard Specifications* and this provision. For this provision, “submittals” refers to only those listed in this provision. The list of submittals contained herein does not represent a list of required submittals for the project. Submittals are only necessary for those items as required by the contract. Make submittals that are not specifically noted in this provision directly to the Engineer. Either the Structures Management Unit or the Geotechnical Engineering Unit or both units will jointly review submittals.

If a submittal contains variations from plan details or specifications or significantly affects project cost, field construction or operations, discuss the submittal with and submit all copies to the Engineer. State the reason for the proposed variation in the submittal. To minimize review time, make sure all submittals are complete when initially submitted. Provide a contact name and information with each submittal. Direct any questions regarding submittal requirements to the Engineer, Structures Management Unit contacts or the Geotechnical Engineering Unit contacts noted below.

In order to facilitate in-plant inspection by NCDOT and approval of working drawings, provide the name, address and telephone number of the facility where fabrication will actually be done if different than shown on the title block of the submitted working drawings. This includes, but is not limited to, precast concrete items, prestressed concrete items and fabricated steel or aluminum items.

2.0 ADDRESSES AND CONTACTS

For submittals to the Structures Management Unit, use the following addresses:

Via US mail:

Mr. B. C. Hanks, P. E.
State Structures Engineer
North Carolina Department
of Transportation
Structures Management Unit
1581 Mail Service Center
Raleigh, NC 27699-1581

Attention: Mr. J. L. Bolden, P. E.

Via other delivery service:

Mr. B. C. Hanks, P. E.
State Structures Engineer
North Carolina Department
of Transportation
Structures Management Unit
1000 Birch Ridge Drive
Raleigh, NC 27610

Attention: Mr. J. L. Bolden, P. E.

Submittals may also be made via email.

Send submittals to:

jlbolden@ncdot.gov (James Bolden)

Send an additional e-copy of the submittal to the following address:

eomile@ncdot.gov (Emmanuel Omile)

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mrorie@ncdot.gov (Madonna Rorie)

For submittals to the Geotechnical Engineering Unit, use the following addresses:

For projects in Divisions 1-7, use the following Eastern Regional Office address:

Via US mail:

Mr. Chris Kreider, P. E.
Eastern Regional Geotechnical
Manager
North Carolina Department
of Transportation
Geotechnical Engineering Unit
Eastern Regional Office
1570 Mail Service Center
Raleigh, NC 27699-1570

Via other delivery service:

Mr. Chris Kreider, P. E.
Eastern Regional Geotechnical
Manager
North Carolina Department
of Transportation
Geotechnical Engineering Unit
Eastern Regional Office
3301 Jones Sausage Road, Suite 100
Garner, NC 27529

Via Email: EastGeotechnicalSubmittal@ncdot.gov

For projects in Divisions 8-14, use the following Western Regional Office address:

Via US mail or other delivery service:

Mr. Eric Williams, P. E.
Western Regional Geotechnical
Manager
North Carolina Department
of Transportation
Geotechnical Engineering Unit
Western Regional Office
5253 Z Max Boulevard
Harrisburg, NC 28075

Via Email: WestGeotechnicalSubmittal@ncdot.gov

The status of the review of structure-related submittals sent to the Structures Management Unit can be viewed from the Unit's website, via the "Drawing Submittal Status" link.

The status of the review of geotechnical-related submittals sent to the Geotechnical Engineering Unit can be viewed from the Unit's website, via the "Geotechnical Construction Submittals" link.

Direct any questions concerning submittal review status, review comments or drawing markups to the following contacts:

Primary Structures Contact:

James Bolden (919) 707 – 6408
(919) 250 – 4082 facsimile
jlbolden@ncdot.gov

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Secondary Structures Contacts: Emmanuel Omile (919) 707 – 6451
Madonna Rorie (919) 707 – 6508

Eastern Regional Geotechnical Contact (Divisions 1-7):
Chris Kreider (919) 662 – 4710
ckreider@ncdot.gov

Western Regional Geotechnical Contact (Divisions 8-14):
Eric Williams (704) 455 – 8902
ewilliams3@ncdot.gov

3.0 SUBMITTAL COPIES

Furnish one complete copy of each submittal, including all attachments, to the Engineer. At the same time, submit the number of hard copies shown below of the same complete submittal directly to the Structures Management Unit and/or the Geotechnical Engineering Unit.

The first table below covers “Structure Submittals”. The Engineer will receive review comments and drawing markups for these submittals from the Structures Management Unit. The second table in this section covers “Geotechnical Submittals”. The Engineer will receive review comments and drawing markups for these submittals from the Geotechnical Engineering Unit.

Unless otherwise required, submit one set of supporting calculations to either the Structures Management Unit or the Geotechnical Engineering Unit unless both units require submittal copies in which case submit a set of supporting calculations to each unit. Provide additional copies of any submittal as directed.

STRUCTURE SUBMITTALS

Submittal	Copies Required by Structures Management Unit	Copies Required by Geotechnical Engineering Unit	Contract Reference Requiring Submittal ¹
Arch Culvert Falsework	5	0	Plan Note, SN Sheet & “Falsework and Formwork”
Box Culvert Falsework ⁷	5	0	Plan Note, SN Sheet & “Falsework and Formwork”
Cofferdams	6	2	Article 410-4
Foam Joint Seals ⁶	9	0	“Foam Joint Seals”

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Expansion Joint Seals (hold down plate type with base angle)	9	0	“Expansion Joint Seals”
Expansion Joint Seals (modular)	2, then 9	0	“Modular Expansion Joint Seals”
Expansion Joint Seals (strip seals)	9	0	“Strip Seals”
Falsework & Forms ² (substructure)	8	0	Article 420-3 & “Falsework and Formwork”
Falsework & Forms (superstructure)	8	0	Article 420-3 & “Falsework and Formwork”
Girder Erection over Railroad	5	0	Railroad Provisions
Maintenance and Protection of Traffic Beneath Proposed Structure	8	0	“Maintenance and Protection of Traffic Beneath Proposed Structure at Station ____”
Metal Bridge Railing	8	0	Plan Note
Metal Stay-in-Place Forms	8	0	Article 420-3
Metalwork for Elastomeric Bearings ^{4,5}	7	0	Article 1072-8
Miscellaneous Metalwork ^{4,5}	7	0	Article 1072-8
Disc Bearings ⁴	8	0	“Disc Bearings”
Overhead and Digital Message Signs (DMS) (metalwork and foundations)	13	0	Applicable Provisions
Placement of Equipment on Structures (cranes, etc.)	7	0	Article 420-20
Precast Concrete Box Culverts	2, then 1 reproducible	0	“Optional Precast Reinforced Concrete Box Culvert at Station ____”
Prestressed Concrete Cored Slab (detensioning sequences) ³	6	0	Article 1078-11
Prestressed Concrete Deck Panels	6 and 1 reproducible	0	Article 420-3

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Prestressed Concrete Girder (strand elongation and detensioning sequences)	6	0	Articles 1078-8 and 1078- 11
Removal of Existing Structure over Railroad	5	0	Railroad Provisions
Revised Bridge Deck Plans (adaptation to prestressed deck panels)	2, then 1 reproducible	0	Article 420-3
Revised Bridge Deck Plans (adaptation to modular expansion joint seals)	2, then 1 reproducible	0	“Modular Expansion Joint Seals”
Sound Barrier Wall (precast items)	10	0	Article 1077-2 & “Sound Barrier Wall”
Sound Barrier Wall Steel Fabrication Plans ⁵	7	0	Article 1072-8 & “Sound Barrier Wall”
Structural Steel ⁴	2, then 7	0	Article 1072-8
Temporary Detour Structures	10	2	Article 400-3 & “Construction, Maintenance and Removal of Temporary Structure at Station _____”
TFE Expansion Bearings ⁴	8	0	Article 1072-8

FOOTNOTES

- References are provided to help locate the part of the contract where the submittals are required. References in quotes refer to the provision by that name. Articles refer to the *Standard Specifications*.
- Submittals for these items are necessary only when required by a note on plans.
- Submittals for these items may not be required. A list of pre-approved sequences is available from the producer or the Materials & Tests Unit.
- The fabricator may submit these items directly to the Structures Management Unit.
- The two sets of preliminary submittals required by Article 1072-8 of the *Standard Specifications* are not required for these items.
- Submittals for Fabrication Drawings are not required. Submittals for Catalogue Cuts of Proposed Material are required. See Section 5.A of the referenced provision.
- Submittals are necessary only when the top slab thickness is 18” or greater.

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GEOTECHNICAL SUBMITTALS

Submittal	Copies Required by Geotechnical Engineering Unit	Copies Required by Structures Management Unit	Contract Reference Requiring Submittal ¹
Drilled Pier Construction Plans ²	1	0	Subarticle 411-3(A)
Crosshole Sonic Logging (CSL) Reports ²	1	0	Subarticle 411-5(A)(2)
Pile Driving Equipment Data Forms ^{2,3}	1	0	Subarticle 450-3(D)(2)
Pile Driving Analyzer (PDA) Reports ²	1	0	Subarticle 450-3(F)(3)
Retaining Walls ⁴	1 drawings, 1 calculations	2 drawings	Applicable Provisions
Temporary Shoring ⁴	1 drawings, 1 calculations	2 drawings	“Temporary Shoring” & “Temporary Soil Nail Walls”

FOOTNOTES

- References are provided to help locate the part of the contract where the submittals are required. References in quotes refer to the provision by that name. Subarticles refer to the *Standard Specifications*.
- Submit one hard copy of submittal to the Engineer. Submit a second copy of submittal electronically (PDF via email), US mail or other delivery service to the appropriate Geotechnical Engineering Unit regional office. Electronic submission is preferred.
- The Pile Driving Equipment Data Form is available from:
https://connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
See second page of form for submittal instructions.
- Electronic copy of submittal is required. See referenced provision.

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CRANE SAFETY**(6-20-19)**

Comply with the manufacturer specifications and limitations applicable to the operation of any and all cranes and derricks. Prime contractors, sub-contractors, and fully operated rental companies shall comply with the current Occupational Safety and Health Administration (OSHA) regulations.

Submit all items listed below to the Engineer prior to beginning crane operations. Changes in personnel or equipment must be reported to the Engineer and all applicable items listed below must be updated and submitted prior to continuing with crane operations.

CRANE SAFETY SUBMITTAL LIST

- A. **Competent Person:** Provide the name and qualifications of the “Competent Person” responsible for crane safety and lifting operations. The named competent person will have the responsibility and authority to stop any work activity due to safety concerns.
- B. **Riggers:** Provide the qualifications and experience of the persons responsible for rigging operations. Qualifications and experience should include, but not be limited to, weight calculations, center of gravity determinations, selection and inspection of sling and rigging equipment, and safe rigging practices.
- C. **Crane Inspections:** Inspection records for all cranes shall be current and readily accessible for review upon request.
- D. **Certifications:** Crane operators shall be certified by the National Commission for the Certification of Crane Operators (NCCCO) or the National Center for Construction Education and Research (NCCER). Other approved nationally accredited programs will be considered upon request. In addition, crane operators shall have a current CDL medical card. Submit a list of crane operator(s) and include current certification for each type of crane operated (small hydraulic, large hydraulic, small lattice, large lattice) and medical evaluations for each operator.

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SECURING OF VESSELS

(10-12-01)

Secure vessels in accordance with Section 107 of the Standard Specifications and the following provision.

When utilizing barges, tugboats or other vessels, take all necessary precautions to ensure that such vessels are securely anchored or moored when not in active operation. Take all necessary measures to ensure that the vessels are operated in a manner that avoids damage to or unnecessary contact with bridges and other highway structures and attachments. If severe weather conditions are anticipated, or should be anticipated through reasonable monitoring of weather forecasts, take additional measures to protect bridges and other highway structures and attachments from extreme conditions. The Contractor is strictly liable for damages to any bridge or other highway structure or attachment caused by a vessel owned or controlled by the Contractor. The Contractor is also liable to third parties for property damages and loss of revenue caused by vessels under the Contractor's control.

FALSEWORK AND FORMWORK**(4-5-12)****1.0 DESCRIPTION**

Use this Special Provision as a guide to develop temporary works submittals required by the Standard Specifications or other provisions; no additional submittals are required herein. Such temporary works include, but are not limited to, falsework and formwork.

Falsework is any temporary construction used to support the permanent structure until it becomes self-supporting. Formwork is the temporary structure or mold used to retain plastic or fluid concrete in its designated shape until it hardens. Access scaffolding is a temporary structure that functions as a work platform that supports construction personnel, materials, and tools, but is not intended to support the structure. Scaffolding systems that are used to temporarily support permanent structures (as opposed to functioning as work platforms) are considered to be falsework under the definitions given. Shoring is a component of falsework such as horizontal, vertical, or inclined support members. Where the term “temporary works” is used, it includes all of the temporary facilities used in bridge construction that do not become part of the permanent structure.

Design and construct safe and adequate temporary works that will support all loads imposed and provide the necessary rigidity to achieve the lines and grades shown on the plans in the final structure.

2.0 MATERIALS

Select materials suitable for temporary works; however, select materials that also ensure the safety and quality required by the design assumptions. The Engineer has authority to reject material on the basis of its condition, inappropriate use, safety, or nonconformance with the plans. Clearly identify allowable loads or stresses for all materials or manufactured devices on the plans. Revise the plan and notify the Engineer if any change to materials or material strengths is required.

3.0 DESIGN REQUIREMENTS**A. Working Drawings**

Provide working drawings for items as specified in the contract, or as required by the Engineer, with design calculations and supporting data in sufficient detail to permit a structural and safety review of the proposed design of the temporary work.

On the drawings, show all information necessary to allow the design of any component to be checked independently as determined by the Engineer.

When concrete placement is involved, include data such as the drawings of proposed sequence, rate of placement, direction of placement, and location of all construction joints. Submit the number of copies as called for by the contract.

When required, have the drawings and calculations prepared under the guidance of, and sealed by, a North Carolina Registered Professional Engineer who is knowledgeable in temporary works design.

If requested by the Engineer, submit with the working drawings manufacturer's catalog data listing the weight of all construction equipment that will be supported on the temporary work. Show anticipated total settlements and/or deflections of falsework and forms on the working drawings. Include falsework footing settlements, joint take-up, and deflection of beams or girders.

As an option for the Contractor, overhang falsework hangers may be uniformly spaced, at a maximum of 36 inches, provided the following conditions are met:

Member Type (PCG)	Member Depth, (inches)	Max. Overhang Width, (inches)	Max. Slab Edge Thickness, (inches)	Max. Screenshot Wheel Weight, (lbs.)	Bracket Min. Vertical Leg Extension, (inches)
II	36	39	14	2000	26
III	45	42	14	2000	35
IV	54	45	14	2000	44
MBT	63	51	12	2000	50
MBT	72	55	12	1700	48

Overhang width is measured from the centerline of the girder to the edge of the deck slab.

For Type II, III & IV prestressed concrete girders (PCG), 45-degree cast-in-place half hangers and rods must have a minimum safe working load of 6,000 lbs.

For MBT prestressed concrete girders, 45-degree angle holes for falsework hanger rods shall be cast through the girder top flange and located, measuring along the top of the member, 1'-2 1/2" from the edge of the top flange. Hanger hardware and rods must have a minimum safe working load of 6,000 lbs.

The overhang bracket provided for the diagonal leg shall have a minimum safe working load of 3,750 lbs. The vertical leg of the bracket shall extend to the point that the heel bears on the girder bottom flange, no closer than 4 inches from the bottom of the member. However, for 72-inch members, the heel of the bracket shall bear on the web, near the bottom flange transition.

Provide adequate overhang falsework and determine the appropriate adjustments for deck geometry, equipment, casting procedures and casting conditions.

If the optional overhang falsework spacing is used, indicate this on the falsework submittal and advise the girder producer of the proposed details. Failure to notify the Engineer of hanger type and hanger spacing on prestressed concrete girder casting drawings may delay the approval of those drawings.

Falsework hangers that support concentrated loads and are installed at the edge of thin top flange concrete girders (such as bulb tee girders) shall be spaced so as not to exceed 75% of the manufacturer's stated safe working load. Use of dual leg hangers (such as Meadow Burke HF-42 and HF-43) are not allowed on concrete girders with thin top flanges. Design the falsework and forms supporting deck slabs and overhangs on girder bridges so that there will be no differential settlement between the girders and the deck forms during placement of deck concrete.

When staged construction of the bridge deck is required, detail falsework and forms for screed and fluid concrete loads to be independent of any previous deck pour components when the mid-span girder deflection due to deck weight is greater than $\frac{3}{4}$ ".

Note on the working drawings any anchorages, connectors, inserts, steel sleeves or other such devices used as part of the falsework or formwork that remains in the permanent structure. If the plan notes indicate that the structure contains the necessary corrosion protection required for a Corrosive Site, epoxy coat, galvanize or metalize these devices. Electroplating will not be allowed. Any coating required by the Engineer will be considered incidental to the various pay items requiring temporary works.

Design falsework and formwork requiring submittals in accordance with the 1995 AASHTO *Guide Design Specifications for Bridge Temporary Works* except as noted herein.

1. Wind Loads

Table 2.2 of Article 2.2.5.1 is modified to include wind velocities up to 110 mph. In addition, Table 2.2A is included to provide the maximum wind speeds by county in North Carolina.

Table 2.2 - Wind Pressure Values

Height Zone feet above ground	Pressure, lb/ft ² for Indicated Wind Velocity, mph				
	70	80	90	100	110
0 to 30	15	20	25	30	35
30 to 50	20	25	30	35	40
50 to 100	25	30	35	40	45
over 100	30	35	40	45	50

2. Time of Removal

The following requirements replace those of Article 3.4.8.2.

