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

PROPOSAL

INCLUDES ADDENDUM No. 1 DATED 04-11-2017

DATE AND TIME OF BID OPENING: **APRIL 18, 2017 AT 2:00 PM**

CONTRACT ID	C203925
WBS	46483.3.1, 46484.3.1

FEDERAL-AID NO.	STATE FUNDED
COUNTY	CARTERET
T.I.P. NO.	B-5938, B-5939
MILES	1.610
ROUTE NO.	
LOCATION	BRIDGE #68 OVER BOGUE SOUND ON SR-1182 (ATLANTIC BEACH CAUSEWAY), AND BRIDGE #6 OVER BOGUE SOUND ON NC-58.
TYPE OF WORK	BRIDGE REHABILITATION

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. C203925 IN CARTERET 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. **C203925** 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 2012 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. **C203925** in **Carteret 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 2012* 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 Elton Davenport, Jr.
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4/11/2017

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GENERAL

CONTRACT TIME AND LIQUIDATED DAMAGES:
(7-20-99) (Rev. 12-18-07) 108 SP1 G04

The date of availability for this contract is **May 31, 2017,** except that work in jurisdictional waters and wetlands shall not begin until a meeting between the DOT, Regulatory Agencies, and the Contractor is held as stipulated in the permits contained elsewhere in this proposal. This delay in availability has been considered in determining the contract time for this project.

The completion date for this contract is **November 30, 2020**.

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 **Two Thousand Dollars ($ 2,000.00)** 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 **SR 1182** during the following time restrictions:

DAY AND TIME RESTRICTIONS
Monday thru Sunday
7:00 a.m. to 9:00 a.m.

NOTE: LANE CLOSURE RESTRICTIONS FOR SR 1182 ONLY APPLY DURING PHASE I.

In addition, the Contractor shall not close or narrow a lane of traffic on **SR 1182 (During Phase I Only)**, 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 **Easter**, between the hours of **7:00 a.m.** Thursday and **9:00 a.m.** Monday.

3. For **Memorial Day**, between the hours of **7:00 a.m.** Friday and **9:00 a.m.** Tuesday.

4. For **Independence Day**, between the hours of **7:00 a.m.** the day before Independence Day and **9:00 a.m.** the day after Independence Day.

   If **Independence Day** is on a Friday, Saturday, Sunday or Monday, then between the hours of **7:00 a.m.** the Thursday before Independence Day and **9:00 a.m.** the Tuesday after Independence Day.

5. For **Labor Day**, between the hours of **7:00 a.m.** Friday and **9:00 a.m.** Tuesday.

NOTE: HOLIDAY RESTRICTION FOR SR 1182 ONLY APPLY DURING PHASE I.

NOTE: FOR ALL OTHER HOLIDAY RESTRICTIONS, SEE HOLIDAY RESTRICTIONS FOR ANY ROAD.

In addition, the Contractor shall not close or narrow a lane of traffic on **Any Road**, 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 **Peak Tourist Season**, between the hours of **7:00 a.m.** March 15th to **9:00 a.m.** the Monday after Labor Day.

3. For **Thanksgiving Day**, between the hours of **7:00 a.m.** Tuesday and **9:00 a.m.** Monday.

4. For **Christmas**, between the hours of **7:00 a.m.** the Friday before the week of Christmas Day and **9:00 a.m.** the following Tuesday after the week of Christmas Day.

5. For **New Year's Day**, between the hours of **7:00 a.m.** December 31st and **9:00 a.m.** January 2nd. If New Year's Day is on a Friday, Saturday, Sunday or Monday, then until **9:00 a.m.** the following Tuesday.

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 **fifteen (15) minute** time period.

INTERMEDIATE CONTRACT TIME NUMBER 2 AND LIQUIDATED DAMAGES:
(2-20-07) 108 SP1 G14 D

The Contractor shall complete the required work of installing, maintaining and removing the traffic control devices for road closures and restoring traffic to the existing traffic pattern. The Contractor shall not close **SR 1182** during the following time restrictions:

DAY AND TIME RESTRICTIONS

Monday thru Sunday
4:00 a.m. to 12:00 a.m. (Midnight)

NOTE: ROAD CLOSURE RESTRICTION FOR SR 1182 IS ONLY TO BE USED DURING PHASE I, STEP 2. (SEE INTERMEDIATE CONTRACT TIME NO. 3 FOR MAXIMUM NUMBER OF ROAD CLOSURE PERIODS)

The time of availability for this intermediate contract time will be the time the Contractor begins to install traffic control devices required for the lane closures according to the time restrictions stated herein.

The completion time for this intermediate contract time will be the time the Contractor is required to complete the removal of traffic control devices required for the lane closures according to the time restrictions stated herein and restore traffic to the existing traffic pattern.

The liquidated damages are **Two Thousand Five Hundred Dollars ($ 2,500.00)** per **fifteen (15) minute** time period.

INTERMEDIATE CONTRACT TIME NUMBER 3 AND LIQUIDATED DAMAGES:
(2-20-07) (Rev. 6-18-13) 108 SP1 G14 H

The Contractor shall complete the work required of **Phase I, Step #2** as shown on Sheet **TMP-2** and shall place and maintain traffic on same.

The date of availability for this intermediate contract time is the date the Contractor elects to begin the work.

NOTE: SEE INTERMEDIATE CONTRACT TIME NO. 2 FOR ROAD CLOSURE PERIOD TIMES.

The completion date for this intermediate contract time is the date which is a maximum of **Six (6)** Road Closure Periods after and including the date the Contractor begins this work.

The liquidated damages are **Ten Thousand Dollars ($ 10,000.00)** per **road closure period**.

INTERMEDIATE CONTRACT TIME NUMBER 4 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 58** during the following time restrictions:

DAY AND TIME RESTRICTIONS

Monday thru Friday
7:00 a.m. to 9:00 a.m. and
3:00 p.m. to 6:00 p.m.

In addition, the Contractor shall not close or narrow a lane of traffic on **NC 58**, 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 **Easter**, between the hours of **7:00 a.m.** Thursday and **6:00 p.m.** Monday.