Do not remove forms until the concrete has attained strengths required in Article 420-16 of the Standard Specifications and these Special Provisions.

Do not remove forms until the concrete has sufficient strength to prevent damage to the surface.

Table 2.2A - Steady State Maximum Wind Speeds by Counties in North Carolina

COUNTY	25 YR (mph)	COUNTY	25 YR (mph)	COUNTY	25 YR (mph)
Alamance	70	Franklin	70	Pamlico	100
Alexander	70	Gaston	70	Pasquotank	100
Alleghany	70	Gates	90	Pender	100
Anson	70	Graham	80	Perquimans	100
Ashe	70	Granville	70	Person	70
Avery	70	Greene	80	Pitt	90
Beaufort	100	Guilford	70	Polk	80
Bertie	90	Halifax	80	Randolph	70
Bladen	90	Harnett	70	Richmond	70
Brunswick	100	Haywood	80	Robeson	80
Buncombe	80	Henderson	80	Rockingham	70
Burke	70	Hertford	90	Rowan	70
Cabarrus	70	Hoke	70	Rutherford	70
Caldwell	70	Hyde	110	Sampson	90
Camden	100	Iredell	70	Scotland	70
Carteret	110	Jackson	80	Stanley	70
Caswell	70	Johnston	80	Stokes	70
Catawba	70	Jones	100	Surry	70
Cherokee	80	Lee	70	Swain	80
Chatham	70	Lenoir	90	Transylvania	80
Chowan	90	Lincoln	70	Tyrell	100
Clay	80	Macon	80	Union	70
Cleveland	70	Madison	80	Vance	70
Columbus	90	Martin	90	Wake	70
Craven	100	McDowell	70	Warren	70
Cumberland	80	Mecklenburg	70	Washington	100
Currituck	100	Mitchell	70	Watauga	70
Dare	110	Montgomery	70	Wayne	80
Davidson	70	Moore	70	Wilkes	70
Davie	70	Nash	80	Wilson	80
Duplin	90	New Hanover	100	Yadkin	70
Durham	70	Northampton	80	Yancey	70
Edgecombe	80	Onslow	100		
Forsyth	70	Orange	70		

B. Review and Approval

The Engineer is responsible for the review and approval of temporary works' drawings.

Submit the working drawings sufficiently in advance of proposed use to allow for their review, revision (if needed), and approval without delay to the work.

The time period for review of the working drawings does not begin until complete drawings and design calculations, when required, are received by the Engineer.

Do not start construction of any temporary work for which working drawings are required until the drawings have been approved. Such approval does not relieve the Contractor of the responsibility for the accuracy and adequacy of the working drawings.

4.0 CONSTRUCTION REQUIREMENTS

All requirements of Section 420 of the Standard Specifications apply.

Construct temporary works in conformance with the approved working drawings. Ensure that the quality of materials and workmanship employed is consistent with that assumed in the design of the temporary works. Do not weld falsework members to any portion of the permanent structure unless approved. Show any welding to the permanent structure on the approved construction drawings.

Provide tell-tales attached to the forms and extending to the ground, or other means, for accurate measurement of falsework settlement. Make sure that the anticipated compressive settlement and/or deflection of falsework does not exceed 1 inch. For cast-in-place concrete structures, make sure that the calculated deflection of falsework flexural members does not exceed 1/240 of their span regardless of whether or not the deflection is compensated by camber strips.

A. Maintenance and Inspection

Inspect and maintain the temporary work in an acceptable condition throughout the period of its use. Certify that the manufactured devices have been maintained in a condition to allow them to safely carry their rated loads. Clearly mark each piece so that its capacity can be readily determined at the job site.

Perform an in-depth inspection of an applicable portion(s) of the temporary works, in the presence of the Engineer, not more than 24 hours prior to the beginning of each concrete placement. Inspect other temporary works at least once a month to ensure that they are functioning properly. Have a North Carolina Registered Professional Engineer inspect the cofferdams, shoring, sheathing, support of excavation structures, and support systems for load tests prior to loading.

B. Foundations

Determine the safe bearing capacity of the foundation material on which the supports for temporary works rest. If required by the Engineer, conduct load tests to verify proposed bearing capacity values that are marginal or in other high-risk situations.

The use of the foundation support values shown on the contract plans of the permanent structure is permitted if the foundations are on the same level and on the same soil as those of the permanent structure.

Allow for adequate site drainage or soil protection to prevent soil saturation and washout of the soil supporting the temporary works supports.

If piles are used, the estimation of capacities and later confirmation during construction using standard procedures based on the driving characteristics of the pile is permitted. If preferred, use load tests to confirm the estimated capacities; or, if required by the Engineer conduct load tests to verify bearing capacity values that are marginal or in other high risk situations.

The Engineer reviews and approves the proposed pile and soil bearing capacities.

5.0 REMOVAL

Unless otherwise permitted, remove and keep all temporary works upon completion of the work. Do not disturb or otherwise damage the finished work.

Remove temporary works in conformance with the contract documents. Remove them in such a manner as to permit the structure to uniformly and gradually take the stresses due to its own weight.

6.0 METHOD OF MEASUREMENT

Unless otherwise specified, temporary works will not be directly measured.

7.0 BASIS OF PAYMENT

Payment at the contract unit prices for the various pay items requiring temporary works will be full compensation for the above falsework and formwork.

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MAINTENANCE OF WATER TRAFFIC

(12-5-12)

The Contractor will be required to maintain water traffic in a manner satisfactory to both the Engineer and the U.S. Coast Guard and in conformance with the conditions of the Bridge Permit issued by the U.S. Coast Guard. The Contractor shall provide and maintain navigational lights in conformance with the requirements of the U.S. Coast Guard on both temporary and permanent work and shall carry on all operations in connection with the construction of the project in such a manner as to avoid damage or delay to water traffic.

No direct payment will be made for work under this section. All costs shall be considered incidental to items for which direct payment is made.

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COORDINATION WITH THE U.S. COAST GUARD**(SPECIAL)**

At no time during work will the waterway be closed or narrowed to navigation without prior approval from the U.S. Coast Guard. The contractor is required to maintain close and regular contact with the Coast Guard, Sector North Carolina to keep them informed to activities in the waterway. The U.S. Coast Guard Sector North Carolina contacts are LT Derek Burrill at (910)-772-2230 or BM1 Poden Pedrus at (910) 772-2212 or email ncmarineevents@uscg.mil. The contractor must also contact the 5th Coast Guard District Bridges Branch, Mr. Hal Pitts (757) 398-6222 or email at Hal.R.Pitts@uscg.mil.

The Contractor shall bear full responsibility for all required coordination with the Coast Guard. Advance coordination with the Coast Guard for any anticipated disruptions to waterway traffic shall begin within 30 days following award of Contract and prior to commencing on-site activities. Approval for scheduled waterway disruptions shall be initiated approximately 180 days in advance, and confirmed no less than 30 days but no more than 45 days, in advance of the first disruption.

All work shall be conducted so that free navigation of the waterway is not unreasonably interfered with and the present navigable depths are not impaired. Timely notice of any and all events that affect navigation shall be given to the District Commander during the work on the channel span. The channel shall be promptly cleared of all obstructions placed therein or caused by the contractor.

Navigational lighting shall be maintained in accordance with the requirements set forth by the U.S. Coast Guard.

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WORK IN, OVER OR ADJACENT TO NAVIGABLE WATERS**(12-5-12)**

All work in, over, or adjacent to navigable waters shall be in accordance with the special provisions and conditions contained in the permits obtained by the Department from the U.S. Coast Guard, U.S. Army Corps of Engineers, or other authority having jurisdiction. The work shall have no adverse effect on navigation of the waterway including traffic flow, navigational depths, and horizontal and vertical clearances without approval from the authorities granting the permits.

The Contractor shall prepare drawings necessary to obtain any permits which may be required for his operations which are not included in the Department's permit including but not limited to excavation and dumping, constructing wharves, piers, ramps, and other structures connecting to bank or shore, and drawings for constructing falsework, cofferdams, sheeting, temporary bridges, and any other construction within the waterway. Submittals shall show locations of such work with respect to the navigational opening. The Contractor shall coordinate the submittal of drawings with the Engineer.

All construction shall progress and be maintained in a safe and timely manner. Temporary construction facilities shall be removed completely and promptly upon discontinuation of their useful purpose. Navigational lights, signals, or facilities shall be provided and maintained by the Contractor on temporary or permanent construction or vessels until such facilities are no longer needed as determined by the Engineer or permitting agency.

The Contractor shall immediately notify the appropriate authorities and take corrective measures as needed when any situation occurs that imposes a threat to the public. He shall also immediately correct any acts or occurrences that contradict or violate any requirements in the plans, special provisions, or permits when corrective measures can be performed in a safe manner. The Contractor shall notify the appropriate authorities when such corrective measures cannot be performed in a safe manner.

All costs incurred by the Contractor in complying with the above requirements shall be included in the prices bid for the various pay items and no additional payment will be made.

BRIDGE DECK RIDEABILITY AND GROOVING**(9-30-11)****1.0 GENERAL**

This Special Provision shall govern the testing, diamond grinding, transverse grooving and all other related work associated with obtaining satisfactory rideability and surface texture of the bridge deck surface. Provide a surface finish in accordance with Article 420-14(B) of the Standard Specifications.

2.0 TESTING REQUIREMENTS

Perform acceptance testing of the longitudinal profile of the finished bridge deck in each wheel path of each lane in the presence of the Engineer. It is the Contractor's responsibility to submit a proposed plan of action and schedule for profilograph testing. Use a certified independent provider, approved by the Engineer, to perform the profilograph test.

Prior to profilograph testing, placement of the bridge deck and barrier rail within the section to be tested shall be complete, with the exception of blockouts required for the installation of joints. Do not install joints until the Engineer determines that the rideability requirements herein have been met. Joint locations should be temporarily bridged sufficiently to facilitate operation of the profilograph and corrective equipment across the joint. Remove all obstructions from the bridge deck and sweep the surface clean of debris prior to testing. If automated profilograph equipment is used, there shall be no radio transmissions or other activities that might disrupt the automated profilograph equipment during the testing.

Ensure that the profilograph is in good operating condition per the manufacturer's recommendations. Maintain tires free of debris and buildup during each test run. Operate the profilograph at a maximum speed of 2 miles per hour. If a propulsion vehicle is used, it shall be approved, and the gross vehicle weight shall not exceed 1,000 pounds.

At the beginning and end of each day's testing, and at other times determined to be necessary by the Engineer, operate the profilograph over a calibration strip so the Engineer can verify correct operation of the profilograph. The calibration strip shall be a 100 foot section of pavement that is reasonably level and smooth. Submit each day's calibration graphs with that day's test section graphs to the Engineer. Calibrate the profilograph in accordance with the current NCDOT procedure entitled "Determination of Profile Index". Copies of this procedure may be obtained from the NCDOT Construction Unit.

Plot each profilogram on a continuous graph at a horizontal scale of 25 feet per inch with the vertical scale plotted at a true scale. Station numbers shall be recorded on the profilogram at distances not to exceed 200 feet. Note joint locations on the profilogram.

Take profiles with the recording wheel in each wheel path of each lane. The wheel paths of a lane are considered parallel to and approximately 3.5 feet inside both edges of the travel lane. Take profiles over the entire length of the travel lanes on the bridge deck including approach slabs. Upon completion of testing, submit the profilograms for each wheel path to the Engineer for analysis. The Engineer will retain the profilograms.

The Engineer will determine the Profile Index for each wheel path in accordance with the procedure entitled "Determination of Profile Index".

A test section is defined as a 600 foot length of each travel lane. The maximum allowable Profile Index per lane shall not exceed 25" per mile as determined with a 0.0" blanking band over any 600 foot test section. The Contractor will correct individual deviations in excess of 0.3" over any 25 foot length on the line tested by diamond grinding. Additionally, the entire deck surface shall meet a 0.125" in 10 feet straightedge check made atop the deck either transversely or longitudinally as deemed necessary by the Engineer.

3.0 DIAMOND GRINDING

If the deck does not meet the testing requirements, diamond grinding is required to make corrections. Diamond grind the full width of all lanes and shoulders in the direction of travel.

Diamond grinding shall be performed using a Boart Longyear PC 5000, a Target 3804 or an approved equal. Submit grinding equipment specifications to the Engineer for approval before any grinding is performed. Use a grinding machine capable of removing a minimum of 3 feet of width with each pass. Multiple passes may be needed to achieve the required depth of removal. In addition, hand grinding may be required to remove vertical steps between passes.

The ground surface shall consist of between 50 and 60 grooves per foot of width. The grooves shall be between 0.09" and 0.15" in width and 0.0625" in depth. The area between the grooves shall be between 0.06" and 0.13" in width. The final concrete texture shall be uniform.

Construct and operate the grinding machine such that it will not cause strain or damage to the deck surface, excessive ravels, aggregate fractures, spalls, or disturbance of transverse joints. Longitudinally grind the deck parallel to the roadway centerline.

Continuously remove all slurry or other debris resulting from the grinding operations by vacuum pick-up or other approved methods. Prevent the slurry from flowing into floor drains, onto the ground or into the body of water under the bridge. Dispose of all residues off the project.

In completing all corrective work on the deck surface to satisfy the rideability criteria stated herein, limit grinding such that the final reinforcement cover is not less than the plan cover minus ½ inch. In cases where this cannot be achieved, other corrective work may be required as directed by the Engineer.

Provide additional profilograph testing as necessary following grinding until the rideability requirements above are satisfied.

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4.0 GROOVING BRIDGE FLOORS

After the final concrete surface profile has been accepted by the Engineer, groove the bridge deck in accordance with Article 420-14(B) of the *Standard Specifications*.

Grooving will not be required if the entire bridge deck surface is diamond grinded. Payment for grooving in accordance with Section 420 of the *Standard Specifications* will be made when grooving has been performed, or when diamond grinding of the entire bridge deck surface is performed, either condition being an acceptable, final riding surface.

5.0 BASIS OF PAYMENT

No separate payment will be made for profilograph testing, retesting or corrective action work required to meet the requirements established herein. The cost of the testing procedure, equipment, grinding operation, and removal and disposal of slurry and debris resulting from the grinding operation or demolition is considered incidental to the contract bid price for "Placing and Finishing Latex Modified Concrete Overlay – Early Strength".

LMC OVERLAY SURFACE PREPARATION**(2-11-19)****DESCRIPTION**

This special 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 are also 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 or to the limits shown on the plans.

Hydro-demolition shall consist of the removal of the deck surface by means of high pressure water blasting which will 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.

EQUIPMENT

Use the following surface preparation equipment:

- (A) Scarifying equipment that is a power-operated, mechanical grinder capable of removing a minimum depth of ¼” for each pass.
- (B) Hydro-demolition machine, self-propelled with a minimum orifice pressure of 17,000 psi.
- (C) All water used for hydro-demolition shall be potable.
- (D) Equipment capable of sawing concrete to the specified plan depth.
- (E) 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.
- (F) Power driven hand tools for removal of unsound concrete are required that meet the following requirements:
 - (1) Pneumatic hammers weighing a nominal 35 lb or less.
 - (2) Pneumatic hammer chisel-type bits that do not exceed the diameter of the shaft in width.
- (G) Hand tools such as hammers and chisels for removal of final particles of unsound concrete.
- (H) Self-propelled vacuum capable of picking up water, dust, and other loose material from prepared deck surface.
- (I) Vibratory screed for overlays, except as noted herein.

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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:

- (A) Water pressure.
- (B) Angle and distance of the orifice in relation to the surface to be blasted.
- (C) Limits of transverse and longitudinal movement of the orifice.
- (D) 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.

MANAGEMENT AND DISPOSAL OF CONCRETE GRINDING RESIDUALS

The contractor must collect and properly dispose of water, Hydro-demolition Operation Slurry (HOS), Diamond Grinding Slurry (DGS), and solids from bridge deck preparation, otherwise referred to as Concrete Grinding Residuals (CGR). Prior to beginning work, submit for approval by the Engineer an HOS/DGS Management Plan. Prepare the plan in accordance with the NCDOT Guidelines on the Management and Disposal of CGR available at:

[https://connect.ncdot.gov/resources/Environmental/Environmental Permits and Guidelines/Forms/AllItems.aspx](https://connect.ncdot.gov/resources/Environmental/Environmental%20Permits%20and%20Guidelines/Forms/AllItems.aspx)

The contractor shall comply with applicable regulation concerning such water disposal.

Prior to final payment, the contractor must submit a paper copy of all completed records pertaining to disposal of CGR. All costs associated with Management and Disposal of CGR shall be included in the payment of other items.

OSP PLAN SUBMITTAL

Prior to beginning surface preparation activities, the Contractor shall submit for review and approval the Overlay Surface Preparation (OSP) Plan. The OSP Plan shall detail the type of equipment that is intended to be used and the means by which the Contractor will achieve the following requirements:

- (A) Estimate depth of reinforcing steel.
- (B) Scarification of deck to required depth.
- (C) Field verification that required scarification depth was achieved within limits.
- (D) Hydro-demolition of deck with appropriate profile and to required depth.
- (E) Field verification that the required hydro-demolition depth was achieved within limits.

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 entire surface of the concrete deck to remove concrete to a uniform depth within ½” of the plan overlay thickness, but not less than ½” inch above the top mat of reinforcing steel.

It will be the Contractor’s responsibility to determine 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 should be taken for each span at 1/5 points longitudinally and 1/3 points transversely. This cost for this work will be considered incidental to the cost of hydro-demolition of the bridge deck.

Estimated average cover to top mat:

Bridge #090013 : 2 ½ ” +/-3/8” as shown on the original plans

Please note: the cover is reduced in spans 1 – 6 as shown by the exposure of the top mat of steel.

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 operations, then cease work and consult with the Engineer to determine any necessary adjustments to the scarifying 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 (2) 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 sound concrete from the scarified surface to the depth required to achieve the plan overlay thickness. After completion of this test area, the equipment shall be moved to the second area consisting of deteriorated or defective concrete, to determine whether unsound concrete will be completely removed with the previous calibration and to establish a baseline for requiring the contractor 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 ¼” of sound concrete, then re-test on deteriorated concrete.

If additional defective concrete is found, the depth of cut will increase in ¼” 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 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.

- (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 shown on the plans. In areas where reinforcing steel is exposed and debonded for a length greater than two (2) feet, remove deck to an average depth of ½” below the exposed and debonded reinforcing steel. Reinforcing steel that is exposed and loose shall be tied to the crossing bar(s) as needed to secure the steel. Reinforcing steel shall be considered loose if when struck, movement or vibration can be observed. Concrete below crossing bar shall be removed as necessary to tie reinforcing steel to crossing bar with a wire tie. 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.

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

Any areas of the prepared surface contaminated by oil or other materials detrimental to good bond as a result of the contractor’s operations shall be cleaned at the contractor’s expense.

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 including any ¼” increments added per the above calibration process.

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

- (E) Class II Surface Preparation (Partial Depth): At locations specified on the plans 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 not less than $\frac{3}{4}$ " 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. No additional payment will be made for Class II Surface Preparation depths achieved by the initial hydro-demolition.

All patches shall be removed under Class II Surface Preparation. If any patch cannot be removed by means of hydro-demolition, the Contractor shall use hand tools to remove the patch. Areas indicated on the plans that require Class II Surface Preparation, including the locations of existing patches, are from the best information available. The Contractor 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 ft²/ft. length of bridge without overhang support is permitted unless the Engineer directs otherwise. Overhang support is required for areas removed greater than 0.60 ft²/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 ft² suspending forms from existing reinforcing steel using wire ties is permitted. For larger areas, support forms by blocking from the beam flanges, or other approved method.

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

- (G) 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 through may occur during the hydro-demolition process.

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

(H) 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 one of the methods described below:

- (1) Refill full depth areas with Class AA concrete to the bottom of the proposed concrete overlay in accordance with Section 420 of the *Standard Specifications*. Any of the methods for curing Class AA concrete as stated in the *Standard Specifications* 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 $\frac{1}{16}$ " and a maximum relief of $\frac{1}{4}$ ".

Verify the Class AA concrete has attained a minimum compressive strength of 2,500 psi using an approved, non-destructive test method. Brush a lean mix of the latex modified concrete to the surface and immediately place the overlay course.

- (2) Refill full depth areas with high early strength concrete as described in the Concrete for Deck Repair and Volumetric Mixer special provisions.
- (3) Refilling full depth areas with latex modified concrete during the Class III repair is permitted if any of the following conditions are met:
 - (a) The reinforcing steel cover is $1\frac{1}{2}$ inches or less for the top mat of steel.
 - (b) The area being repaired is less than 1 yd².
 - (c) The Engineer directs the fill.

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

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 contractor'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 or as directed by the Engineer.

- (J) Safety: Provide a containment system for handling expected and unexpected blow through of the deck. The containment system shall retain runoff water and debris and protect the area under the bridge deck. The Contractor shall be responsible for any injury or damage caused by these operations. The containment system shall remain in place until the concrete has been cast and 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.

- (K) Surface Cleaning: 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 Contractor and shall be legally disposed of at the contractor's expense. The contractor 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 contractor.

Any areas modified by chipping or hammering shall be cleaned with high pressure water at 7,500 psi minimum to remove any bond-breaking residue, loose concrete, and any deleterious material. This material shall be collected and disposed of by the contractor.

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

MEASUREMENT AND PAYMENT

Scarifying Bridge Deck will be measured and paid for at the contract unit price per square yard and will be full compensation for the milling of existing asphalt wearing surface from the bridge deck or approaches, milling of the entire concrete bridge deck, repairing or replacing any damaged reinforcing steel, and the cleaning and disposal of all waste material generated.

Hydro-Demolition of Bridge Deck will be measured and paid for at the contract unit price per square yard and will be full compensation for hydro-demolition, removal and disposal of unsound and contaminated concrete, cleaning, repairing or replacing of reinforcing steel, and furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work.

Class II Surface Preparation will be measured and paid for at the contract unit price per square yard and will be full compensation for Class II (partial depth) deck preparation where required

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by the plans and not attained by the initial hydro-demolition of the deck. The cost will also include removal and disposal of unsound and contaminated concrete, removal of all existing patches, cleaning, repairing or replacing of reinforcing steel, and all materials, labor, tools, equipment and incidentals necessary to complete the work.

Class III Surface Preparation will be measured and paid for at the contract unit price per square yard and will be full compensation for Class III (full depth) deck preparation and repair where required by the plans. The cost will also include removal and disposal of unsound and contaminated concrete, cleaning, repairing or replacing of reinforcing steel, under deck containment, placing and finishing concrete for full depth repair, and for furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work.

Reinforcing Steel that is required for the repairs will be in accordance with Section 425 of the *Standard Specifications*.

Payment will be made under:

Pay Item

Scarifying Bridge Deck
 Hydro-Demolition of Bridge Deck
 Class II Surface Preparation
 Class III Surface Preparation

Pay Unit

Square Yard
 Square Yard
 Square Yard
 Square Yard

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LATEX MODIFIED CONCRETE OVERLAY – VERY EARLY STRENGTH (2-11-19)**DESCRIPTION**

This special provision addresses the requirements for furnishing and placing an overlay of latex modified concrete - very early strength (LMC-VES) over existing concrete or repair concrete on bridge decks. Perform this work in accordance with this special provision and the applicable parts of the *Standard Specifications*.

QUALITY CONTROL

The Contractor is responsible for scheduling a pre-construction meeting with the Resident Engineer and the Area Bridge Construction Engineer.

Submit a Quality Control Plan to the Engineer for approval which, at a minimum, describes the methods of: storing materials, calibrating mixers, controlling moisture content in the aggregate, maintaining proper mix temperature, retarder usage, curing and curing time, controlling evaporation rate, cleaning and removing excess water.

Prior to beginning work, provide proof of experience of the person in direct responsible charge by submitting a description of jobs similar in size and character that have been completed within the last five (5) years. The name, address and telephone number of references for the submitted projects shall also be furnished. Failure to provide appropriate documentation will result in the rejection of the proposed LMC-VES overlay Contractor.

Before beginning any work, obtain approval for all equipment to be used for deck preparation, mixing, placing, finishing and curing the LMC-VES.

MATERIALS

For materials, equipment, and proportioning and mixing of modified compositions, see Article 1000-7 of the *Standard Specifications*.

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

The *Standard Specifications* shall be revised as follows:

Table 1000-4 – Revise the following:

Cement Content, 658 lb/cy (min.) change to 658 lb/cy (*max.*)

7 day Compressive Strength, 3,000 psi (min.) change to 3 hr. Compressive Strength, 2,500 psi (min.)

1000-7(A), Line 15 – Replace with the following:

Measure the slump after discharge from the mixer.

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

Submit the LMC-VES mix design, including laboratory compressive strength data for a minimum of six (6) 4-inch by 8-inch cylinders at three (3) hours for very early strength concrete to the Engineer for review. 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.

For projects with multiple bridges using the same mix design, or bridge decks with time constraints that require more than one night for placement, a relationship between the compressive strength and rebound hammer readings may be developed and used to estimate the three hour strength for opening to traffic in lieu of compressive strength testing.

For the correct procedure, reference Document: PL11-LMC Rapid Set Overlays. Contact your local M&T representative for a copy of this document or see the following link: <https://connect.ncdot.gov/resources/Materials/MaterialsResources/Rapid%20Set%20Overlays%20Rebound%20Procedure.pdf>. Seven (7) day concrete compressive strength sampling and testing is required in addition to the use of this method.

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 two (2) hours immediately prior to placing the LMC-VES. After soaking the surface for at least two (2) hours, cover it with a layer of white opaque polyethylene film that is at least 4 mils thick. Immediately prior to placing the LMC-VES, remove standing water from the surface using an approved vacuum system.

PLACING AND FINISHING

Prior to placing LMC-VES, install a bulkhead of easily compressible material at expansion joints to the required grade and profile.

Construction joints other than those shown on the plans will not be permitted unless approved by the Engineer. At construction joints, remove 4” of previously placed LMC-VES prior to placing the adjacent latex concrete. Also, for staged construction, 4” of previously poured LMC-VES 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 as shown in the plans. 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-VES until the burlap is saturated and approved by the Engineer. Drain excess water from the wet burlap before placement.

Place the LMC-VES in one operation. Provide a minimum overlay thickness as shown in the plans.

Once LMC-VES placement begins a single layer of wet burlap shall be placed five (5) feet behind the screed's burlap drag. In the event of a delay of ten (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.

Promptly cover the surface with a second layer of clean, wet burlap as soon as the surface will support it without deformation. Wet cure only the surface for a minimum of three (3) hours and until a compressive strength of 2,500 psi is reached. Curing material shall be continually saturated during the wet cure period using a fogging system approved by the Engineer. The Engineer may require an increase in the minimum cure time when the overlay thickness is greater than 1.5 inches or the ambient temperature remains below 60°F.

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-VES 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-VES deck surface shall not deviate from the line and elevation indicated on the plans 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 indicated on the plans, groove the bridge floor in accordance with Subarticle 420-14(B) of the *Standard Specifications*. Vehicular traffic may travel across a deck surface that has not been grooved; however, the entire deck area shall be grooved after the LMC-VES

achieves design strength and no later than seven (7) days after completion of the overlay unless otherwise approved by the Engineer.

LIMITATIONS OF OPERATIONS

The mixer is not permitted on the bridge deck unless otherwise approved.

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

Do not place LMC-VES 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-VES, the air temperature, wind speed, and the evaporation rate shall be determined by the Contractor and verified by the Engineer. Do not place LMC-VES 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-VES when the temperature of the LMC-VES is below 45°F or above 85°F.

It is the Contractor's responsibility to ensure that the rate of evaporation of surface moisture from the LMC-VES does not exceed 0.05 pounds per square foot per hour until the overlay has achieved the specified compressive strength. The evaporation rate is calculated using the following formula:

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

where,

E = Evaporation Rate,

T_c = Concrete Temp (°F),

r = Relative Humidity (%/100)

T_a = Air Temp (°F),

V = Wind Velocity (mph)

The Contractor shall determine the evaporation rate prior to placement. Additionally, the Contractor shall determine the predicted evaporation rate from the beginning of the placement until the expected time of achieving the required compressive strength. If the calculated evaporation rate during that time exceeds or is predicted to exceed 0.05 pounds per square foot per hour, the Contractor may propose engineered controls of the parameters (temperature, relative humidity, wind velocity) to reduce the evaporation rate. The evaporation rate shall be recalculated, with the appropriate parameters, after the proposed control measures are in place. The recalculated evaporation rate shall be 0.05 pounds per square foot per hour or less, prior to

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placement, and must stay below 0.05 pounds per square foot per hour until the specified compressive strength is achieved.

Stop all placement operations during periods of precipitation. Take adequate precautions to protect freshly placed LMC-VES 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.

MEASUREMENT AND PAYMENT

Latex Modified Concrete Overlay– Very Early Strength will be measured and paid for in cubic yards of LMC-VES satisfactorily placed on the completed deck.

Placing and Finishing Latex Modified Concrete Overlay – Very Early Strength will be paid for at the contract unit price bid per square yard which includes compensation for furnishing all labor, tools, equipment and incidentals necessary to complete the work in accordance with the contract documents.

Grooving Bridge Floors will be measured and paid in accordance with Article 420-21 of the *Standard Specifications*.

Payment will be made under:

Pay Item

Latex Modified Concrete Overlay – Very Early Strength
Placing & Finishing of Latex Modified Concrete Overlay –
Very Early Strength
Grooving Bridge Floors

Pay Unit

Cubic Yard
Square Yard
Square Feet

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CONCRETE FOR DECK REPAIR**(2-11-19)****DESCRIPTION**

This special provision addresses the material requirements of high early strength structural concrete to be used for reconstruction of deck slab and, if necessary, bent diaphragms as noted in the plans.

MATERIALS

Furnish Department approved pre-packaged concrete or bulk concrete materials in a mix proportioned to satisfy provisions for Class AA Concrete detailed in Article 1000-5 of the *Standard Specifications* or as otherwise noted in this special provision. Concrete mix shall meet the following requirements:

Physical Property	Threshold Limitation	Test Method
Compressive Strength (at 3 hrs.)	4,500 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)	5,200 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		ASTM C191
Initial	30 min. (max.)	
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 Article 1000-8 of the *Standard Specifications*.

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Submit pre-packaged concrete mix contents or concrete mix design, including laboratory compressive strength data, for a minimum of six (6) 4-inch diameter by 8-inch cylinders at an age of three (3) hours and six (6) 4-in diameter by 8-inch cylinders at an age of 1 day to the Engineer for review. 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 Article 1000-12 of the *Standard Specifications* and the Volumetric Mixer special provision. 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.

Measurement and Payment

No separate payment will be made for Concrete for Deck Repair. The furnishing and placing of Concrete for Deck Repair shall be incidental to applicable pay items.

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 *Standard Specifications* 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 is visible at all times and furnishes 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 a Department 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 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 Standard Specifications except that the sample secured for acceptance testing will 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

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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 contractor is responsible for providing a Certified Concrete Plant Technician during batching operations, and a Certified Concrete Field Technician during placing operations

MEASUREMENT AND PAYMENT

Volumetric Mixer will be paid for as lump sum and will be full compensation for furnishing the certified MHPVM devices and calibration of the equipment.

Pay Item	Pay Unit
Volumetric Mixer	Lump Sum

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SILANE DECK TREATMENT**(SPECIAL)****DESCRIPTION**

This work consists of preparation of concrete bridge deck surfaces and the furnishing and application of alkylalkoxysilane (silane) penetrant sealers, with 100% solids, to seal bridge deck surfaces and cracks. Prepare the surface of the concrete deck and apply the silane bridge deck sealer in accordance with this special provision and as indicated on the plans, or as approved by the Engineer.

Work includes: bridge deck surface preparation, placement of silane deck sealer, and any incidentals necessary to complete the project, as specified or as indicated on the plans.

SUBMITTALS

Submit for approval the following requested items and any other relevant documents:

- (A) A safety data sheet (SDS) for each shipment of the silane materials.
- (B) Silane material information and manufacturer's written preparation and application instructions.
- (C) Certification from an independent testing laboratory that the materials meet the requirements of these provisions. Do not incorporate these materials into the project until the Engineer has accepted and approved the certification for the material.
- (D) The dates of manufacture of the silane materials, their lot numbers and date of shelf-life expiration for each lot number.
- (E) A table indicating the likely cure time, in minutes, to allow vehicular traffic on the silane-treated deck surface. Provide time for the allowable ambient temperature range, in increments of 10° F.
- (F) A work plan for each structure that includes estimated times for surface preparation and silane application.

MATERIAL DELIVERY AND STORAGE

Store at the site sufficient quantities of silane materials to perform the entire application.

Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact. Ensure that each container is clearly marked by the manufacturer with the following information:

- (A) Manufacturer's name and address.
- (B) Product name.
- (C) Date of manufacture.

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(D) Expiration date.

(E) LOT identification number.

(F) Container serial number.

Provide the Engineer a certification from the manufacturer, confirming that the silane materials meet the requirements of this special provision. Do not incorporate these materials into the project until the Engineer has accepted and approved the certification for the material. Submit such certification for each LOT of material delivered to the project. In each certification, identify the serial or LOT numbers of the containers certified.

The Engineer may require samples from each LOT or container of materials delivered to the project or from containers at the point of use. When samples are required, furnish samples in accordance with the Engineer's instructions.

Store silane materials in unopened containers in a clean, dry area between 40° F and 90° F. Store containers in a manner that prevents leakage or spillage.

MANUFACTURER'S REPRESENTATIVE

Provide a manufacturer's representative on site for the duration of the surface preparation and silane application work, to provide expert assistance on surface preparation, storage, mixing, application, clean-up, and disposal of materials.

MATERIALS

Provide silane from a single manufacturer, and provide silane that conforms to requirements indicated in Table 1, below.

Table 1
SILANE PROPERTIES

Property	Test Method	Requirement
Silane Content		100%
VOC content	EPA method 24	Less than 350 g/l
Surface Appearance after Application		Unchanged
Flash Point	ASTM D3278	140° F, minimum
Resistance to Chloride Ion Penetration	AASHTO T259 and T260	Less than: 0.52 pounds/yd ³ (criteria of 1.5) at 1/2 inch level; 0.00 pounds/yd ³ (criteria of 0.75) at 1 inch level
Water absorption test	ASTM C 642	0.50% maximum/48 hours; 1.5% maximum/50 days
Scaling resistance	ASTM C 672	(non-air-entrained concrete) 0 rating "No Scaling" (100 cycles)

NCHRP 244		
Water weight gain	Series II - cube test	85% reduction, minimum
Absorbed chloride		87% reduction, minimum
Absorbed chloride	Series IV - Southern climate	95% reduction, minimum

SURFACE PREPARATION

Prepare the surface of the concrete deck for application of the silane by shotblasting in order to remove all existing grease, slurry, oils, paint, dirt, striping, curing compound, rust, membrane, weak surface mortar, or any other contaminants that could interfere with the proper adhesion, penetration, and the curing of the silane material.