3. For **Memorial Day**, between the hours of **7:00 a.m.** Friday and **6:00 p.m.** Tuesday.

4. For **Independence Day**, between the hours of **7:00 a.m.** the day before Independence Day and **6:00 p.m.** the day after Independence Day.

   If **Independence Day** is on a Friday, Saturday, Sunday or Monday, then between the hours of **7:00 a.m.** the Thursday before Independence Day and **6:00 p.m.** the Tuesday after Independence Day.

5. For **Labor Day**, between the hours of **7:00 a.m.** Friday and **6:00 p.m.** Tuesday.

NOTE: FOR ALL OTHER HOLIDAY RESTRICTIONS, SEE HOLIDAY RESTRICTIONS FOR ANY ROAD (INTERMEDIATE CONTRACT TIME NUMBER 1).

Holidays and holiday weekends shall include New Year's Day, 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 **fifteen (15) minute** time period.

MANDATORY PRE-BID CONFERENCE (Prequalifying To Bid):
(7-18-06) (Rev. 3-25-13) SPI 1-14

In order for all prospective bidders to have an extensive knowledge of the project, all prospective bidders shall attend a mandatory pre-bid conference on Thursday **April 6, 2017** at 10:00 am at:

Chief Engineer's Conference Room
NCDOT Equipment and Maintenance Facility
4809 Beryl Rd
Raleigh, NC 27606
(919)733-2220
(Contractors please use visitor entrance at front of building for access)

The pre-bid conference will include a thorough discussion of the plans, contract pay items, special provisions, etc.

Only bidders who have attended and properly registered at the above scheduled pre-bid conference and who have met all other prequalification requirements will be considered prequalified to bid on this project. A bid received from a bidder who has not attended and properly registered at the above scheduled pre-bid conference will not be accepted and considered for award.

Attendance at the pre-bid conference will not meet the requirements of proper registration unless the individual attending has registered at the pre-bid conference in accordance with the following:

(A) The individual has signed his name on the official roster no later than thirty (30) minutes after the above noted time for the beginning of the conference.

(B) The individual has written in the name and address of the company he or she represents.

(C) Only one company has been shown as being represented by the individual attending.

(D) The individual attending is an officer or permanent employee of the company they are representing.

Attendance at any prior pre-bid conference will not meet the requirement of this provision.

CONSTRUCTION MORATORIUM:
(7-15-14) SP1 G18B

No in-water work will be allowed from **April 1** through **September 30** of any year.

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 *2012 Standard Specifications*):

Line #	Description
49	CP Jacket (Non Monitoring)
54	PPC Materials
55	Prestressed Concrete Girder Repair
63	Placing and Finishing PPC Overlay

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 *2012 Standard Specifications*).

Line #	Description
5 thru 6	Guardrail
22 thru 23, 27 thru 28	Long-Life Pavement Markings
24	Removable Tape
31 thru 32	Permanent Pavement Markers
38, 66, 69, 72 thru 75, 80, 83 thru 84	Lighting

SPECIAL REQUIREMENTS FOR WORK IN NATIONAL FOREST:

(7-1-95) 107-13 SP1 G40

In addition to other requirements in this proposal with respect to clearing, erosion control, protection of environment, etc., comply with the following requirements:

(A) Comply with the portions of these Special Requirements, entitled “Fire Plan,” “Clearing Plan,” and “Landscape and Erosion Control Plan.” Note the fact that merchantable timber within Forest Service Property will become the property of the Contractor.

(B) Comply with the following recommendations of the State Fish and Game Department and Forest Service for wildlife and fish management:

(1) Take all necessary precautions to avoid damage to fish habitat and exercise every reasonable precaution to prevent muddying or silting live streams.

(2) Do not deposit material removed from the roadway or channel changes in live streams or into the streams or stream channel where it would be washed away by high stream flows.

(3) Do not haul materials, including logs, brush, and debris, by fording live streams. Instead, provide temporary bridges or other structures for this purpose.

(C) Dispose of waste material resulting from slides during construction and surplus material at locations approved by the Forest Supervisor. Submit a plan showing the proposed method of disposal at the time approval is requested.

(D) Treat sections of existing road to be abandoned as a result of the proposed new construction, as designated by the Forest Supervisor, to restore them to their natural state. The necessary treatment will be determined during a joint review between the Forest Service and the State and may include ripping of roadbed, removal of drainage structure, and opening drainage channels. Plans and specifications as mutually deemed appropriate to accomplish the objective will become a part of this stipulation.

(E) Permanently monument the right of way prior to completion of construction in accordance with State requirements for such right of way, but in any event the minimum requirements will be to place permanent monuments at the intersection of right of way with all property lines, section lines, and at intervals of not more than 1,000 feet along the right-of-way limits.

(F) Re-establish or restore public land monuments disturbed or destroyed by construction, reconstruction, or maintenance according to instructions of the Bureau of Land Management, Department of the Interior. Do not damage, destroy, or obliterate other land monuments and property corners or witness markers without the prior permission of the Regional Forester. Relocate or re-establish these land monuments, property corners, and witness markers in accordance with standards satisfactory to the Regional Forester.

Fire Protection Plan

During the period of construction, perform both independently and in cooperation with the Forest Service everything that is reasonable and practical to prevent and suppress forest fires on the easement area and in its immediate vicinity. Include provisions in all subcontracts for the construction of the road requiring subcontractors and their respective employees to do likewise. The contractors and subcontractors, shall conform to, but not be limited to, the following Fire Plan:

(A) Take immediate independent or cooperative action to control and extinguish any fire, regardless of cause, within the easement area and its vicinity.

(B) Maintain at readily available sites one or more boxes of firefighting tools to be furnished by the Forest Service for forest fire fighting purposes only.

(C) Perform debris burning only in the center of the right of way, and only after a strip 20 feet wide around each pile is cleared to mineral soil.

(D) Keep fires compact by throwing in the larger material as it burns. If piles are too close together or burn hot, light every second or third pile; allow these to cool down before firing the others. On slopes start burning at the top and work down. Confine fires to piles at all times.

(E) Do not leave fires unattended.

(F) Discontinue burning upon notification by the District Forest Ranger or his representative that fire danger is such that there is abnormal risk.

(G) Whenever a fire escapes, notify the District Ranger immediately even if the fire is suppressed without Forest Service assistance.

(H) The contractor or subcontractor responsible will bear the costs, including Forest Service direct costs and value of resources damages, incurred by the Forest Service in controlling and extinguishing any fire on or threatening National Forest lands which they or their employees caused with or without negligence in connection with construction operations.

(I) Contact the District Ranger 24 hours in advance of burning.

Clearing Plan

Conform to the following clearing plan:

(A) Dispose of unmerchantable materials including tops, branches, etc., by piling and burning as directed by the Forest Service or used in brush barriers. Alternate methods of disposal, including any of the following methods or combinations of methods (lop and scatter, chip, remove, pile only), shall be approved in advance by the Forest Service.

(B) The maximum clearing and grubbing limits are to be as shown on the plans except that cutting of hazard trees outside these limits may be done with approval. Confine construction machinery within the clearing limits.

Landscape and Erosion Control Plan

The erosion control plan will be designed and implemented to prevent visible sediment, as defined by NC DEQ regulations, from reaching any defined stream channel.

Conform to, but not be limited to, the following Landscape and Erosion Control Plan.

(A) Prevent visible sediment from entering any stream channel. If an erosion control practice must be sited in a channel, it shall stop further down-channel transport of visible sediment.

(B) Bear responsibility for the prevention and control of soil erosion and gullying on the right of way and lands adjacent thereto resulting from the construction of maintenance of the road. Revegetate with grass (not Love Grass) or herbaceous plants all ground where the soil has been exposed. Accomplish revegetation within 20 working days following final grading.

(C) Round the ends of cut sections and the tops of back slopes.

(D) Vegetate all front and back slopes by liming, fertilizing, mulching and seeding; including any waste area. Mulch critical areas if they are to be exposed greater than 5 working days of probable inclement weather during seasons when seeding is impracticable. Critical areas include all bare soils within 100 feet (slope distance) of perennial and intermittent streams. Mulch these as soon as practical and after final seeding.

(E) Maintain all erosion control practices in a timely manner to prevent visible sediment from entering any stream channel, until such time that the final revegetation stabilizes the site and prevents erosion and off-site movement of sediment.

FUEL PRICE ADJUSTMENT:
(11-15-05) (Rev. 2-18-14) 109-8 SP1 G43

Revise the *2012 Standard Specifications* as follows:

Page 1-83, Article 109-8, Fuel Price Adjustments, add the following:

The base index price for DIESEL #2 FUEL is **$ 1.7230** 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. 5-17-16) 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:

Fiscal Year		Progress (% of Dollar Value)
2017	(7/01/16 - 6/30/17)	**2**% of Total Amount Bid
2018	(7/01/17 - 6/30/18)	**43**% of Total Amount Bid
2019	(7/01/18 - 6/30/19)	**32**% of Total Amount Bid
2020	(7/01/19 - 6/30/20)	**17**% of Total Amount Bid
2021	(7/-1/20 – 6/30/21)	**6**% of Total Amount Bid

The Contractor shall also furnish his own progress schedule in accordance with Article 108-2 of the *2012 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. 1-17-17) 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 either the MBE or WBE goal. No submittal of a Letter of Intent is required, unless the additional participation is used for banking purposes.

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

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

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

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

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

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

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

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

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

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

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

Forms and Websites Referenced in this Provision

Payment Tracking System - On-line system in which the 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 amount listed at the time of bid. http://connect.ncdot.gov/letting/LetCentral/Letter%20of%20Intent%20to%20Perform%20as%20a%20Subcontractor.pdf

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

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

MBE and WBE Goal

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

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

(1) *If the MBE goal 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 as the MBE goal.

(2) *If the MBE goal 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 **1.0 %**

(1) *If the WBE goal 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 as the WBE goal.

(2) *If the WBE goal 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.

Directory of Transportation Firms (Directory)

Real-time information is available about firms doing business with the Department and firms that are certified through NCUCP in the Directory of Transportation Firms. Only firms identified in the Directory as MBE and WBE certified shall be used to meet the MBE and WBE goals respectively. The Directory can be found at the following link. https:// 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 MBE goal and the WBE goal will be considered committed, even though the listing shall include both committed MBE/WBE subcontractors and additional MBE/WBE subcontractors. Any additional MBE/WBE subcontractor participation above the goal for which letters of intent are received will follow the banking guidelines found elsewhere in this provision. All other additional MBE/WBE subcontractor participation submitted at the time of bid will be used toward the Department's overall race-neutral goals. Only those firms with current MBE and WBE certification at the time of 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 Expedite, the bidding software of Bid Express®.

(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 Expedite, 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 either the MBE or WBE goal.

(B) Paper Bids

(1) *If either the MBE or 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 corresponding goal.

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

MBE or WBE Prime Contractor

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

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

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

Written Documentation – Letter of Intent

The bidder shall submit written documentation for each MBE/WBE that will be used to meet the MBE and WBE goals 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 MBE and WBE goals, or if the form is incomplete (i.e. both signatures are not present), the MBE/WBE participation will not count toward meeting the MBE/WBE goal. If the lack of this participation drops the commitment below either the MBE or WBE goal, the Contractor shall submit evidence of good faith efforts for the goal not met, completed in its entirety, to the State Contractor Utilization Engineer or DBE@ncdot.gov no later than 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 by Letter of Intent exceeds the algebraic sum of the MBE or WBE goal by $1,000 or more, the excess will be placed on deposit by the Department for future use by the 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 firms to meet the contract goal, as part of the good faith effort, the Department will consider allowing the bidder to withdraw funds to meet the MBE goal as long as there are adequate funds available from the bidder's MBE bank account.

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

Submission of Good Faith Effort

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

A hard copy and an electronic copy of this information shall be received in the office of the State Contractor Utilization Engineer or at DBE@ncdot.gov no later than 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 9 copies of this information shall be received under the same time constraints above.

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

Consideration of Good Faith Effort for Projects with MBE/WBE Goals More Than Zero

Adequate good faith efforts mean that the 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 MBE and WBE goals will be achieved.

(1) Where appropriate, break out contract work items into economically feasible units to facilitate MBE/WBE participation, even when the prime contractor might otherwise prefer to perform these work items with its own forces.