Prepare a final surface that adheres to the following requirements:

- (A) For areas to receive deck seal treatment, clean by shotblasting. Where approved by the Engineer, abrasive sandblasting may be used in areas that cannot be accessed by the shotblaster. Select the size of shot or sand, and travel speed of the equipment to provide a uniformly clean surface with a uniform profile. Remove striping to the maximum extent determined to be practical by the Engineer using up to three passes with shotblasting, sandblasting, or other approved equipment. Do not expose cleaned surfaces to vehicular traffic unless approved by the Engineer. If the deck becomes contaminated before placing the silane deck sealer, shotblast or abrasive sandblast the contaminated areas to the satisfaction of the Engineer, at no additional cost.
- (B) Prior to silane application, protect cracks on the concrete bridge deck from materials that can interfere with the penetration and the curing of the silane material. Just prior to placement of the silane, remove, by magnets and oil-free compressed air and vacuuming, any loose particles, such that no excess particles remain. The concrete deck shall be completely dry. Power washing will not be allowed.
- (C) The silane manufacturer may suggest cleaning and preparation methods other than those detailed by this special provision. The Engineer must approve such alternative methods prior to implementation.

SILANE APPLICATIONTest Area

- (A) Test a small area of the surface (minimum 5 ft. by 5 ft.) before general application to ensure desired performance results, aesthetics, and application rates and to verify application technique. Allow 5–7 days for the product to react fully before evaluating. Application rates may vary depending on field conditions.

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- (B) Conduct at least one absorption test in the test area, using a Rilem Tube Test. Acceptable results are no loss of water in the Rilem tube over a period of 20 minutes. Adjust application to achieve required repellent performance.
- (C) The manufacturer's representative shall assist the Contractor in determining the application rates. Use test applications on actual surfaces to determine accurate application rates. Extremely porous surfaces may require two coats of silane.
- (D) Do not begin production application of silane until Engineer has approved the test area, including approval of aesthetics, color, texture, and appearance.

Application

Immediately before placing silane, all exposed surfaces shall be completely dry and blown clean with oil-free compressed air to remove any loose dust and debris. Apply silane as soon as practical after the exposed surfaces have been properly prepared and conditions are satisfactory:

- (A) Stir material thoroughly before and during application.
- (B) Apply silane with low-pressure spray or by flooding, followed by brooming or squeegeeing for even distribution, in accordance with manufacturer's instructions.
- (C) Maintain operating pressures in sprayers used for application of the silane sealer material sufficiently low so that atomization or misting of the material does not occur.
- (D) Begin the application of the silane at the lowest elevation and proceed upward, toward higher elevations, unless otherwise approved by the Engineer.
- (E) Apply even distribution of silane. Avoid ponding of silane; take care when applying the silane, so that running or puddling does not occur.
- (F) Apply silane in a single application to the concrete deck surface with enough material to saturate the surface. Remove excess material with a broom or squeegee and dispose of excess material appropriately. If a second coat is required, it should be applied "wet on wet" before first coat dries.
- (G) Application of sealant by spray methods will not be permitted when wind speeds are 20 mph or more, or if in the opinion of the Engineer, unsatisfactory results will be obtained. Other application methods or rescheduling will be required.
- (H) Avoid application with hand pump sprayers. For small areas of silane application, the use of hand pump sprayers must be approved by the Engineer.
- (I) Contractor shall protect from overspray all pedestrians, vehicles, plants and vegetation, and other areas not receiving silane application.
- (J) Allow product to penetrate the bridge deck and dry, as required by the manufacturer, prior to opening to traffic.

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LIMITATIONS OF OPERATIONS

- (A) Prior to application of any silane sealer, cure concrete or concrete repairs for a minimum of 21 days.
- (B) Do not use silane material after the shelf life date.
- (C) Do not return unused material in opened containers to storage for later use. Either apply such material to appropriate areas on concrete deck surfaces or remove and appropriately dispose of it at offsite locations provided by the Contractor.
- (D) If expansion joints are not being replaced or have been replaced prior to shotblasting, they shall be protected from damage from the shotblasting operation. Deck drains and areas of curb or railing above the proposed surface shall be protected from the shotblasting operation.
- (E) Pick up and store all blast media and contaminants in a vacuum unit. Do not create dust during the blasting operation that will obstruct the view of motorists in adjacent roadways. Store, handle, and dispose of blast media and contaminants in accordance with all applicable local, state, and federal requirements.
- (F) Cover deck joint seal and elastomeric material, plug deck drain scuppers, seal cracks on underside of deck, and use other necessary protective measures to prevent leakage of silane below the concrete deck, to protect waterways, bridge components, pedestrians, vehicles, roadway, vegetation, and any other items or areas below or near the bridge.
- (G) Application of sealant by spray methods will not be permitted during windy conditions, if in the opinion of the Engineer, unsatisfactory results will be obtained. Other application methods or rescheduling will be required.
- (H) Avoid application with hand pump sprayers. For small areas of silane application, the use of hand pump sprayers might be allowed, but must be approved by the Engineer.
- (I) Protect traffic from rebound, dust, overspray, and construction activities. Provide appropriate shielding, as required and/or directed by the Engineer.
- (J) The Contractor shall provide suitable coverings (e.g. heavy-duty drop cloths) as needed to protect all exposed areas not to receive silane treatment, such as asphalt pavement, curbs, sidewalks, parapets, etc.
- (K) Clean and/or repair all damage or defacement resulting from Contractor's operations to the Engineer's satisfaction at no additional cost to the Department.
- (L) The equipment used for silane application must be clean of foreign materials and approved by the Engineer before use.
- (M) The surface to receive the treatment shall be dry for at least 48 hours before treatment and shall be free from sand, surface dust and dirt, oil, grease, chemical films, and other contaminants prior to application of the silane.

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- (N) The surface, air, and material temperatures shall be between 40°F and 90°F during application.
- (O) Do not apply silane materials during cold, hot, or wet weather conditions or when adverse weather conditions are forecast within twelve (12) hours of the completion of the silane application. Correct any coating damaged by rain or moisture by an additional application or as required by the silane manufacturer.
- (P) Protect prepared surfaces from precipitation and heavy dew during and after the application of the silane.
- (Q) Conduct the work in a continuous operation, with the silane application as soon as practical following surface preparation.
- (R) Apply silane during the lowest temperature period of the day, typically between 1:00 a.m. and 9:00 a.m., when the cracks are open to the greatest extent.
- (S) Clean up, dispose of any surplus material, and restore any disturbed areas unless otherwise directed.
- (T) 100% Silane is a combustible liquid; take appropriate precautions during handling, storage, and operations. **KEEP AWAY FROM OPEN FLAME.**
- (U) Work crews should wear appropriate personal protection equipment and follow manufacturer's recommendations when applying silane. Refer to the SDS and all applicable local, state, and federal laws, and rules and regulations of authorities having jurisdiction over the project, for specific guidance for personal and environmental protection and safety requirements.

MEASUREMENT AND PAYMENT

Shotblasting Bridge Deck will be measured and paid for at the contract unit price per square yard and will be full compensation for the shotblasting and necessary sandblasting and handwork to prepare the entire concrete bridge deck, and removal and disposal of all waste material generated.

Silane Deck Treatment will be measured and paid for at the contract unit price per square yard and will be full compensation for bridge deck surface and crack preparation; for furnishing and applying the silane deck treatment; for protection of waterways, bridge, and other nearby surfaces, vehicles, and pedestrians; and for all labor, tools, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Shotblasting Bridge Deck	Square Yard
Silane Deck Treatment	Square Yard

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BRIDGE JOINT DEMOLITION**(SPECIAL)****DESCRIPTION**

This special provision addresses the removal of existing joint material and adjacent concrete headers to facilitate the installation of new elastomeric concrete headers and bridge joint seals at the locations noted in the contract plans.

EQUIPMENT

Use the following surface preparation equipment:

- (A) Sawing equipment capable of sawing concrete to a specified depth.
- (B) Power driven hand tools for removal of concrete are required that meet the following requirements:
- (C) Pneumatic hammers weighing a nominal 15 lbs. (7 kg) or less
- (D) Pneumatic hammer chisel-type bits that do not exceed the diameter of the shaft in width.
- (E) 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 is not allowed to 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 headers adjacent to the joint to the limits shown on the contract plans. 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 ft²/ft length of bridge will 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.

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MEASUREMENT AND PAYMENT

Bridge Joint Demolition will be measured and paid for at the contract unit price bid per square foot and will be full compensation for removal, containment and disposal of existing joint material and concrete and shall include the cost of labor, tools, equipment and incidentals necessary to complete the work.

Pay Item

Pay Unit

Bridge Joint Demolition

Square Feet

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Brunswick County

ELASTOMERIC CONCRETE FOR PRESERVATION**(2-11-19)****DESCRIPTION**

Elastomeric concrete is a mixture of a two-part polymer consisting of polyurethane and/or epoxy and kiln-dried aggregate. Provide an elastomeric concrete and binder system that is preapproved. Use the concrete in the blocked-out areas on both sides of the bridge deck joints as indicated on the plans.

MATERIALS

Provide materials that comply with the following minimum requirements at 14 days (or at the end of the specified curing time).

ELASTOMERIC CONCRETE PROPERTIES	TEST METHOD	MINIMUM REQUIREMENT
Compressive Strength, psi	ASTM D695	2000
5% Deflection Resilience	ASTM D695	95
Splitting Tensile Strength, psi	ASTM D3967	625
Bond Strength to Concrete, psi	ASTM C882 (C882M)	450
Durometer Hardness	ASTM D2240	50

BINDER PROPERTIES (without aggregate)	TEST METHOD	MINIMUM REQUIREMENT
Tensile Strength, psi	ASTM D638	1000
Ultimate Elongation	ASTM D638	150%
Tear Resistance, lb/in	ASTM D624	200

In addition to the requirements above, the elastomeric concrete must be resistant to water, chemical, UV and ozone exposure and withstand temperature extremes. Elastomeric concrete systems requiring preheated aggregates are not allowed.

PREQUALIFICATION

Manufacturers of elastomeric concrete materials shall submit samples (including aggregate, primer and binder materials) and a Type 3 certification in accordance with Article 106-3 of the *Standard Specifications* for prequalification to:

North Carolina Department of Transportation

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Materials and Tests Unit
1801 Blue Ridge Road
Raleigh, NC 27607

Prequalification will be determined for the system. Individual components will not be evaluated, nor will individual components of previously evaluated systems be deemed prequalified for use.

The submitted binder (a minimum volume of 1 gallon) and corresponding aggregate samples will be evaluated for compliance with the Materials requirements specified above. Systems satisfying all of the Materials requirements will be prequalified for a one (1) year period. Before the end of this period new product samples shall be resubmitted for prequalification evaluation.

If, at any time, any formulation or component modifications are made to a prequalified system that system will no longer be approved for use.

INSTALLATION

The elastomeric concrete shall not be placed until the reinforced concrete deck slab or overlay has cured for seven (7) full days and reached a minimum strength of 3,000 psi.

Provide a manufacturer's representative at the bridge site during the installation of the elastomeric concrete to ensure that all steps being performed comply with all manufacturer installation requirements including, but not limited to: weather conditions (ambient temperature, relative humidity, precipitation, wind, etc.), concrete deck surface preparation, binder and aggregate mixing, primer application, elastomeric concrete placement, curing conditions and minimum curing time before joint exposure to traffic. Do not place elastomeric concrete if the ambient air or surface temperature is below 45°F.

Prepare the concrete surface within 48 hours prior to placing the elastomeric concrete. Before placing the elastomeric concrete, all concrete surfaces shall be thoroughly cleaned and dry. Sandblast the concrete surface in the block-out and clear the surface of all loose debris. Do not place the elastomeric concrete until the surface preparation is completed and approved.

Prepare and apply a primer, as per manufacturer's recommendations, to all concrete faces to be in contact with elastomeric concrete, and to areas specified by the manufacturer.

Prepare, batch, and place the elastomeric concrete in accordance with the manufacturer's instructions. Place the elastomeric concrete in the areas specified on the plans while the primer is still tacky and within two (2) hours after applying the primer. Trowel the elastomeric concrete to a smooth finish.

The joint opening in the elastomeric concrete shall match the formed opening in the concrete deck prior to sawing the joint.

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FIELD SAMPLING

Provide additional production material to allow freshly mixed elastomeric concrete to be sampled for acceptance. A minimum of six (6) 2-inch cube molds and three (3) 3-inch diameter x 6-inch cylinders will be taken by the Department for each day's production. Compression, splitting tensile, and durometer hardness testing will be performed by the Department to determine acceptance. Materials failing to meet the requirements listed above are subject to removal and replacement at no cost to the Department.

BASIS OF PAYMENT

Elastomeric Concrete for Preservation will be measured and paid for at the contract unit price bid per cubic foot and will be full compensation for material, labor, tools, and equipment necessary for satisfactorily installing the elastomeric concrete in place.

Pay Item	Pay Unit
Elastomeric Concrete for Preservation	Cubic Feet

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FOAM JOINT SEALS FOR PRESERVATION**(SPECIAL)****SEALS**

Use preformed seals compatible with concrete and resistant to abrasion, oxidation, oils, gasoline, salt, and other materials that are spilled on or applied to the surface. Use a resilient, UV stable, preformed, impermeable, flexible, expansion joint seal. The joint seal shall consist of low-density, closed cell, cross-linked polyethylene non-extrudable foam. The joint seal shall contain no EVA (Ethylene Vinyl Acetate). Cell generation shall be achieved by being physically blown using nitrogen. No chemical blowing agents shall be used in the cell generation process.

Use seals manufactured with grooves $1/8'' \pm$ wide by $1/8'' \pm$ deep and spaced between $1/4''$ and $1/2''$ apart along the bond surface running the length of the joint. Use seals with a depth that meets the manufacturer's recommendation, but is not less than 70% of the uncompressed width. Provide a seal designed so that, when compressed, the center portion of the top does not extend upward above the original height of the seal by more than $1/4''$. Provide a seal that has a working range of 30% tension and 60% compression and meets the requirements given below.

TEST	TEST METHOD	REQUIREMENT
Tensile Strength	ASTM D3575, Suffix T	110 – 130 psi
Compression Set	ASTM D1056 Suffix B, 2 hr recovery	10% - 16%
Water Absorption	ASTM D3575	< 0.03 lb/ft ²
Elongation at Break	ASTM D3575	180% - 210%
Tear Resistance	ASTM D624 (D3575, Suffix G)	14 – 20 pli
Density	ASTM D3575, Suffix W, Method A	1.8 – 2.2 lb/ft ³
Toxicity	ISO-10993.5	Pass (not cytotoxic)

Have the top of the joint seal clearly shop marked. Inspect the joint seals upon receipt to ensure that the marks are clearly visible before installation.

BONDING ADHESIVE

Use a two-component, 100% solid, modified epoxy adhesive supplied by the joint seal manufacturer that meets the requirements given below.

TEST	TEST METHOD	REQUIREMENT
Tensile strength	ASTM D638	3,000 psi (min.)
Compressive strength	ASTM D695	7,000 psi (min.)
Hardness	Shore D Scale	75-85 psi
Water Absorption	ASTM D570	0.25% by weight max.

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Elongation to Break	ASTM D638	5% (max.)
Bond Strength	ASTM C882	2,000 psi (min.)

Use an adhesive that is workable to 40°F. When installing in ambient air or surface temperatures below 40°F or for application on moist, difficult to dry concrete surfaces, use an adhesive specified by the manufacturer of the joint seal.

SAWING THE JOINT

The concrete at the face of the joint (elastomeric concrete, polyester polymer concrete, Portland cement concrete, etc.) shall have sufficient time to cure such that no damage can occur to the concrete prior to sawing to the final width and depth as specified in the plans.

When sawing the joint to receive the foam seal, always use a rigid guide to control the saw in the desired direction. To control the saw and to produce a straight line as indicated on the plans, anchor and positively connect a template or a track to the bridge deck. Do not saw the joint by visual means such as a chalk line. Fill the holes used for holding the template or track to the deck with an approved flowable, non-shrink, non-metallic grout.

Saw cut to the desired width and depth in one (1) or two (2) passes of the saw by placing and spacing two (2) metal blades on the saw shaft to the desired width for the joint opening.

The desired depth is the depth of the seal plus ¼” above the top of the seal plus approximately 1” below the bottom of the seal. An irregular bottom of sawed joint is permitted as indicated on the plans. Grind exposed corners on saw cut edges to a ¼” chamfer.

Saw cut a straight joint, centered over the formed opening and to the desired width specified in the plans. Prevent any chipping or damage to the sawed edges of the joint.

Remove any staining or deposited material resulting from sawing with a wet blade to the satisfaction of the Engineer.

PREPARATION OF SAWED JOINT FOR SEAL INSTALLATION

The elastomeric concrete or polyester polymer concrete at the joint shall cure a minimum of 24 hours prior to seal installation. Portland cement concrete at the joint shall cure following the special provisions.

After sawing the joint, the Engineer will thoroughly inspect the sawed joint opening for spalls, popouts, cracks, etc. All necessary repairs will be made by the Contractor prior to blast cleaning and installing the seal, at no cost to the Department.

Clean the joints by sandblasting with clean dry sand immediately before placing the bonding agent. Sandblast the joint opening to provide a firm, clean joint surface free of curing compound, loose material and any foreign matter. Sandblast the joint opening without causing pitting or uneven surfaces. The aggregate in the joint concrete may be exposed after sandblasting.

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After blasting, either brush the surface with clean brushes made of hair, bristle, or fiber, blow the surface with compressed air, or vacuum the surface until all traces of blast products and abrasives are removed from the surface, pockets, and corners.