(2) Negotiate with subcontractors to assume part of the responsibility to meet the contract MBE/WBE goals 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 contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using MBEs/WBEs is not in itself sufficient reason for a bidder's failure to meet the contract MBE or WBE goals, as long as such costs are reasonable. Also, the ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the 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 DBE@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 MBE and WBE 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 MBE and WBE goals.

(2) The bidders' past performance in meeting the MBE and WBE goals.

(3) The performance of other bidders in meeting the MBE and WBE goals. For example, when the apparent successful bidder fails to meet the goals, but others meet it, you may reasonably raise the question of whether, with additional reasonable efforts the apparent successful bidder could have met the goals. If the apparent successful bidder fails to meet the MBE and WBE goals, 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 MBE and WBE goals can be met or that an adequate good faith effort has been made to meet the MBE and WBE goals.

Non-Good Faith Appeal

The State 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 MBE/WBE Goals

(A) Participation

The total dollar value of the participation by a committed MBE/WBE will be counted toward the contract goal requirements. The total dollar value of participation by a committed MBE/WBE will be based upon the value of work actually performed by the MBE/WBE and the actual payments to MBE/WBE firms by the 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 MBE contract goal requirement. The same holds for work that a WBE subcontracts to another WBE firm. Work that a MBE subcontracts to a non-MBE firm does <u>not</u> count toward the MBE contract goal requirement. Again, the same holds true for the work that a WBE subcontracts to a non-WBE firm. If a MBE or WBE contractor or subcontractor subcontracts a significantly greater portion of the work of the contract than would be expected on the basis of standard industry practices, it shall be presumed that the MBE or WBE is not performing a commercially useful function. The MBE/WBE may present evidence to rebut this presumption to the Department. The Department's decision on the rebuttal of this presumption may be subject to review by the Office of Inspector General, NCDOT.

(D) Joint Venture

When a MBE or WBE performs as a participant in a joint venture, the 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 or WBE requirement 60 percent of its expenditures for materials and supplies required to complete the contract and obtained from a MBE or WBE regular dealer and 100 percent of such expenditures from a MBE or WBE manufacturer.

(F) Manufacturers and Regular Dealers

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

(1) The fees or commissions charged by a MBE/WBE firm for providing a *bona fide* service, such as professional, technical, consultant, or managerial services, or for providing bonds or insurance specifically required for the performance of a DOT-assisted contract, provided the fees or commissions are determined to be reasonable and not excessive as compared with fees and commissions customarily allowed for similar services.

(2) With respect to materials or supplies purchased from a MBE/WBE, which is neither a manufacturer nor a regular dealer, count the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on a job site (but not the cost of the materials and supplies themselves), provided the fees are determined to be reasonable and not excessive as compared with fees customarily allowed for similar services.

Commercially Useful Function

(A) MBE/WBE Utilization

The 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.

(B) MBE/WBE Utilization in Trucking

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

(1) The MBE/WBE shall be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract, and there shall not be a contrived arrangement for the purpose of meeting the MBE or WBE goal.

(2) The MBE/WBE shall itself own and operate at least one fully licensed, insured, and operational truck used on the contract.

(3) The MBE/WBE receives credit for the total value of the transportation services it provides on the contract using trucks it owns, insures, and operates using drivers it employs.

(4) The MBE may subcontract the work to another MBE firm, including an owner-operator who is certified as a MBE. The same holds true that a WBE may subcontract the work to another WBE firm, including an owner-operator who is certified as a WBE. When this occurs, the MBE or WBE who subcontracts work receives credit for the total value of the transportation services the subcontracted MBE or WBE provides on the contract. It should be noted that every effort shall be made by MBE and WBE contractors to subcontract to the same certification (i.e., MBEs to MBEs and WBEs to WBEs), in order to fulfill the goal requirement. This, however, may not always be possible due to the limitation of firms in the area. If the MBE or WBE firm shows a good faith effort has been made to reach out to similarly certified transportation service providers and there is no interest or availability, and they can get assistance from other certified providers, the Engineer will not hold the prime liable for meeting the goal.

(5) The MBE/WBE may also subcontract the work to a non-MBE/WBE firm, including from an owner-operator. The MBE/WBE who subcontracts the work to a non-MBE/WBE is entitled to credit for the total value of transportation services provided by the non-MBE/WBE subcontractor not to exceed the value of transportation services provided by MBE/WBE-owned trucks on the contract. Additional participation by non-MBE/WBE subcontractors receives credit only for the fee or commission it receives as a result of the subcontract arrangement. The value of services performed under subcontract agreements between the MBE/WBE and the 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 firm (or an approved substitute MBE or WBE firm) to meet all or part of a contract goal requirement, the contractor shall not terminate the MBE/WBE 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. A MBE/WBE may only be terminated after receiving the Engineer's written approval based upon a finding of good cause for the termination. The prime contractor must give the MBE/WBE firm five (5) calendar days to respond to the prime contractor's notice of termination and advise the prime contractor and the Department of the reasons, if any, why the firm objects to the proposed termination of its subcontract and why the Department should not approve the action. All requests for replacement of a committed MBE/WBE firm shall be submitted to the Engineer for approval on Form RF-1 *(Replacement Request).* If the Contractor fails to follow this procedure, the Contractor may be disqualified from further bidding for a period of up to 6 months.

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

(A) Performance Related Replacement

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

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

(2) Efforts to negotiate with MBEs/WBEs for specific subbids including, at a minimum:

(a) The names, addresses, and telephone numbers of MBEs/WBEs who were contacted.

(b) A description of the information provided to MBEs/WBEs regarding the plans and specifications for portions of the work to be performed.

(3) A list of reasons why MBE/WBE quotes were not accepted.

(4) Efforts made to assist the MBEs/WBEs contacted, if needed, in obtaining bonding or insurance required by the 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 similarly certified MBE/WBE subcontractor to perform at least the same amount of work to meet the MBE/WBE goal requirement. If a MBE/WBE firm is not found to do the same amount of work, a good faith effort must be submitted to NCDOT (see A herein for required documentation).

Changes in the Work

When the Engineer makes changes that result in the reduction or elimination of work to be performed by a committed MBE/WBE, the 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 and WBE firms, including material suppliers and contractors at all levels (prime, subcontractor, or second tier subcontractor). This accounting shall be furnished to the Engineer for any given month by the end of the following month. Failure to submit this information accordingly may result in the following action:

(A) Withholding of money due in the next partial pay estimate; or

(B) Removal of an approved 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 *2012 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).

SUBSURFACE INFORMATION:

(7-1-95) 450 SP1 G112 A

There is **no** subsurface information available on this project. The Contractor shall make his own investigation of subsurface conditions.

LOCATING EXISTING UNDERGROUND UTILITIES:

(3-20-12) 105 SP1 G115

Revise the *2012 Standard Specifications* as follows:

Page 1-43, Article 105-8, line 28, after the first sentence, add the following:

Identify excavation locations by means of pre-marking with white paint, flags, or stakes or provide a specific written description of the location in the locate request.

VALUE ENGINEERING PROPOSAL:

(05-19-15) 104 SP01 G116

Revise the *2012 Standard Specifications* as follows:

Page 1-36, Subarticle 104-12(B) Evaluation of Proposals, lines 42-44, replace the fourth sentence of the second paragraph with the following:

Pending execution of a formal supplemental agreement implementing an approved VEP and transferal of final plans (hard copy and electronic) sealed by an engineer licensed in the State of North Carolina incorporating an approved VEP to the Resident Engineer and the State Value Management Engineer, the Contractor shall remain obligated to perform the work in accordance with the terms of the existing contract.

Page 1-37, Subarticle 104-12(D) Preliminary Review, lines 9-12, replace the first sentence of the first paragraph with the following:

Should the Contractor desire a preliminary review of a possible VEP, before expending considerable time and expense in full development, a copy of the Preliminary VEP shall be submitted to the Resident Engineer and the State Value Management Engineer at ValueManagementUnit@ncdot.gov.

Page 1-37, Subarticle 104-12(E) Final Proposal, lines 22-23, replace the first sentence of the first paragraph with the following:

A copy of the Final VEP shall be submitted by the Contractor to the Resident Engineer and the State Value Management Engineer at ValueManagementUnit@ncdot.gov.

Page 1-38, Subarticle 104-12(F) Modifications, lines 2-8, replace the first paragraph with the following:

To facilitate the preparation of revisions to contract drawings, the Contractor may purchase reproducible copies of drawings for his use through the Department's Value Management Unit. The preparation of new design drawings by or for the Contractor shall be coordinated with the appropriate Design Branch through the State Value Management Engineer. The Contractor shall provide, at no charge to the Department, one set of reproducible drawings of the approved design needed to implement the VEP. Drawings (hard copy and electronic) which are sealed by an engineer licensed in the State of North Carolina shall be submitted to the State Value Management Engineer no later than ten (10) business days after acceptance of a VEP unless otherwise permitted.

Page 1-38, Subarticle 104-12(F) Modifications, line 17, add the following at the end of the third paragraph:

Supplemental agreements executed for design-bid-build contracts shall reflect any realized savings in the corresponding line items. Supplemental agreements executed for design-build contracts shall add one line item deducting the full savings from the total contract price and one line item crediting the Contractor with 50% of the total VEP savings.

Page 1-38, Subarticle 104-12(F) Modifications, lines 45-47, replace the eighth paragraph with the following:

Unless and until a supplemental agreement is executed and issued by the Department and final plans (hard copy and electronic) sealed by an engineer licensed in the State of North Carolina incorporating an approved VEP have been provided to the Resident Engineer and the State Value Management Engineer, the Contractor shall remain obligated to perform the work in accordance with the terms of the existing contract.

RESOURCE CONSERVATION AND ENV. SUSTAINABLE PRACTICES:

(5-21-13) (Rev. 5-19-15) 104-13 SP1 G118

In accordance with North Carolina Executive Order 156, NCGS 130A-309.14(3), and NCGS 136-28.8, it is the objective of the Department to aid in the reduction of materials that become a part of our solid waste stream, to divert materials from landfills, to find ways to recycle and reuse

materials, to consider and minimize, where economically feasible, the environmental impacts associated with agency land use and acquisition, construction, maintenance and facility management for the benefit of the Citizens of North Carolina.

To achieve the mission of reducing environmental impacts across the state, the Department is committed to supporting the efforts to initiate, develop and use products and construction methods that incorporate the use of recycled, solid waste products and environmentally sustainable practices in accordance with Article 104-13 of the *Standard Specifications*.

Report the quantities of reused or recycled materials either incorporated in the project or diverted from landfills and any practice that minimizes the environmental impact on the project annually on the Project Construction Reuse and Recycling Reporting Form. The Project Construction Reuse and Recycling Reporting Form and a location tool for local recycling facilities are available at:
http://connect.ncdot.gov/resources/Environmental/Pages/North-Carolina-Recycling-Locations.aspx.

Submit the Project Construction Reuse and Recycling Reporting Form by August 1 annually to valuemanagementunit@ncdot.gov. For questions regarding the form or reporting, please contact the State Value Management Engineer at 919-707-4810.

DOMESTIC STEEL:

(4-16-13) 106 SP1 G120

Revise the *2012 Standard Specifications* as follows:

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

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

REMOVABLE PAVEMENT MARKINGS - (Partial Payments for Materials):

(7-1-95) (Rev. 8-16-11) 1205-10 SP1 G124

When so authorized by the Engineer, partial materials payments will be made up to 95 percent of the delivered cost of pavement marking tape, provided that these materials have been delivered on or in the vicinity of the project, stored in an acceptable manner, not to exceed the shelf life recommended by the manufacturer, and further provided the documents listed in Subarticle 109-5(C) of the *2012 Standard Specifications* have been furnished to the Engineer.

The Contractor shall be responsible for the material and the satisfactory performance of the material when used in the work.

The provisions of Article 109-6 of the *2012 Standard Specifications* will not apply to removable pavement marking materials.

MAINTENANCE OF THE PROJECT:

(11-20-07) (Rev. 1-17-12) 104-10 SP1 G125

Revise the *2012 Standard Specifications* as follows:

Page 1-35, 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 1-35, 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 1-35, 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.

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.