If nozzle blasting is used to clean the joint opening, use compressed air that does not contain detrimental amounts of water or oil.

Examine the blast-cleaned surface and remove any traces of oil, grease, or smudge deposited in the cleaning operations.

Bond the seal to the blast-cleaned surface on the same day the surface is blast cleaned.

SEAL INSTALLATION

Install the joint seal according to the manufacturer's procedures and recommendations and as recommended below. Do not install the joint seal if the ambient air or surface temperature is below 45°F. Have a manufacturer's certified trained factory representative present during the installation of the first seal of the project.

Before installing the joint seal, check the uninstalled seal length to ensure the seal is the same length as the deck opening. When the joint seal requires splicing, use the heat welding method by placing the joint material ends against a Teflon heating iron of 425-475°F for 7 - 10 seconds, then pressing the ends together tightly. Do not test the welding until the material has completely cooled.

Begin installation by protecting the top edges of the concrete deck adjacent to the vertical walls of the joint as a means to minimize clean up. Stir each epoxy bonding agent component independently, using separate stirring rods for each component to prevent premature curing of the bonding agent. Pour the two (2) components, at the specified mixing ratio, into a clean mixing bucket. Mix the components with a low speed drill (400 rpm max.) until a uniform gray color is achieved without visible marbling. Apply bonding agent to both sides of the joint concrete, as well as both sides of the joint seal, making certain to fill completely the grooves with epoxy. With gloved hands, compress the joint seal and with the help of a blunt probe, push the seal into the joint opening until the seal is recessed approximately ¼" below the surface. When pushing down on the joint seal, apply pressure only in a downward direction. Do not push the joint seal into the joint opening at an angle that would stretch the material. Seals that are stretched during installation shall be removed and rejected. Once work on placing a seal begins, do not stop until it is completed. Clean the excess epoxy from the top of the joint seal immediately with a trowel. Do not use solvents or any cleaners to remove the excess epoxy from the top of the seal. Remove the protective cover at the joint edges and check for any excess epoxy on the surface. Remove excess epoxy with a trowel, the use of solvents or any cleaners will not be allowed.

The installed system shall be watertight and will be monitored until final inspection and approval.

(A) Watertight Integrity Test

- (1) Upon completion of each foam seal expansion joint, perform a water test on the top surface to detect any leakage. Cover the roadway section of the joint from curb to curb, or barrier rail to barrier rail, with water, either ponded or flowing, not less than 1 inch

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above the roadway surface at all points. Block sidewalk sections and secure an unnozzled water hose delivering approximately 1 gallon of water per minute to the inside face of the bridge railing, trained in a downward position about six (6) inches above the sidewalk, such that there is continuous flow of water across the sidewalk and down the curb face of the joint.

- (2) Maintain the ponding or flowing of water on the roadway and continuous flow across sidewalks and curbs for a period of five (5) hours. At the conclusion of the test, the underside of the joint is closely examined for leakage. The foam seal expansion joint is considered watertight if no obvious wetness is visible on the Engineer's finger after touching a number of underdeck areas. Damp concrete that does not impart wetness to the finger is not considered a sign of leakage.
- (3) If the joint system leaks, locate the place(s) of leakage and take any repair measures necessary to stop the leakage at no additional cost to the Department. Use repair measures recommended by the manufacturer and approved by the Engineer prior to beginning corrective work.
- (4) If measures to eliminate leakage are taken, perform a subsequent water integrity test subject to the same conditions as the original test. Subsequent tests carry the same responsibility as the original test and are performed at no additional cost to the Department.

Do not place pavement markings on top of foam joint seals.

BASIS OF PAYMENT

Foam Joint Seals for Preservation will be measured and paid for at the contract unit price bid per linear foot and will be full compensation for furnishing all material, labor, tools, and equipment necessary for installing these seals in place and accepted.

Pay Item

Foam Joint Seals for Preservation

Pay Unit

Linear Feet

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REPAIRS TO PRESTRESSED CONCRETE GIRDERS**(SPECIAL)****DESCRIPTION**

Work includes removal of concrete in spalled and/ or delaminated areas of the existing prestressed concrete girders, in reasonably close conformity with the lines, depth, and details shown on the plans, described herein, and as established by the Engineer. This work also includes straightening, cleaning, and replacement of reinforcing steel; application of HRCSA corrosion penetrant; doweling/ adhesively anchoring new reinforcing steel or studs; removing all loose materials; removing and disposing of debris; formwork; applying repair material; and protecting adjacent areas of the bridge and environment from work operations. The repair material shall be one of the materials described below, unless otherwise noted in the plans or provisions.

The location and extent of repairs shown on the plans are general in nature. The Engineer shall determine the extent of removal in the field based on an evaluation of the condition of the exposed surfaces.

The Contractor shall coordinate removal operations with the Engineer. No more than 30% of the bearing area under a beam shall be removed without a temporary support system and approval from the Engineer.

Any portion of the structure that is damaged from construction operations shall be repaired to the Engineer's satisfaction, at no extra cost to the Department.

SUBMITTALS

Submit all of the following to the Engineer for review and approval before scheduling the pre-construction meeting. Allow 40 calendar days for review and approval, or acceptance, of working drawings, from the date they are received, until they are returned by the Engineer.

- (A) HRCSA (High Ratio Co-Polymerized Calcium Sulfonate) Penetrant
- (B) Polymer Modified Concrete Repair Material
- (C) Epoxy Mortar Repair Material
- (D) Temporary Work Platform

GENERAL SURFACE PREPARATION

Prior to starting the repair operation, confirm and delineate all surfaces and areas assumed to be deteriorated by visually examining and sounding the concrete surface with a hammer (14 ounce or larger) or other approved method. The Engineer is the sole judge in determining the limits of deterioration.

Remove surface concrete to verify that ½" sawcut depth will not damage existing reinforcing steel or prestressing strand. If confirmed, introduce a shallow saw cut a minimum ½" in depth around the repair area, at right angles to the concrete surface. Within the limits of the sawcut, remove all concrete to a minimum depth of ½". Remove all unsound concrete in the repair area, and where the bond between existing concrete and reinforcing steel has been

compromised, or where more than half of the diameter of the reinforcing steel is exposed, remove concrete 1 inch behind the reinforcing steel. For concrete removal, use a 17-pound (maximum) pneumatic hammer with points that do not exceed the width of the shank or use hand picks or chisels as directed by the Engineer. Do not cut or remove the existing reinforcing steel. Unless specifically directed by the Engineer, do not remove concrete deeper than 1 inch below the reinforcing steel. Prevent cutting, stretching, or damaging of reinforcing steel.

Remove concrete and prepare concrete substrate such that placement of repair material in forms will adequately fill the repair area and will not result in air pockets or honeycombed area. Inside faces should generally be normal to the exterior face, except that the top should slope up toward the front of the form at an approximate 1-to-3 slope. Provide air vents as necessary. Interior corners should be rounded to a radius of approximately one inch.

As necessary, remove grease, wax, salt, oil, and other contaminants by scrubbing with an industrial grade detergent or degreasing compound followed by a mechanical cleaning. Remove dirt, dust, laitance, and curing compounds by gritblasting, sanding, or etching with 15% hydrochloric acid. Acid etch only if approved by the Engineer. Follow acid etching by scrubbing and flushing with copious amounts of clean water. Check the cleaning using moist pH paper. Water cleaning is complete when the paper reads 10 or higher.

Abrasive blast all exposed concrete surfaces and existing reinforcing steel and strand in the repair area to clean the area and remove all loose materials. Use a wire brush or other hand tools to clean all exposed reinforcing steel and strand not sufficiently cleaned by blasting operations.

After blast cleaning, examine the reinforcing steel and prestressing strand. If there is more than 10% reduction in the diameter of reinforcing steel, splice in and securely tie supplemental reinforcing bars within the original concrete cover. Lap the bars sufficiently to develop the full strength of the bar and, if necessary, provide additional removal of concrete to achieve the required splice length. Reinforcing steel that is required for the repairs shall be in accordance with Section 425 of the Standard Specifications.

At beam ends where the end of prestressing strand might be free and not anchored in concrete, cut and remove prestressing strand back to even with the prepared concrete substrate. If the length of free, unanchored prestressing strand exceeds 12", or if more than one column of prestressing strand is exposed, notify the Engineer immediately.

If four or more prestressing strands have 50% or greater section loss from their original diameter, notify the Engineer immediately.

Follow all cleaning, remove all remaining dust and loose material with air blast or vacuum cleaning.

Apply HRCSA penetrant to the prepared reinforcing steel and prestressing strand. Do not apply excessive amount of HRCSA Penetrant; HRCSA shall not extend onto surrounding concrete by more than 1/4". HRCSA (High Ratio Co-Polymerized Calcium Sulfonate) Penetrant shall be Zero VOC, 100% Solids Penetrant/Sealer (Minimum 15% active sulfonate, a total base number of 135 to 165, must maintain a 9-11 to 1 ratio Active Sulfonate to Total

Base Number as determined by Total Base Number Determination testing, Procedure No. 817/4.9/T1401). Allow HRCSA penetrant to dry before placing concrete repair material. Drying time is temperature, humidity, and film thickness dependent. Use manufacturer's recommended drying schedule to estimate the drying time of the penetrating sealer for application of the concrete repair material. If the manufacturer's recommendations allow, the use of forced air pressure to dry the surface will be permitted.

In repair areas that exceed one square foot (1.0 ft²) install adhesively anchored ¼" diameter stainless steel studs in concrete on a 6" x 6" grid. Depth of embedment of adhesively anchored studs shall be 2". Install studs such that concrete cover on the studs is a minimum one inch (1").

REPAIR MATERIAL OPTIONS

Polymer Modified Concrete Repair Material

Repair material shall be polymer modified cement mortar/grout for vertical or overhead applications and shall be suitable for applications in marine environments. Material shall be approved for use by NCDOT. Submit repair material to the Engineer for review and approval prior to beginning the work. Color of repair material shall be concrete gray.

Prior to the application of polymer modified cement mortar/grout, prepare concrete substrate as indicated in "General Surface Preparation," above. Final preparation of the substrate concrete surface prior to repair material application shall be in accordance with the repair material manufacturer's recommendations.

When surface preparation is completed, mix and apply repair mortar in accordance with manufacturer's recommendations. Use aggregate that is washed, kiln-dried, and bagged. Aggregate size for repair material shall not exceed 2/3 the minimum depth of the repair area. As recommended by the repair material manufacturer, apply bonding agent to all repair areas immediately prior to placing repair mortar. Repair areas shall be formed, unless otherwise approved by the Engineer. Form areas to establish the original neat lines of the member being repaired, unless otherwise approved by the Engineer.

Unless otherwise allowed by the repair material recommendations, forms shall remain in place until repair material achieves 75% of its design compressive strength.

After placing the repair mortar and form removal, remove excessive material and provide a smooth, flush surface.

Epoxy Mortar Repair Material

Use a two-component paste epoxy bonding agent for the epoxy mortar conforming to the requirements for Type 2 epoxies as outlined in Section 1081 of the NCDOT *Standard Specifications for Roads and Structures*, January 2018 and Type III epoxies as outlined in ASTM C881.

Prior to the application of epoxy mortar/grout, prepare concrete substrate as indicated in “General Surface Preparation,” above. Final preparation of the substrate concrete surface prior to repair material application shall be in accordance with the repair material manufacturer’s recommendations.

When surface preparation is completed, mix and apply repair epoxy mortar in accordance with manufacturer’s recommendations. Use aggregate that is washed, kiln-dried, and bagged. Aggregate size for repair material shall not exceed 2/3 the minimum depth of the repair area. Repair areas shall be formed, unless otherwise approved by the Engineer. Form areas to establish the original neat lines of the member being repaired, unless otherwise approved by the Engineer.

Unless otherwise allowed by the repair material recommendations, forms shall remain in place until repair material achieves 75% of its design compressive strength.

After placing the repair mortar and form removal, remove excessive material and provide a smooth, flush surface.

TEMPORARY WORK PLATFORM

Prior to beginning any repair work, provide details for a sufficiently sized temporary work platform at each repair location. Design steel members to meet the requirements of the American Institute of Steel Construction Manual. Design timber members in accordance with the “National Design Specification for Stress-Grade Lumber and Its Fastenings” of the National Forest Products Association. Submit the platform design and plans for review and approval. The design and plans shall be sealed and signed by a North Carolina registered Professional Engineer. Do not install the platform until the design and plans are approved. Drilling holes in the superstructure for the purpose of attaching the platform is prohibited. Upon completion of work, remove all anchorages in the substructure and repair the substructure at no additional cost to the Department.

MEASUREMENT AND PAYMENT

Repairs to Prestressed Concrete Girders will be measured and paid for at the contract unit price bid per cubic foot and will be full compensation for removal, containment and disposal off-site of unsound concrete, including the cost of materials, reinforcing steel, labor, tools, equipment and incidentals necessary to complete the repair work. Depth will be measured from the original outside concrete face. The Contractor and Engineer will measure quantities after removal of unsound concrete and before application of repair material. Payment will also include the cost of sandblasting, surface cleaning and preparation, cleaning of reinforcing steel, placement of new reinforcing steel, furnishing and application of HRCSA penetrant, furnishing and installation of temporary work platform, testing of the soundness of the exposed concrete surface, furnishing and installation of repair mortar/grout material, curing and sampling of mortar/grout, and protection/cleaning of adjacent areas from splatter or leakage.

Payment will be made under:

15BPR.24

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Brunswick County

Pay Item

Pay Unit

Repairs to Prestressed Concrete Girders

Cubic Feet

15BPR.24

BP-61

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EPOXY RESIN INJECTION**(2-11-19)****GENERAL**

For repairing cracks, an applicator certified by the manufacturer of epoxy injection system to be used is required to perform the epoxy resin injection. The Contractor shall submit documentation that indicates the firm, supervisor and the workmen have completed an instruction program in the methods of restoring concrete structures utilizing the epoxy injection process and have five (5) years of relative experience with a record of satisfactory performance on similar projects.

The Contractor furnishes all materials, tools, equipment, appliances, labor and supervision required when repairing cracks with the injection of an epoxy resin adhesive.

SCOPE OF WORK

Using Epoxy Resin Injection, repair all cracks 5 mils (125 μ m) wide or greater in bent columns, struts, piles and caps, girders, and in the cantilevered portion of the superstructure deck.

Repair the column cracks to the top of the footings. Make the underwater repairs when water surface elevation is low and the water is still. For underwater repairs, use manufacturer recommended materials.

Repair any crack, void, honeycomb or spall area unsuitable for repair by injection with epoxy mortar.

COOPERATION

Cooperate and coordinate with the Technical Representative of the epoxy resin manufacturer for satisfactory performance of the work.

Have the Technical Representative present when the job begins and until the Engineer is assured that his service is no longer needed.

The expense of having this representative on the job is the Contractor's responsibility and no direct payment will be made for this expense.

TESTING

The North Carolina Department of Transportation Materials and Tests Unit will obtain cores from the repaired concrete for testing. If the failure plane is located at the repaired crack, a minimum compressive strength of 3,000 psi is required of these cores.

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MATERIAL PROPERTIES

Provide a two-component structural epoxy adhesive for injection into cracks or other voids. Provide modified epoxy resin (Component "A") that conforms to the following requirements:

	Test Method	Specification Requirements
Viscosity @ 40 ± 3°F, cps	Brookfield RVT Spindle No. 4 @ 20 rpm	6,000 – 8,000
Viscosity @ 77 ± 3°F, cps	Brookfield RVT Spindle No. 2 @ 20 rpm	400 - 700
Epoxide Equivalent Weight	ASTM D1652	152 - 168
Ash Content, %	ASTM D482	1 max.

Provide the amine curing agent (Component "B") used with the epoxy resin that meets the following requirements:

	Test Method	Specification Requirements
Viscosity @ 40 ± 3°F, cps	Brookfield RVT Spindle No. 2 @ 20 rpm	700 - 1400
Viscosity @ 77 ± 3°F, cps	Brookfield RVT Spindle No. 2 @ 20 rpm	105 - 240
Amine Value, mg KOH/g	ASTM D664*	490 - 560
Ash Content, %	ASTM D482	1 max.
* Method modified to use perchloric acid in acetic acid.		

Certify that the Uncured Adhesive, when mixed in the mix ratio that the material supplier specifies, has the following properties:

Pot Life (60 gram mass)

@ 77 ± 3°F - 15 minutes minimum

@ 100 ± 3°F - 5 minutes minimum

Certify that the Adhesive, when cured for seven (7) days at 77 ± 3°F unless otherwise specified, has the following properties:

	Test Method	Specification Requirements
Ultimate Tensile Strength	ASTM D638	7,000 psi (min.)
Tensile Elongation at Break	ASTM D638	4% max.
Flexural Strength	ASTM D790	10,000 psi (min.)
Flexural Modulus	ASTM D790	3.5 x 10 ⁵ psi
Compressive Yield Strength	ASTM D695	11,000 psi (min.)
Compressive Modulus	ASTM D695	2.0 - 3.5 x 10 ⁵ psi
Heat Deflection Temperature	ASTM D648*	125°F min.

Cured 28 days @ 77 ± 3°F		135°F min.
Slant Shear Strength, 5,000 psi (34.5 MPa) compressive strength concrete	AASHTO T237	
Cured 3 days @ 40°F wet concrete		3,500 psi (min.)
Cured 7 days @ 40°F wet concrete		4,000 psi (min.)
Cured 1 day @ 77°F dry concrete		5,000 psi (min.)
* Cure test specimens so the peak exothermic temperature does not exceed 77°F.		