IRAN DIVESTMENT ACT:

(5-17-16) SP01 G151

As a result of the Iran Divestment Act of 2015 (Act), Article 6E, N.C. General Statute § 147-86.55, the State Treasurer published the Final Divestment List (List) which includes the Final Divestment List-Iran, and the Parent and Subsidiary Guidance-Iran. These lists identify companies and persons engaged in investment activities in Iran and will be updated every 180 days. The List can be found at https://www.nctreasurer.com/inside-the-department/OpenGovernment/Pages/Iran-Divestment-Act-Resources.aspx

By submitting the Offer, the Contractor certifies that, as of the date of this bid, it is not on the then-current List created by the State Treasurer. The Contractor must notify the Department immediately if, at any time before the award of the contract, it is added to the List.

As an ongoing obligation, the Contractor must notify the Department immediately if, at any time during the contract term, it is added to the List. Consistent with § 147-86.59, the Contractor shall not contract with any person to perform a part of the work if, at the time the subcontract is signed, that person is on the then-current List.

During the term of the Contract, should the Department receive information that a person is in violation of the Act as stated above, the Department will offer the person an opportunity to respond and the Department will take action as appropriate and provided for by law, rule, or contract.

GIFTS FROM VENDORS AND CONTRACTORS:

(12-15-09) 107-1 SP1 G152

By Executive Order 24, issued by Governor Perdue, and *N.C.G.S.§ 133-32*, it is unlawful for any vendor or contractor (i.e. architect, bidder, contractor, construction manager, design professional, engineer, landlord, offeror, seller, subcontractor, supplier, or vendor), to make gifts or to give favors to any State employee of the Governor's Cabinet Agencies (i.e. Administration, Commerce, Correction, Crime Control and Public Safety, Cultural Resources, Environment and Natural Resources, Health and Human Services, Juvenile Justice and Delinquency Prevention, Revenue, Transportation, and the Office of the Governor). This prohibition covers those vendors and contractors who:

(A) Have a contract with a governmental agency; or
(B) Have performed under such a contract within the past year; or
(C) Anticipate bidding on such a contract in the future.

For additional information regarding the specific requirements and exemptions, vendors and contractors are encouraged to review Executive Order 24 and *N.C.G.S. § 133-32*.

Executive Order 24 also encouraged and invited other State Agencies to implement the requirements and prohibitions of the Executive Order to their agencies. Vendors and contractors should contact other State Agencies to determine if those agencies have adopted Executive Order 24.

LIABILITY INSURANCE:

(5-20-14) SP1 G160

Revise the *2012 Standard Specifications* as follows:

Page 1-60, Article 107-15 LIABILITY INSURANCE, line 16, add the following as the second sentence of the third paragraph:

Prior to beginning services, all contractors shall provide proof of coverage issued by a workers' compensation insurance carrier, or a certificate of compliance issued by the Department of Insurance for self-insured subcontractors, irrespective of whether having regularly in service fewer than three employees.

EMPLOYMENT:

(11-15-11) (Rev. 1-17-12) 108, 102 SP1 G184

Revise the *2012 Standard Specifications* as follows:

Page 1-20, Subarticle 102-15(O), delete and replace with the following:

(O) Failure to restrict a former Department employee as prohibited by Article 108-5.

Page 1-65, Article 108-5 Character of Workmen, Methods, and Equipment, line 32, delete all of line 32, the first sentence of the second paragraph and the first word of the second sentence of the second paragraph.

STATE HIGHWAY ADMINISTRATOR TITLE CHANGE:

(9-18-12) SP1 G185

Revise the *2012 Standard Specifications* as follows:

Replace all references to "State Highway Administrator" with "Chief Engineer".

SUBLETTING OF CONTRACT:

(11-18-2014) 108-6 SP1 G186

Revise the *2012 Standard Specifications* as follows:

Page 1-66, Article 108-6 Subletting of Contract, line 37, add the following as the second sentence of the first paragraph:

All requests to sublet work shall be submitted within 30 days of the date of availability or prior to expiration of 20% of the contract time, whichever date is later, unless otherwise approved by the Engineer.

Page 1-67, Article 108-6 Subletting of Contract, line 7, add the following as the second sentence of the fourth paragraph:

Purchasing materials for subcontractors is not included in the percentage of work required to be performed by the Contractor. If the Contractor sublets items of work but elects to purchase material for the subcontractor, the value of the material purchased will be included in the total dollar amount considered to have been sublet.

PROJECT SPECIAL PROVISIONS

ROADWAY

ASPHALT PAVEMENTS - SUPERPAVE:

(6-19-12) (Rev. 8-16-16) 605, 609, 610, 650 SP6 R01

Revise the *2012 Standard Specifications* as follows:

Page 6-3, Article 605-7, APPLICATION RATES AND TEMPERATURES, replace this article, including Table 605-1, with the following:

Apply tack coat uniformly across the existing surface at target application rates shown in Table 605-1.

TABLE 605-1
APPLICATION RATES FOR TACK COAT

Existing Surface	Target Rate (gal/sy)
	Emulsified Asphalt
New Asphalt	0.04 ± 0.01
Oxidized or Milled Asphalt	0.06 ± 0.01
Concrete	0.08 ± 0.01

Apply tack coat at a temperature within the ranges shown in Table 605-2. Tack coat shall not be overheated during storage, transport or at application.

TABLE 605-2
APPLICATION TEMPERATURE FOR TACK COAT

Asphalt Material	Temperature Range
Asphalt Binder, Grade PG 64-22	350 - 400°F
Emulsified Asphalt, Grade RS-1H	130 - 160°F
Emulsified Asphalt, Grade CRS-1	130 - 160°F
Emulsified Asphalt, Grade CRS-1H	130 - 160°F
Emulsified Asphalt, Grade HFMS-1	130 - 160°F
Emulsified Asphalt, Grade CRS-2	130 - 160°F

Page 6-6, Subarticle 607-5(A), Milled Asphalt Pavement, line 25, add the following to the end of the paragraph:

Areas to be paid under these items include mainline, turn lanes, shoulders, and other areas milled in conjunction with the mainline and any additional equipment necessary to remove pavement in the area of manholes, water valves, curb, gutter and other obstructions.

Page 6-6, Subarticle 607-5(C), Incidental Milling, lines 42-48, replace the paragraph with the following:

Incidental Milling to be paid will be the actual number of square yards of surface milled where the Contractor is required to mill butt joints, irregular areas and intersections milled as a separate operation from mainline milling and re-mill areas that are not due to the Contractor's negligence

whose length is less than 100 feet. Measurement will be made as provided in Subarticle 607-5(A) for each cut the Contractor is directed to perform. Where the Contractor elects to make multiple cuts to achieve the final depth, no additional measurement will be made. Compensation will be made at the contract unit price per square yard for *Incidental Milling*.

Page 6-7, Article 609-3, FIELD VERIFICATION OF MIXTURE AND JOB MIX FORMULA ADJUSTMENTS, lines 35-37, delete the second sentence of the second paragraph.

Page 6-18, Article 610-1 DESCRIPTION, lines 40-41, delete the last sentence of the last paragraph.

Page 6-19, Subarticle 610-3(A), Mix Design-General, line 5, add the following as the first paragraph:

Warm mix asphalt (WMA) is allowed for use at the Contractor's option in accordance with the NCDOT Approved Products List for WMA Technologies available at:
https://connect.ncdot.gov/resources/Materials/MaterialsResources/Warm%20Mix%20Asphalt%20Approved%20List.pdf

Page 6-20, Subarticle 610-3(C), Job Mix Formula (JMF), lines 47-48, replace the last sentence of the third paragraph with the following:

The JMF mix temperature shall be within the ranges shown in Table 610-1 unless otherwise approved.

Page 6-21, Subarticle 610-3(C) Job Mix Formula (JMF), replace Table 610-1 with the following:

TABLE 610-1
MIXING TEMPERATURE AT THE ASPHALT PLANT

Binder Grade	JMF Mix Temperature
PG 58-28; PG 64-22	250 - 290ºF
PG 70-22	275- 305ºF
PG 76-22	300- 325ºF

Page 6-21, Subarticle 610-3(C) Job Mix Formula (JMF), lines 1-2, in the first sentence of the first paragraph, delete "and compaction". Lines 4-7, delete the second paragraph and replace with the following:

When RAS is used, the JMF mix temperature shall be established at 275ºF or higher.

Page 6-22, Article 610-4, WEATHER, TEMPERATURE AND SEASONAL LIMITATIONS FOR PRODUCING AND PLACING ASPHALT MIXTURES, lines 15-17, replace the second sentence of the first paragraph with the following:

Do not place asphalt material when the air or surface temperatures, measured at the location of the paving operation away from artificial heat, do not meet Table 610-5.

Page 6-23, Article 610-4, WEATHER, TEMPERATURE AND SEASONAL LIMITATIONS FOR PRODUCING AND PLACING ASPHALT MIXTURES, replace Table 610-5 with the following:

TABLE 610-5
PLACEMENT TEMPERATURES FOR ASPHALT

Asphalt Concrete Mix Type	Minimum Surface and Air Temperature
B25.0B, C	35°F
I19.0B, C, D	35°F
SF9.5A, S9.5B	40°F[A]
S9.5C, S12.5C	45°F[A]
S9.5D, S12.5D	50°F

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

Page 6-23, Subarticle 610-5(A), General, lines 33-34, replace the last sentence of the third paragraph with the following:

Produce the mixture at the asphalt plant within ±25 ºF of the JMF mix temperature. The temperature of the mixture, when discharged from the mixer, shall not exceed 350ºF.

Page 6-26, Article 610-7, HAULING OF ASPHALT MIXTURE, lines 22-23, in the fourth sentence of the first paragraph replace "so as to overlap the top of the truck bed and" with "to". Line 28, in the last paragraph, replace "+15 ºF to -25 ºF of the specified JMF temperature." with "±25 ºF of the specified JMF mix temperature."

Page 6-26, Article 610-8, SPREADING AND FINISHING, **line 34**, add the following new paragraph:

As referenced in Section 9.6.3 of the *HMA/QMS Manual*, use the automatic screed controls on the paver to control the longitudinal profile. Where approved by the Engineer, the Contractor has the option to use either a fixed or mobile string line.

Page 6-29, Article 610-13, FINAL SURFACE TESTING AND ACCEPTANCE, line 39, add the following after the first sentence in the first paragraph:

Smoothness acceptance testing using the inertial profiler is not required on ramps, loops and turn lanes.

Page 6-30, Subarticle 610-13(A), Option 1 – Inertial Profiler, lines 15-16, replace the fourth sentence of the fourth paragraph with the following:

The interval at which relative profile elevations are reported shall be 2".

Page 6-30, Subarticle 610-13(A), Option 1 – Inertial Profiler, lines 25-28, replace the ninth paragraph with the following:

Operate the profiler at any speed as per the manufacturer's recommendations to collect valid data.

Page 6-30, Subarticle 610-13(A), Option 1 – Inertial Profiler, lines 30-31, delete the third sentence of the tenth paragraph.

Page 6-31, Subarticle 610-13(A), Option 1 – Inertial Profiler, lines 11-13, replace the first sentence of the third paragraph with the following:

After testing, transfer the profile data from the profiler portable computer's hard drive to a write once storage media (Flash drive, USB, DVD-R or CD-R) or electronic media approved by the Engineer.

Page 6-31, Subarticle 610-13(A), Option 1 – Inertial Profiler, lines 17-18, replace the first sentence of the fourth paragraph with the following:

Submit a report with the documentation and electronic data of the evaluation for each section to the Engineer within 10 days after completion of the smoothness testing. The report shall be in the tabular format for each 0.10 segment or a portion thereof with a summary of the MRI values and the localized roughness areas including corresponding project station numbers or acceptable reference points. Calculate the pay adjustments for all segments in accordance with the formulas in Sections (1) and (2) shown below. The Engineer shall review and approval all pay adjustments unless corrective action is required.

Page 6-31, Subarticle 610-13(A)(1), Acceptance for New Construction, lines 36-37, replace the third paragraph with the following:

The price adjustment will apply to each 0.10-mile section or prorated for a portion thereof, based on the Mean Roughness Index (MRI), the average IRI values from both wheel paths.