Use an epoxy bonding agent, as specified for epoxy mortar, as the surface seal (used to confine the epoxy resin during injection).

EQUIPMENT FOR INJECTION

Use portable positive displacement type pumps with interlock to provide positive ratio control of exact proportions of the two (2) components at the nozzle to meter and mix the two (2) injection adhesive components and inject the mixed adhesive into the crack. Use electric or air powered pumps that provide in-line metering and mixing.

Use injection equipment with automatic pressure control capable of discharging the mixed adhesive at any pre-set pressure up to 200 ± 5 psi and equipped with a manual pressure control override.

Use equipment capable of maintaining the volume ratio for the injection adhesive as prescribed by the manufacturer. A tolerance of ± 5% by volume at any discharge pressure up to 200 psi is permitted.

Provide injection equipment with sensors on both the Component A and B reservoirs that automatically stop the machine when only one component is being pumped to the mixing head.

PREPARATION

Follow these steps prior to injecting the epoxy resin:

- (A) Remove all dirt, dust, grease, oil, efflorescence and other foreign matter detrimental to the bond of the epoxy injection surface seal system from the surfaces adjacent to the cracks or other areas of application. Acids and corrosives are not permitted.
- (B) Provide entry ports along the crack at intervals not less than the thickness of the concrete at that location, unless otherwise directed by the Engineer.

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- (C) Apply surface seal material to the face of the crack between the entry ports. For through cracks, apply surface seal to both faces.
- (D) Allow enough time for the surface seal material to gain adequate strength before proceeding with the injection.

EPOXY INJECTION

Before epoxy adhesive injection occurs, the Contractor shall test discharge one pint of epoxy to calibrate the equipment and to demonstrate that the workmen and equipment are working properly.

Begin epoxy adhesive injection in vertical cracks at the lower entry port and continue until the epoxy adhesive appears at the next higher entry port adjacent to the entry port being pumped.

Begin epoxy adhesive injection in horizontal cracks at one end of the crack and continue as long as the injection equipment meter indicates adhesive is being dispensed or until adhesive shows at the next entry port.

When epoxy adhesive appears at the next adjacent port, stop the current injection and transfer the epoxy injection to the next adjacent port where epoxy adhesive appeared.

Perform epoxy adhesive injection continuously until cracks are completely filled. Any stoppage of injection for more than 15 minutes shall result in the injection equipment being cleaned, at no additional cost to the Department, before resuming injection.

If port to port travel of epoxy adhesive is not indicated, immediately stop the work and notify the Engineer.

FINISHING

When cracks are completely filled, allow the epoxy adhesive to cure for sufficient time to allow the removal of the surface seal without any draining or runback of epoxy material from the cracks.

Drill 4" diameter cored holes of the cured epoxy to the full depth of the crack to verify the cracks has been completely filled with epoxy. Three (3) cored holes are required for every 100 linear feet of crack to be injected, or as directed by the Engineer. The cored holes will be filled with Type 3 grout in accordance with Section 1003 of the *Standard Specifications*.

Remove the surface seal material and injection adhesive runs or spills from concrete surfaces.

Finish the face of the crack flush to the adjacent concrete, removing any indentations or protrusions caused by the placement of entry ports.

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BASIS OF PAYMENT

Epoxy Resin Injection will be paid at the contract unit price per linear foot. Such payment will be full compensation for all materials, tools, equipment, labor, and for all incidentals necessary to complete the work.

Pay Item

Pay Unit

Epoxy Resin Injection

Linear Foot

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SHOTCRETE REPAIRS**(SPECIAL)****GENERAL**

The work covered by this special provision consists of removing deteriorated concrete from the structure in accordance with the limits, depth and details shown on the plans, described herein and as established by the Engineer. This work also includes removing and disposing all loose debris, cleaning, and repairing reinforcing steel and applying structural shotcrete.

The location and extent of repairs shown on the plans are general in nature. The Engineer shall determine the extent of removal in the field based on an evaluation of the condition of the exposed surfaces.

Any portion of the structure that is damaged from construction operations shall be repaired to the Engineer's satisfaction, at no extra cost to the Department.

MATERIAL REQUIREMENTS

Use prepackaged dry mix shotcrete conforming to the requirements of ASTM C1480, the applicable sections of the *Standard Specifications* and the following:

Test Description	Test Method	Age (Days)	Specified Requirements
Silica Fume (%)	ASTM C1240	-	10 (Max.)
Air Content - As Shot (%)	ASTM C231 or ASTM C457	-	5 ± 2
Minimum Compressive Strength (psi)	ASTM C109	7 28	3,000 5,000
Minimum Bond Pull-off Strength (psi)	ASTM C1583 or ASTM C882	28	250
Rapid Chloride Permeability Tests (range in coulombs)	ASTM C1202	-	100 - 1000

Admixtures are not allowed unless approved by the Engineer. Store shotcrete in an environment where temperatures remain above 40°F and less than 95°F

All equipment must operate in accordance with the manufacturer's specifications and material must be placed within the recommended time.

QUALITY CONTROL**(A) Qualification of Shotcrete Contractor**

The shotcrete Contractor shall provide proof of experience by submitting a description of jobs similar in size and character that have been completed within the last five (5) years. The name,

address and telephone number of references for the submitted projects shall also be furnished. Failure to provide appropriate documentation will result in the rejection of the proposed shotcrete contractor.

(B) Qualification of Nozzleman

The shotcrete Contractor's nozzleman shall be certified by the American Concrete Institute (ACI). Submit proof of certification to the Engineer prior to beginning repair work. The nozzleman shall maintain certification at all times while work is being performed for the Department. Failure to provide and maintain certification will result in the rejection of the proposed nozzleman.

TEMPORARY WORK PLATFORM

Prior to beginning any repair work, provide details for a sufficiently sized temporary work platform at each repair location. Design steel members to meet the requirements of the American Institute of Steel Construction Manual. Design timber members in accordance with the *National Design Specification for Stress-Grade Lumber and Its Fastenings* of the National Forest Products Association. Submit the platform design and plans for review and approval. The design and plans shall be sealed and signed by a North Carolina registered Professional Engineer. Do not install the platform until the design and plans are approved. Drilling holes in the superstructure for the purpose of attaching the platform is prohibited. Upon completion of work, remove all anchorages in the substructure and repair the substructure at no additional cost to the Department.

SURFACE PREPARATION

Prior to starting the repair operation, delineate all surfaces and areas assumed to be deteriorated by visually examining and sounding the concrete surface with a hammer or other approved method. The Engineer is the sole judge in determining the limits of deterioration.

Prior to removal, introduce a shallow saw cut approximately 1/2" in depth around the repair area at right angles to the concrete surface. Remove all deteriorated concrete 1 inch below the reinforcing steel with a 17 lb (maximum) pneumatic hammer with points that do not exceed the width of the shank or with hand picks or chisels as directed by the Engineer. Do not cut or remove the existing reinforcing steel. Unless specifically directed by the Engineer, do not remove concrete deeper than 1 inch below the reinforcing steel.

Abrasive blast all exposed concrete surfaces and existing reinforcing steel in repair areas to remove all debris, loose concrete, loose mortar, rust, scale, etc. After sandblasting examine the reinforcing steel to ensure at least 90% of the original diameter remains. If there is more than 10% reduction in the rebar diameter, splice in and securely tie supplemental reinforcing bars as directed by the Engineer.

Provide stainless welded wire fabric at each repair area larger than one square foot if the depth of the repair exceeds 2 inches from the existing, intact exterior face of the concrete member. Provide a minimum 4" x 4" - 12 gage stainless welded wire fabric unless otherwise shown on the plans. Rigidly secure the welded wire fabric to existing steel or to 3/16" diameter stainless hook fasteners

adequately spaced to prevent sagging. Encase the welded wire fabric in shotcrete a minimum depth of 1½ inches.

With the exception of overhead applications, the contractor has the option to use synthetic fiber reinforcement as an alternate to welded wire fabric if attaching welded wire fabric is impractical or if approved by the Engineer. Welded wire fabric and synthetic fiber reinforcement shall not be used in the same repair area.

Thoroughly clean the repair area of all dirt, grease, oil or foreign matter, and remove all loose or weakened material before applying shotcrete. Saturate the repair area with clean water the day before applying shotcrete. Bring the wetted surface to a saturated surface dry (SSD) condition prior to applying shotcrete and maintain this condition until the application begins. Use a blowpipe to facilitate removal of free surface water. Only oil-free compressed air is to be used in the blowpipe.

The time between removal of deteriorated concrete and applying shotcrete shall not exceed five (5) calendar days. If the time allowance exceeds (5) calendar days, prepare the surface at the direction of the Engineer before applying shotcrete.

APPLICATION AND SURFACE FINISH

Apply shotcrete only when the surface temperature of the repair area is greater than 40°F and less than 95°F. Do not apply shotcrete to frosted surfaces. Maintain shotcrete at a minimum temperature of 40°F for three (3) calendar days after placement.

Apply shotcrete in layers. The properties of the applied shotcrete determine the proper thickness of each layer or lift.

The nozzleman should hold the nozzle three (3) to four (4) feet from the surface being covered in a position that ensures the shotcrete strikes at right angles to the surface being covered without excessive impact. The nozzleman shall maintain the water amount at a practicable minimum, so the mix properly adheres to the repair area. Water content should not become high enough to cause the mix to sag or fall from vertical or inclined surfaces, or to separate in horizontal layers.

Use shooting wires or guide strips that do not entrap rebound sand. Use guide wires to provide a positive means of checking the total thickness of the shotcrete applied. Remove the guide wires prior to the final finish coat.

To avoid leaving sand pockets in the shotcrete, blow or rake off sand that rebounds and does not fall clear of the work, or which collects in pockets in the work. Do not reuse rebound material in the work.

If a work stoppage longer than two (2) hours takes place on any shotcrete layer prior to the time it has been built up to required thickness, saturate the area with clean water and use a blowpipe as outlined previously, prior to continuing with the remaining shotcrete course. Do not apply shotcrete to a dry surface.

Finish all repaired areas, including chamfered edges, as close as practicable to their original dimensions and configuration, unless otherwise required to provide a minimum 2" of cover for reinforcing steel exposed during repair. If necessary to extend shotcrete repair material beyond the original member dimensions and geometry, coordinate with the Engineer to determine methods, geometry, and dimensions of the final finished surface to provide a minimum 2" of cover on reinforcing steel. Slightly build up and trim shotcrete to the final surface by cutting with the leading edge of a sharp trowel. Use a rubber float to correct any imperfections. Limit work on the finished surface to correcting imperfections caused by trowel cutting.

Immediately after bringing shotcrete surfaces to final thickness, thoroughly check for sags, bridging, and other deficiencies. Repair any imperfections at the direction of the Engineer.

Cure the completed shotcrete surface in accordance with Article 420-15(B) Water Method, of the *Standard Specifications* for seven (7) calendar days. If the water method is impracticable or if approved by the Engineer, a membrane curing compound may be used in accordance with Subarticle 420-15(C) at double the manufacturer's recommended coverage rate.

MATERIAL TESTING & ACCEPTANCE

Each day shotcreting takes place, the nozzleman shall shoot one 18" x 18" x 3.5" test panel in the same position as the repair work that is being done to demonstrate the shotcrete is being applied properly. Store, handle and cure the test panel in the same manner as the repaired substructure and do not disturb for the first 24 hours after shotcreting.

Approximately 72 hours after completing the final shotcrete placement, thoroughly test the surface with a hammer. At this time, the repair area should have sufficient strength for all sound sections to ring sharply. Remove and replace any unsound portions prior to the final inspection of the work. No additional compensation will be provided for removal and replacement of unsound shotcrete.

In accordance with Subarticle 1002-3(H) of the *Standard Specifications*, core three (3) 3" diameter samples from each test panel. Compressive strength values on test panels shall equal or exceed the required 28-day strength requirements. Should failures occur on the test panel cores, acceptance of the material will be determined by tests on cores from the installed work on the structure. A minimum of (3) three cores shall be taken from the area in question of the structure. The average compressive strength of the cores taken from the structure shall equal or exceed the specified strength of the shotcrete applied, and no single core shall have strength less than 85% of the specified value. Any cores taken from the structure shall penetrate into the existing concrete at least two (2) inches. Cores shall also be inspected for delamination, sand pockets, segregation, and voids.

The adequacy of the bond between the existing concrete and the shotcrete shall be determined by direct tension bond testing, in accordance with ASTM C1583 or ASTM C882, as directed by the Engineer. A minimum bond strength of 250 psi will be accepted as satisfactory. Bond failure less than 250 psi attributable to the failure of existing concrete will not be cause for rejection. The cost of up to three passing direct tension bond tests shall be the responsibility of the Contractor; additional passing pull-off tests will be the responsibility of the Department.

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Any repair work failing to meet the requirements of this provision will be rejected and the Contractor shall implement a remediation plan to correct the deficiency at no additional cost to the Department. No extra payment will be provided for drilling extra cores. Patch all core holes in the repaired structure to the satisfaction of the Engineer.

MEASUREMENT AND PAYMENT

Shotcrete Repairs will be measured and paid for at the contract unit price bid per cubic foot and will be full compensation for removal, containment and disposal off-site of unsound concrete including the cost of materials, labor, tools, equipment and incidentals necessary to complete the repair work. Depth will be measured from the original outside concrete face. If modifications to the dimensions and geometry are approved by the Engineer to achieve proper clearance over reinforcing steel, depth measurements will be made from the modified final outside face. The Contractor and Engineer will measure quantities after removal of unsound concrete and before application of repair material. Payment will also include the cost of sandblasting, surface cleaning and preparation, cleaning of reinforcing steel, placement of new steel, cost of temporary work platform, testing for soundness and bond strength, curing of shotcrete and taking core samples from the test panels and the structure.

Payment will be made under:

Pay Item	Pay Unit
Shotcrete Repairs	Cubic Feet

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CONCRETE REPAIRS**(2-11-19)****DESCRIPTION**

Work includes removal of concrete in spalled, delaminated and/or cracked areas of the existing bent caps, bent columns, underside of bridge decks, deck slabs, girders, and bridge rails in reasonably close conformity with the lines, depth, and details shown on the plans, described herein and as established by the Engineer. This work also includes straightening, cleaning, and replacement of reinforcing steel, doweling new reinforcing steel, removing all loose materials, removing and disposing of debris, formwork, applying repair material, and protecting adjacent areas of the bridge and environment from material leakage. The repair material shall be one of the materials described in this Special Provision, unless otherwise noted in the plans or special provisions.

The location and extent of repairs shown on the plans described herein are general in nature. The Engineer shall determine the extent of removal in the field based on an evaluation of the condition of the exposed surfaces. The Contractor shall coordinate removal operations with the Engineer. No more than 30% of a round or square column or 30% of the bearing area under a beam shall be removed without a temporary support system and approval from the Engineer.

Repair, to the Engineer's satisfaction, any portion of the structure that is damaged from construction operations. No extra payment is provided for these repairs.

SURFACE PREPARATION

Adhere to the following surface preparation requirements or the repair material manufacturer's requirements, whichever is more stringent.

Prior to starting the repair operation, delineate all surfaces and areas assumed to be deteriorated by visually examining and sounding the concrete surface with a hammer or other approved method. The Engineer is the sole judge in determining the limits of deterioration.

Prior to concrete removal, introduce a shallow saw cut, ½" in depth, around the repair area at right angles to the concrete surface. Sawcut should be located a minimum 2" beyond the perimeter of the deteriorated concrete area to be repaired. Remove all concrete within the sawcut to a minimum depth of ½". If concrete removal exposes reinforcing steel, remove all deteriorated concrete 1" below the reinforcing steel with a 17 lb (maximum) pneumatic hammer, with points that do not exceed the width of the shank, or with hand picks or chisels, as directed by the Engineer. Do not cut or remove the existing reinforcing steel. Unless specifically directed by the Engineer, do not remove concrete deeper than 1" below the reinforcing steel.

Abrasive blast all exposed concrete surfaces and existing reinforcing steel in repair areas to remove all debris, loose concrete, loose mortar, rust, scale, etc. After blasting, examine the reinforcing steel to ensure at least 90% of the original diameter remains. If there is more than 10% reduction in the rebar diameter, splice in and securely tie supplemental reinforcing bars as directed by the Engineer. This might require additional removal of concrete, in order to achieve an appropriate splice length of the reinforcing steel.

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Thoroughly clean the repair area of all dirt, grease, oil, or foreign matter, and remove all loose or weakened material by abrasive blasting before applying concrete repair material. Acid etch with 15% hydrochloric acid, only if approved by the Engineer. Follow acid etching by scrubbing and flushing with copious amounts of clean water. Check the cleaning using moist pH paper. Water cleaning is complete when the paper reads ten (10) or higher.

Follow all abrasive blasting with vacuum cleaning.

The time between removal of deteriorated concrete and applying concrete repair material shall not exceed 72 hours. If the time allowance exceeds 72 hours, prepare the surface at the direction of the Engineer before applying concrete repair material.

APPLICATION AND SURFACE FINISH

Apply repair material to damp surfaces only when allowed by repair material recommendations and approved by the Engineer. Prepare damp surfaces in accordance with the *Standard Specifications* and/ or repair material manufacturer's recommendations. Use a blowpipe to facilitate removal of free surface water. Only oil-free compressed air is to be used in the blowpipe.

When surface preparation is completed, mix and apply repair material in accordance with the *Standard Specifications* and/ or repair material manufacturer's recommendations.

Use aggregate that is washed, kiln-dried, and bagged. Maximum size of aggregate shall not exceed 2/3 of the minimum depth of the repair area, or 3/4 of the depth of excavation behind the reinforcing steel, whichever is smaller.

Unless otherwise required by the repair material manufacturer, apply bonding agent to all repair areas immediately prior to placing repair material.

Repair areas shall be formed unless otherwise approved by the Engineer. Form and finish all repaired areas, including chamfered edges, as close as practicable to their original "As Built" dimensions and configuration. After applying the repair material, remove excessive material and provide a smooth, flush surface, unless directed otherwise.

Cure finished Class A concrete repair material by maintaining 95% relative humidity at the repair and surrounding areas by fogging, moist curing, or other approved means for seven (7) days. Cure polymer modified concrete repair material in accordance with manufacturer's recommendations.

REPAIR MATERIAL OPTIONS**(A) Polymer Modified Concrete Repair Material**

Repair material shall be polymer modified cement mortar for vertical or overhead applications and shall be suitable for applications in marine environments. Material shall be approved for use by NCDOT. Submit repair material to the Engineer for review and approval prior to beginning the work. Color of repair material shall be concrete gray.

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(B) Class A Concrete Repair Material

Repair material shall be Class A Portland Cement Concrete as described in Article 1000-4 of the *Standard Specifications*.

TEMPORARY WORK PLATFORM

Prior to beginning any repair work, provide details for a sufficiently sized temporary work platform at each repair location. Design steel members to meet the requirements of the *American Institute of Steel Construction Manual*. Design timber members in accordance with the *National Design Specification for Stress-Grade Lumber and Its Fastenings* of the National Forest Products Association. Submit the platform design and plans for review and approval. The design and plans shall be sealed and signed by a North Carolina registered Professional Engineer. Do not install the platform until the design and plans are approved. Drilling holes in the superstructure for the purpose of attaching the platform is prohibited. Upon completion of work, remove all anchorages in the substructure and repair the substructure at no additional cost to the Department.

MEASUREMENT AND PAYMENT

Concrete Repairs will be measured and paid for at the contract unit price bid per cubic foot and will be full compensation for removal, containment and disposal off-site of unsound concrete including the cost of materials, reinforcing steel, labor, tools, equipment and incidentals necessary to complete the repair work. Depth will be measured from the original outside concrete face. The Contractor and Engineer will measure quantities after removal of unsound concrete and before application of repair material. Payment will also include the cost of abrasive blasting, surface cleaning and preparation, blast cleaning of reinforcing steel, placement of new reinforcing steel, cost of temporary work platform, testing of the soundness of the exposed concrete surface, furnishing and installation of repair mortar material, curing and sampling of concrete, and protection/cleaning of adjacent areas from splatter or leakage.

Reinforcing Steel that is required for the repairs will be in accordance with Section 425 of the *Standard Specifications*.

Payment will be made under:

Pay Item	Pay Unit
Concrete Repairs	Cubic Feet

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EPOXY COATING AND DEBRIS REMOVAL**(SPECIAL)****GENERAL**

This work applies to all bents and end bents of all bridges throughout the project as noted in the plans. Pressure wash, clean and epoxy coat top of the all bent and end bent caps under open joints and at the expansion joints of steel girder spans after painting of all girders is concluded.

Debris removal from the top of bent caps shall be incidental to epoxy coating the top of bent caps.

Use a Type 4A flexible and moisture insensitive epoxy coating in accordance with Section 1081 of the *Standard Specifications*. Provide a Type 3 material certification in accordance with Article 106-3 showing the proposed epoxy meets Type 4A requirements.

SURFACES

Apply the epoxy protective coating to the top surface area, including chamfer area of bent caps under open joints and expansion joints of the steel girder spans, excluding areas under elastomeric bearings.

Thoroughly clean all dust, dirt, grease, oil, laitance and other objectionable material from the concrete surfaces to be coated. Air blast all surfaces immediately before applying the protective coating.

Use only cleaning agents preapproved by the Engineer.

APPLICATION

Apply epoxy protective coating only when the air temperature is at least 40°F and rising, but less than 95°F and the surface temperature of the area to be coated is at least 40°F. Remove any excess or free-standing water from the surfaces before applying the coating. Apply one coat of epoxy protective coating at a rate such that it covers between 100 and 200 sf/gal.

Under certain combinations of circumstances, the cured epoxy protective coating may develop an oily condition on the surface due to amine blush. This condition is not detrimental to the applied system.

Apply the coating so the entire designated surface of the concrete is covered and all pores are filled. To provide a uniform appearance, use the exact same material on all visible surfaces.

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BASIS OF PAYMENT

Epoxy Coating will be measured and paid for by the contract unit price per square foot and shall be full compensation for furnishing all material, labor, tools and equipment necessary for cleaning and coating the tops of bent caps. Debris removal from the top of bent caps shall be incidental to epoxy coating the top of bent caps.

Pay Item

Pay Unit

Epoxy Coating

Square Feet

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BRIDGE JACKING**(SPECIAL)****DESCRIPTION**

Bridge jacking at end bents and interior bents is to facilitate beam or bent cap repairs and to replace and/ or reset bearings, as necessary. This work shall consist of furnishing all engineering, labor, equipment, and materials necessary for construction and subsequent removal of jacking support system, including jacks, jack supports, shims and all necessary blocking. Included under this item shall be all work to raise and support the existing structure as specified on the plans and as noted herein.

UTILITY COORDINATION

Utility owners with active utilities on the bridge shall be notified by the contractor of the jacking operation 30 days before the operation begins.

SCOPE OF WORK

Work for bridge jacking includes calculating existing and applied bridge loads, designing proper strength jacking scheme, evaluating stresses imposed on the bridge members, setting blocking and jacks, jacking bridge girders, mechanically locking jacks, and lowering bridge spans onto bearing assemblies.

Submit calculations, working drawings, and jacking procedure to the Engineer for review and approval prior to the start of work. Calculations and jacking procedure shall account for all loads expected while bridge is jacked or temporarily supported. Working drawings and all calculations (for determination of all applied loads, for design of the jacking scheme, to evaluate stresses imposed on the bridge members, and any other necessary calculations) for the required jacking scheme shall be sealed by an engineer licensed in the State of North Carolina. Included in the submittal, the Contractor shall submit all relevant information about the jacking system to be used.

Prior to bridge jacking, complete all diaphragm modifications necessary at the location where jacking is to occur. If a span connected to an end bent is to be jacked, ensure the curtain wall is either clear of the girders, or fully free to move with the jacked span prior to jacking. Lock jacks and install blocking while the bridge is in the raised condition. While in the raised condition, follow bridge plans for any work that may be required. After all repairs requiring bridge jacking are completed, lower the bridge onto the bearing assemblies. Complete repair work, as needed.

Unless otherwise allowed by the Engineer, all bridge jacking operations shall be complete before new deck overlay or deck joints and seals are placed on the existing structure.

Bridge jacking will be designated as one of two jacking arrangements, as follows:

Type I

Type I Bridge Jacking shall be applicable for jacking at individual beam or bearing locations. On a particular bridge bent or end bent, there might be more than one Type I Bridge Jacking. When jacking individual beam or bearing locations, all adjacent bearings of beams not being jacked may

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be loosened to decrease the resistance of the deck slab during jacking. The maximum differential between adjacent beams that are being jacked is 1/8". Should the jacking of an individual beam require the jacking of adjacent beams to reduce stresses or damage in the bridge, the jacking of the individual beam and adjacent beams shall be considered one Type I Bridge Jacking. All bearings loosened shall be tightened back after repair operations are completed and the jacks and blocking have been removed.

Type II

Type II Bridge Jacking shall be applicable for jacking an entire span end (i.e., all beams at one time) on a bent or end bent.

BASIS OF PAYMENT

Payment will be made at the price bid for each set-up to complete *Type I Bridge Jacking Bridge No. 13* or *Type II Bridge Jacking Bridge No. 13* as shown in the contract plans. The price per each jacking set-up Type required will be full compensation for designing proper strength jacking scheme (calculations, working drawings, and jacking procedure), all materials, equipment, tools, labor, and incidentals necessary to complete the work of this scope, including any jacking frames, jacking plates, and concrete repair required due to jacking operations.

Payment will be made under:

Pay Item	Pay Unit
Type I Bridge Jacking Bridge No. 13	Each
Type II Bridge Jacking Bridge No. 13	Each

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STEEL REINFORCED ELASTOMERIC BEARINGS

(6-22-16)

The 2018 Standard Specifications shall be revised as follows:

In **Section 1079-2(A) – Elastomeric Bearings** add the following after the second paragraph:

Internal holding pins are required for all shim plates when the contract plans indicate the structure contains the necessary corrosion protection for a corrosive site.

Repair laminated (reinforced) bearing pads utilizing external holding pins via vulcanization. Submit product data for repair material and a detailed application procedure to the Materials and Tests Unit for approval before use and annually thereafter.

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INTEGRAL PILE JACKETING**(SPECIAL)****DESCRIPTION**

Furnish, fabricate and install an integral pile jacket in accordance with contract documents.

MATERIALS**Stay-In-Place Forms:**

Use forms composed of a durable, inert, corrosion resistant material with an interlocking joint along one or two sides that permits the form to be assembled and sealed in place around the pile or column. Fabricate the forms from glass or carbon fibers and polyester or vinylester resins. Provide jackets with a minimum thickness of 1/8 inch with a minimum thickness at the corners of 3/16 inch and dimensions as shown in the Contract Documents. Ensure the form is capable of maintaining its original shape without additional support or damage when placed around a pile. Ensure the inside face of the form has no bond inhibiting agents in contact with the filler material. Provide the forms with bonded or bolted-on, non-metallic, adjustable standoffs to maintain the forms in the required positions. Sandblast or score the inside surface of the forms with an abrasive material to provide a rough surface texture and ensure bond with the filler material. Equip the forms with a compressible sealing strip at the bottom which will effectively seal the annular space between the pile or column and the form. Use non-metallic hardware for pumping ports when these are provided. Fabricate the jacket form in a workmanlike manner and have it inspected and approved by the Engineer prior to placement. Remove from the project any jacket form that has been rejected.

The forms shall meet the following physical property requirements of Table 1:

Table 1: Physical Requirements of Stay-In-Place Forms	
Water Absorption (ASTM D 570)	1% maximum
Ultimate Tensile Strength (ASTM D 638)*	9,000 psi minimum
Flexural Strength (ASTM D 790)*	16,000 psi minimum
Modulus of Elasticity (ASTM D 790)	700,000 psi minimum
IZOD Impact (ASTM D 256)	15 lb/inch minimum (unnotched specimen)
Barcol Hardness (ASTM D 2583)	45 minimum
Color: Similar to Federal Color Standard No. 595, Table VII, Shade No. 36622. The color must be integral in the form gel coat.	
* On original specimens whose flat surfaces are not machined to disturb the fiberglass.	

Fillers:

Use portland cement grout fillers for non-structural jackets and concrete fillers for structural jackets unless otherwise specified in the Contract Documents. See Special Filler Addendum at end of this PSP.

Portland Cement Grout:

Use a mix design of portland cement, fine aggregate, water and an admixture containing a minimum of 940 pounds of cementitious material per cubic yard. Up to 30%, by weight of cement, may be replaced by fly ash for standard pile jackets.

Use silica sand fine aggregate meeting the requirements of Section 1014.

Use portland cement meeting the requirements of Section 1024.

Use admixtures meeting the requirements of Sections 1000 and 1024, ASHTO M194, Types A and D.

Use air-entraining admixtures meeting the requirements of Section 1024 and containing no chlorides or other salts corrosive to metals.

Use fly ash meeting the requirements of Section 1024, ASTM C618, Type F, except that loss on ignition shall not exceed 4%.

Provide a grout filler mix with a minimum compressive strength of 5,000 psi at 28 days and a slump of 7 inches to 9 inches. Submit the design mix to the Engineer for approval by the Department before placing any grout filler.

Class AA Concrete:

Use Class AA Concrete meeting the requirements of Section 1000 with an adjusted slump of 7 inches to 9 inches. Reduced size coarse aggregate may be used as approved by the Engineer.

Submit the design mix to the Engineer for approval by the Department before placing any concrete filler.

Special:

When specified, furnish special fillers in accordance with the Contract Documents. Submit test results and documentation that demonstrate the material meets the requirements for the project. Use materials meeting the requirements of the attached addendum for special fillers when cementitious pre-bagged fillers are specified.

Chlorides:

Total amount of chlorides for jacket fillers shall not exceed 0.4 pounds per cubic yard of filler after placement. Total amount of chloride will be tested at a random basis as directed by the Engineer.

Water:

Use water that meets the requirements of Section 1024 for all filler mixing. Use potable water for cleaning, rinsing, or any other application that requires direct contact with the piles.

Reinforcing Steel:

Use reinforcing steel meeting the requirements of Section 1070 for all integral jackets.

MATERIALS CERTIFICATION AND TESTING**Certification:**

For materials other than those for Portland cement grout and Class AA concrete, submit a certificate to the Engineer certifying that the materials furnished meet all the requirements of this Section and conform in all respects to the materials tested.

Attach current test reports to the certificate.

Testing:

No test report for tests made more than two years prior to shipment will be accepted for the form material.

Test materials for Portland cement grout and Class AA concrete as required in Section 1000 for approved design mixes. Perform sampling and testing using Quality Control technicians meeting the requirements of this Project Special Provision.

Test properties of materials for other cement based fillers allowed under "Special" in this project special provision, the same as required for the Department approved design mixes. Test the materials at a frequency of one set of tests per load of the mixer. For each set of tests, cast three 4 inch by 8 inch cylinders for compressive strength testing at the required test date. The Engineer may adjust the frequency of testing based on consistency of the mixes. Conduct a field verification mix prior to commencing the jacket installation. Cure samples of cement based materials in accordance with ASTM C31.

Hardened concrete or grout will be accepted on the basis of strength test results as defined in this Section. Test the laboratory cured samples for compressive

strength at 28 days in a laboratory meeting and maintaining at all times the qualification requirements listed in Section 1000.

CONSTRUCTION

Shop Drawings:

Submit shop drawings and obtain approval prior to field installation. Submit shop drawings showing locations of standoff spacers, method of fastening jacket form to piling, method of sealing the form after assembly, and method for bracing during placement of filler. Include details of access holes, fiberglass caps, method of securing anode from movement, and methods for placing the filler and cutting and sealing the pumping ports.

Surface Preparation:

Remove all cracked or delaminated concrete and excavate to a depth of 3/4 inch to 1 inch behind the exposed reinforcement. Limit the size of chipping hammers to 20 pounds unless otherwise approved by the Engineer. Thoroughly clean all pile/column surfaces that the jackets will cover. Remove all oil, grease, dirt, broken concrete, marine growth and any other deleterious material that could prevent proper bonding. Sandblast all exposed reinforcing steel to SSPC-SP10, near white, per the Society of Protective Coatings, to remove all rust and scale before installing the pile jacket. Water blast or mechanically clean reinforcing steel exposed under water by methods and with equipment approved by the Engineer. Clean existing concrete surfaces by sandblasting, wet blasting, wire brushing, water laser, or other methods approved by the Engineer which will yield an equivalent result. Do not place the form until the surface preparation has been approved by the Engineer.

Form Placement:

Place the fiberglass form in position around the pile; secure and seal the interlocking joints, and seal the bottom of the form against the pile surface with the compressible seal and an Engineer approved epoxy mastic suitable for underwater application. Adjust stand-offs as necessary to prevent misalignment and install temporary hard backing to prevent deformation of the jacket. Place a temporary plastic wrap around the form prior to placement of the hardbacking to protect the gel coat.

Filler Placement:

Wet to saturation the surface of the existing concrete immediately prior to placing the filler. Place the filler in one continuous pour at no more than 72 hours after surface preparation. Fill the annulus between the pile or column and jacket form following the jacket manufacturer's instructions and the Contract Documents. Do not drop filler material into forms higher than five feet or into forms containing water. Prevent contamination of the filler during placement and provide internal or external vibration to ensure proper consolidation.

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Cure filler for a minimum of 96 hours before removing any external bracing. Remove any filler or other extraneous material from the exterior surface of the form and clean the form without damaging the fiberglass or gel coat resin. Cut pumping ports flush with the surface of the jacket and seal opening with an Engineer approved listed epoxy.

METHOD OF MEASUREMENT

The quantities to be paid for under this Section will be the total feet of integral pile or column jacket furnished, installed, completed and accepted. Measure length from bottom of the form to top of the form.

BASIS OF PAYMENT

Price and payment will be full compensation for all work specified in this Section. No separate payment will be made for reinforcing steel or filler material. Remove and replace jackets with misalignment exceeding 3/4 inch at no additional cost to the department. Price and payment will also be full compensation for removal, containment and disposal off-site of unsound concrete including

Payment will be made under:

Pay Item	Unit
Integral Pile Jacketing	Linear Foot

SPECIAL FILLER ADDENDUM FOR INTEGRAL PILE JACKETING**SPECIAL FILLERS****General:**

This material is intended to be used as filler material and for rapid repairs to pile jacket structures and other locations specified in the Plans when no design mix concrete is available or a special filler is specified in the Contract Documents. Meet the requirements of this Project Special Provision for preparing the surfaces, placing, testing and curing the concrete.

Mix the material in accordance with the manufacturer's recommendations.

Classification:

The materials to be considered under this classification shall meet the following requirements:

Non-Cathodic Protection (Non-CP) Filler:

Provide cementitious based materials with a minimum cement content of 650 pounds of cement per cubic yard of mix.

The material shall not contain any substances corrosive to metals.

Where concrete filler materials are specified, approved mortar materials may be extended using size number 89 gradation aggregates from a certified Department approved source.

Physical Properties:

The repair material shall meet or exceed the physical properties stated in Table 4 as determined by the specified standard test methods. If extended, materials shall meet the minimum requirements of Table 4.

Table 4 - Physical Properties of Special Fillers			
Requirement	Test Method	Cathodic Protection	Non-Cathodic Protection
Minimum Compressive Strength, psi			
24 hours	ASTM C39* or ASTM C109*	1,500	2,000
28 days		5,000	5,000
Maximum Length Change, %			

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Allowable expansion at 28 days when water cured compared to length at one day	ASTM C157**	0.12	0.12
Allowable shrinkage at 28 days when air cured compared to length at one day		-0.12	-0.12
Allowable difference between increase in water and decrease in air		0.20	0.20

Slump (Concrete), inches	ASTM C143	7-9	7-9
Minimum Flow (Mortar), %	ASTM C1437	100	100
Time of Setting (Initial), minutes	ASTM C191* or ASTM C403*	200 to 400	200 to 400
Minimum Bond Strength by Slant Shear (at 7 days), psi	FM 5-587	450	450
Minimum Flexural Strength (at 7 days), psi	ASTM C580	700	700
Minimum Tensile Strength (at 7 days), psi	ASTM C307	200	200
Surface Resistivity (at 28 days), KOhm-cm	FM 5-578	15 or less	22 or greater
Maximum Allowable Total Chlorides lbs/yd ³	FM 5-516	0.40	

* as applicable

** Make and cure the test specimens in accordance with ASTM C157, except omit the curing period in Section 10.3; however both 11.1.1 and 11.1.2 shall apply for 28 day curing period.

Constructability:

Submit to the Engineer for approval shop drawing as may be required to complete repairs in compliance with the design shown in the Plans and the manufacturer's recommended repair system.

CATHODIC PROTECTION SYSTEM – SUBMERGED ZINC BULK ANODE (SPECIAL)**DESCRIPTION**

This work consists of furnishing and placing a submerged bulk zinc (ZnSBA) anode cathodic protection system at substructure units defined in the plans. The surface of the concrete shall be prepared and the cathodic protection system shall be applied in accordance with this provision in conformity with the lines, and details shown on the plans or as approved by the Engineer.

Work includes: bridge substructure concrete repairs, monitoring port and reference steel installation and associated electrical work, excavation for continuity; placement of bulk anode assemblies comprised of coated steel channels mounted on the substructure with assemblies shown in the plans; and any incidentals necessary to complete the project as specified or as shown on the plans.

QUALIFICATIONS AND SUBMITTALS

The cathodic protection (CP) Contractor conducting the installation of the ZnSBA system must be engaged in cathodic protection installation operations and shall have a minimum of three years of previous experience in cathodic protection operations with concrete. Provide locations and contact names of successful previous projects for verification at the preconstruction conference.

A. Quality Control Plan:

Include the work under this Project Special Provision in the Contractor General Requirements set forth in NCDOT Specification Division 1. The portion of the Quality Control Plan covering cathodic protection shall be certified by the CP Specialist. For the ZnSBA system the plan shall include but not be limited to, method and frequency of Contractor's QC testing, continuity testing procedures, zinc anode application, time dedicated for training, monitoring port installation plan, and method(s) for initial activation of the cathodic protection systems.

The Contractor shall submit two copies of the System Provider's material information, written installation instructions, material safety data sheets, and independent test results for approval.

B. Cathodic Protection Report:

Provide a final report produced by the CP Specialist for the metalizing system. The report shall describe the general characteristics of the systems and installation sequence. The report shall describe the general characteristics of the cathodic protection work, the size and connection details for each metalized component, as well as native potentials and evidence of polarization after energizing the system. The report and all collected data shall be in typed form and a digital version of the report must be provided along with 4 bound hard copies.

C. Cathodic Protection Specialist Qualifications: The Contractor shall employ the services of a CP Specialist as outlined in the SP for CP for Intermediate Bent Metalizing. Qualifications and Responsibilities are the same for this work as for intermediate bent metalizing, but for the ZnSBA system.

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MATERIALS*Bulk Zinc Anode*

Bulk Zinc Anodes shall be 50 pounds by weight with rectangular cross section sufficient for welding to the proposed steel channel. The Bulk Zinc Anode shall meet the requirements of ASTM B418-01, Type I.

Steel Channels

Provide structural steel, galvanizing and weld material per the Standard Specifications sections 1072, and 1076.

Stainless Steel Rod

Provide stainless steel threaded rods for connection in accordance with ASTM A304.

Electrical Materials

Provide electrical materials, including wire, leads and associated parts in accordance with Standard Specifications Section 1091.

Reinforcing Steel for Monitoring

Provide mild reinforcing steel per Standard Specifications Section 1070.

Epoxy

Provide epoxy Type 1, 3, or 3A per Standard Specifications Section 1081.

Grout

Provide grout for structures per these special provisions and Standard Specifications Section 1003.

CONSTRUCTION REQUIREMENTS**Concrete Removal and Repair:**

All concrete removal and repair shall be made under the requirements of the Project Special Provision for Concrete Restoration. The CP specialist may select a different repair mortar than for other applications in order to provide a repair material with lower resistivity to enhance the overall performance of the Cathodic Protection System.

Electrical Continuity:

Electrical continuity of the reinforcing steel and any other metallic component in the concrete shall be tested by the CP Specialist and corrected by the Contractor as shown in the Contract Documents. Although part of the cathodic protection work, continuity shall be provided during the concrete restoration operation. Care shall be observed as not to damage any rebar connecting rods or wires for connection plates which may have been installed during the concrete restoration work.

Monitoring Ports:

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Excavate monitoring port holes as shown in the Contract Documents and attach different colored electrical leads to native steel and CP system samples placed in monitoring port holes. Attach bare wire leads to steel samples and cover all exposed wire with epoxy.

Attach weatherproof monitoring junction box to the substructure unit per the plans and insert lead wires into junction box. Attach a jumper wire to the CP system.

Cut grooves for wire routing to a depth and width sufficient to fully encapsulate wire and grout into place on the substructure unit. Clearly identify which wires are native structure representative sample and CP sample in the CP report submitted to the Department.

Anode Attachment Assembly:

Fabricate and prepare galvanized steel channels as shown in the plans for attachment to the substructure. Weld bulk anodes to the steel channel per the Standard Specifications for structural welding prior to coating the assembly. Attach each assembly to the substructure unit with concrete anchors and bolts as shown in the plans.

Energizing CP system Time Window:

Coordinate the CP assembly and concrete restoration operations such that cathodic protection is completed and connected to the reinforcement on each component at no less than 10 days and no more than 90 days after placing the concrete for concrete restoration. Any cathodic protection to be accepted after 90 days (not to exceed 120 days) following the placement of the concrete shall be tested and certified as having a low probability of corrosion activity around the repaired area.

MEASUREMENT AND PAYMENT*Cathodic Protection System – Submerged Zinc Bulk Anode*

Price and Payment will be full compensation for all work and materials specified in this Project Special Provision and all incidental items necessary to provide a function Zinc Bulk Anode Cathodic Protection System

Payment will be made under:

Pay Item

Cathodic Protection System – Submerged Zinc Bulk Anode

Pay Unit

Each

RAIL RETROFIT**(SPECIAL)****1. GENERAL****1.1. Work Includes:**

The work under this Project Special Provision includes all labor, materials and incidentals necessary for installation of the rail system defined herein.

1.2. Related Work:

Standard Specifications Section 420-13 - Adhesively anchored bolts or dowels.

1.3. System Description:

The manufacturer shall supply a rail system that shall include all components (i.e., rails, posts, and hardware) required, as shown on the plans.

1.4. Quality Assurance:

The contractor shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and materials and techniques specified. The contractor shall supply material certification for all the components of the barrier rail system.

1.5. Shop Drawings:

Submit shop drawings and obtain approval prior to fabrication.

1.6. Product Handling and Storage:

Upon delivery at the job site, all materials shall be checked to ensure that no damages occurred during shipping or handling. Materials shall be stored in such a manner to ensure proper ventilation and drainage, and to protect against damage, weather, vandalism and theft.

2. MATERIALS**2.1. Material**

- A. Aluminum material for rails and posts shall be alloy 6061-T6 in accordance with the requirements of ASTM B221 or B429, with minimum yield strength of 35,000 psi.
- B. Posts shall meet the minimum size of 2½" x 1½" x 1/8"
- C. Material for base plates shall be alloy 6061-T6 in accordance with the requirements of ASTM B209, with minimum yield strength of 40,000 psi and 5/8" minimum thickness.
- D. Anchor bolts shall be 7/8" ϕ hot dip galvanized steel in accordance with ASTM F1554 Grade 55.
- E. Nuts, washers, and other hardware components shall be galvanized in accordance with Section 1076 of the *Standard Specifications*.

- F. Bearing pads placed under the base plate shall have a thickness of $\frac{1}{8}$ " and are allowed to be one of the following:
- **Plain Pads:** Plain pads shall be either molded, extruded, or vulcanized in large sheets and cut to size. Cutting shall not heat the material and shall produce a smooth finish conforming to ANSI B46.1, $6.3 \mu\text{m}$ (0.248 mils). Plain pads shall be molded or extruded to the finished thickness. Plying pads of lesser thickness together shall not be permitted. External load plates, when used, shall be protected from rusting and shall be hot bonded by vulcanization during the primary molding process. The finished pads shall withstand a minimum uniform compressive load of 1200 psi when tested.
 - **Fiber Reinforced or Fabric Laminated Pads:** Fiber reinforced pads shall be constructed with a homogeneous blend of elastomer and random-oriented high strength synthetic fiber cords. Bearing pads may be molded and vulcanized in large sheets and cut to size. Cutting shall be performed so as to prevent heating and must produce a smooth finish conforming to ANSI B46.1. Fabric laminated bearings shall be constructed of multiple layers of fabric and elastomer. The fabric shall be composed of 8 ounce cotton duck and the pads manufactured in accordance with Military Specification MIL-C-882. Ensure the fabric is free of folds or ripples and parallel to the top and bottom surfaces. Fiber reinforced and fabric pads shall withstand a minimum uniform compressive load of 2,400 psi when tested.

For bearing pads to be used under metal railings, submit certification indicating compliance with ASTM D2000 M1 BC (suffix grade 1 - basic requirements, type B, class C).

2.2. Fabrication

- A. Rails and posts shall be precut to specified lengths. Rails shall be predrilled to accept bolts, as shown on plans. The contractor shall be responsible to field verify dimensions, geometry and location of all elements of the rail system.
- B. Completed sections shall comply with AASHTO 13.8.2. Load Combination Limit State: Strength 1, 1.00 design live load, 1.25 dead load
- C. Post base plates shall be shop welded, as shown on the plans, in accordance with Section 1074-18 of the *Standard Specifications*.

3. INSTALLATION

3.1. Preparation

All new installation shall be laid out by the contractor in accordance with the construction plans.

3.2. Barrier Rail Installation

Posts shall be spaced as shown on plans. The post spacing dimension must be measured along the concrete parapet. Rails shall be attached to posts with slotted bracket hardware; brackets shall be bolted to posts. Posts setting shall be done by means of adhesively anchored bolts or dowels, see *Standard Specifications* Section 420-13.

3.3. Cleaning

The contractor shall clean the jobsite of excess materials.

4. MEASUREMENT AND PAYMENT

Rail retrofit will be measured and paid for the contract unit price bid per linear foot and will be full compensation for installation of the rail system, including the installation of adhesively anchored dowels, and shall consider the cost of labor, tools, equipment, and incidentals necessary to complete the work. Repair, to the Engineer's satisfaction, any portion of the structure that is damaged from construction operations. No extra payment is provided for these repairs.

Pay Item**Pay Unit**

Rail Retrofit

Linear Feet

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WATER LINE REMOVAL**(SPECIAL)****1. GENERAL****1.1. Work Includes:**

The work under this Project Special Provision includes all labor, equipment and incidentals necessary for removal of existing water line defined herein.

1.2. Related Work:

Standard Specifications Section 340-3 – Construction Methods.

1.3. System Description:

The contractor is responsible for full removal of existing water pipes and the different hanger assemblies attached to the bridge.

2. REMOVAL REQUIREMENTS

- A. Full removal of existing pipes and necessary accessories such as adjustable clevis with hanger rod assemblies, steel pipe sleeves and bolts as directed in the plans.
- B. Cut existing bolts and fasteners flush with concrete deck overhang or concrete girder. Epoxy coat the ends after cutting.
- C. When an existing pipe is encountered that is not shown in the plans, do not remove until the Engineer is notified of its presence and has directed its removal.
- D. Pipes shall be emptied prior to removal.
- E. Pipe ends at end bent 1 and 2 shall be capped at a distance of 6 inches from the end bents.
- F. Contractor responsibilities:
 - Disposal of the existing water lines and accessories.
 - Repair any damage to the existing structure as a result of this work. Repair any concrete per the plans.
 - Avoid damaging of existing drain pipes while removing the water pipes and hanger assemblies.
- G. If bridge is damaged during removal of water lines, the contractor shall perform repairs as directed by the Engineer at no additional cost to the department.

3. UTILITY COORDINATION

- A. Prior to removal of pipe line, the contractor shall locally coordinate with the town of Ocean Isle Beach to ensure that the new pipe line has been installed, tested and in working order.

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B. See Transportation Management plans for additional lane closure times and restrictions.

4. MEASUREMENT AND PAYMENT

Water Line Removal will be measured and paid as lump sum, including the cost of labor, tools, equipment, and incidentals necessary to complete the work.

Pay Item

Pay Unit

Water Line Removal

Lump Sum

County : Brunswick

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
ROADWAY ITEMS						
0001	0000100000-N	800	MOBILIZATION	Lump Sum	L.S.	
0002	1330000000-E	607	INCIDENTAL MILLING	305 SY		
0003	1523000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5C	26 TON		
0004	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	2 TON		
0005	4400000000-E	1110	WORK ZONE SIGNS (STATIONARY)	48 SF		
0006	4405000000-E	1110	WORK ZONE SIGNS (PORTABLE)	176 SF		
0007	4420000000-N	1120	PORTABLE CHANGEABLE MESSAGE SIGN	2 EA		
0008	4455000000-N	1150	FLAGGER	500 DAY		
0009	4516000000-N	1180	SKINNY DRUM	60 EA		
0010	4850000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (4")	5,565 LF		
0011	4890000000-E	SP	GENERIC PAVEMENT MARKING ITEM POLYUREA PAVEMENT MARKING LINES (4", 20MILS) (STANDARD GLASS BEADS)	8,069 LF		
0012	4900000000-N	1251	PERMANENT RAISED PAVEMENT MARKERS	49 EA		
STRUCTURE ITEMS						
0013	8161000000-E	420	GROOVING BRIDGE FLOORS	14,417 SF		
0014	8559000000-E	SP	CLASS II, SURFACE PREPARATION	2 SY		
0015	8657000000-N	430	ELASTOMERIC BEARINGS	Lump Sum	L.S.	
0016	8660000000-E	SP	CONCRETE REPAIRS	20 CF		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0017	8664000000-E	SP	SHOTCRETE REPAIRS	439 CF		
0018	8678000000-E	SP	EPOXY RESIN INJECTION	848 LF		
0019	8860000000-N	SP	GENERIC STRUCTURE ITEM VOLUMETRIC MIXER	Lump Sum	L.S.	
0020	8860000000-N	SP	GENERIC STRUCTURE ITEM WATER LINE REMOVAL	Lump Sum	L.S.	
0021	8867000000-E	SP	GENERIC STRUCTURE ITEM FOAM JOINT SEALS FOR PRESERVA- TION	720 LF		
0022	8867000000-E	SP	GENERIC STRUCTURE ITEM INTEGRAL PILE JACKETING	5 LF		
0023	8867000000-E	SP	GENERIC STRUCTURE ITEM RAIL RETROFIT	3,795 LF		
0025	8882000000-E	SP	GENERIC STRUCTURE ITEM ELASTOMERIC CONCRETE FOR PRES- ERVATION	78 CF		
0026	8882000000-E	SP	GENERIC STRUCTURE ITEM REPAIRS TO PRESTRESSED CON- CRETE GIRDERS	191 CF		
0027	8892000000-E	SP	GENERIC STRUCTURE ITEM BRIDGE JOINT DEMOLITION	244 SF		
0028	8892000000-E	SP	GENERIC STRUCTURE ITEM EPOXY COATING	6,282 SF		
0029	8893000000-E	SP	GENERIC STRUCTURE ITEM HYDRO-DEMOLITION OF BRIDGE DECK	1,790 SY		
0031	8893000000-E	SP	GENERIC STRUCTURE ITEM SCARIFYING BRIDGE DECK	1,790 SY		
0032	8893000000-E	SP	GENERIC STRUCTURE ITEM SHOTBLASTING BRIDGE DECK	4,801 SY		
0033	8893000000-E	SP	GENERIC STRUCTURE ITEM SILANE DECK TREATMENT	4,801 SY		
0034	8897000000-N	SP	GENERIC STRUCTURE ITEM CATHODIC PROTECTION SYSTEM- SUBMERGED ZINC BULK ANODE	50 EA		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0035	8897000000-N	SP	GENERIC STRUCTURE ITEM TYPE I BRIDGE JACKING BRIDGE NO 13	6	EA	
0036	8881000000-E	SP	GENERIC STRUCTURE ITEM LATEX MODIFIED CONCRETE OVERLAY - VERY EARLY STRENGTH	103	CY	
0037	8893000000-E	SP	GENERIC STRUCTURE ITEM PLACING AND FINISHING LATEX MODIFIED CONC OVERLAY - VERY EARLY STRENGTH	1,790	SY	

1235/Dec08/Q56978.0/D243652100000/E35

Total Amount Of Bid For Entire Project :