Page 6-32, Subarticle 610-13(A)(2), Localized Roughness, lines 12-16, replace the first paragraph with the following:

Areas of localized roughness shall be identified through the "Smoothness Assurance Module (SAM)" provided in the ProVAL software. Use the SAM report to optimize repair strategies by analyzing the measurements from profiles collected using inertial profilers. The ride quality threshold for localized roughness shall be 165 in/mile for any sections that are 15 ft. to 100 ft. in length at the continuous short interval of 25 ft. Submit a continuous roughness report to identify each section with project station numbers or reference points outside the threshold and identify all localized roughness, with the signature of the Operator included with the submitted IRI trace and electronic files.

Page 6-32, Subarticle 610-13(A)(2), Localized Roughness, line 21, add the following new paragraph:

If the Engineer does not require corrective action, the pay adjustment for each area of localized roughness shall be based on the following formula:

PA = (165 – LR#) 5

Where:

PA = Pay Adjustment (dollars)
LR# = The Localized Roughness number determined from SAM report for the ride quality threshold

Page 6-41, Subarticle 650-3(B), Mix Design Criteria, replace Table 650-1 with the following:

TABLE 650-1
OGAFC GRADATION CRITERIA

Sieve Size (mm)	*Type FC-1*	*Type FC-1 Modified*	*Type FC-2 Modified*
19.0	-	-	100
12.5	100	100	80 - 100
9.50	75 - 100	75 - 100	55 - 80
4.75	25 - 45	25 - 45	15 - 30
2.36	5 - 15	5 - 15	5 - 15
0.075	1.0 - 3.0	1.0 - 3.0	2.0 - 4.0

ASPHALT BINDER CONTENT OF ASPHALT PLANT MIXES:
(11-21-00) (Rev. 7-17-12) 609 SP6 R15

The approximate asphalt binder content of the asphalt concrete plant mixtures used on this project will be as follows:

Asphalt Concrete Base Course	Type B 25.0__	4.4%
Asphalt Concrete Intermediate Course	Type I 19.0__	4.8%
Asphalt Concrete Surface Course	Type S 4.75A	6.8%
Asphalt Concrete Surface Course	Type SA-1	6.8%
Asphalt Concrete Surface Course	Type SF 9.5A	6.7%
Asphalt Concrete Surface Course	Type S 9.5__	6.0%
Asphalt Concrete Surface Course	Type S 12.5__	5.6%

The actual asphalt binder content will be established during construction by the Engineer within the limits established in the *2012 Standard Specifications.*

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 *2012 Standard Specifications.*

The base price index for asphalt binder for plant mix is **$ 361.07** per ton.

This base price index represents an average of F.O.B. selling prices of asphalt binder at supplier's terminals on **March 1, 2017**.

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.*

MATERIALS:

(2-21-12) (Rev. 11-22-16) 1000, 1002, 1005, 1016, 1018, 1024, 1050, 1074, 1078, 1080, 1081, 1086, 1084, 1087, 1092 SP10 R01

Revise the *2012 Standard Specifications* as follows:

Page 10-1, Article 1000-1, DESCRIPTION, lines 9-10, replace the last sentence of the first paragraph with the following:

Type IL, IP, IS or IT blended cement may be used instead of Portland cement.

Page 10-1, Article 1000-1, DESCRIPTION, line 14, add the following:

If any change is made to the mix design, submit a new mix design (with the exception of an approved pozzolan source change).

If any major change is made to the mix design, also submit new test results showing the mix design conforms to the criteria. Define a major change to the mix design as:

(1) A source change in coarse aggregate, fine aggregate or cement.

(2) A pozzolan class or type change (e.g. Class F fly ash to Class C fly ash).

(3) A quantitative change in coarse aggregate (applies to an increase or decrease greater than 5%), fine aggregate (applies to an increase or decrease greater than 5%), water (applies to an increase only), cement (applies to a decrease only), or pozzolan (applies to an increase or decrease greater than 5%).

Use materials which do not produce a mottled appearance through rusting or other staining of the finished concrete surface.

Page 10-1, Article 1000-2, MATERIALS, line 16; Page 10-8, Subarticle 1000-7(A), Materials, line 8; and Page 10-18, Article 1002-2, MATERIALS, line 9, add the following to the table of item references:

Item	**Section**
Type IL Blended Cement	1024-1

Page 10-1, Subarticle 1000-3(A), Composition and Design, lines 25-27, replace the second paragraph with the following:

Fly ash may be substituted for cement in the mix design up to 30% at a rate of 1.0 lb of fly ash to each pound of cement replaced.

Page 10-2, Subarticle 1000-3(A), Composition and Design, lines 12-21, delete the third paragraph through the sixth paragraph beginning with "If any change is made to the mix design, submit…" through "…(applies to a decrease only)."

Page 10-5, Table 1000-1, REQUIREMENTS FOR CONCRETE, replace with the following:

TABLE 1000-1
REQUIREMENTS FOR CONCRETE

Class of Concrete	Min. Comp. Strength at 28 days	Maximum Water-Cement Ratio				Consistency Max. Slump		Cement Content			
		Air-Entrained Concrete		Non Air-Entrained Concrete		Vibrated	Non-Vibrated	Vibrated		Non-Vibrated	
		Rounded Aggregate	Angular Aggregate	Rounded Aggregate	Angular Aggregate			Min.	Max.	Min.	Max.
Units	*psi*					*inch*	*inch*	*lb/cy*	*lb/cy*	*lb/cy*	*lb/cy*
AA	4,500	0.381	0.426	-	-	3.5	-	639	715	-	-
AA Slip Form	4,500	0.381	0.426	-	-	1.5	-	639	715	-	-
Drilled Pier	4,500	-	-	0.450	0.450	-	5-7 dry 7-9 wet	-	-	640	800
A	3,000	0.488	0.532	0.550	0.594	3.5	4	564	-	602	-
B	2,500	0.488	0.567	0.559	0.630	1.5 machine-placed 2.5 hand-placed	4	508	-	545	-
Sand Light-weight	4,500	-	0.420	-	-	4	-	715	-	-	-
Latex Modified	3,000 7 day	0.400	0.400	-	-	6	-	658	-	-	-
Flowable Fill excavatable	150 max. at 56 days	as needed	as needed	as needed	as needed	-	Flow-able	-	-	40	100
Flowable Fill non-excavatable	125	as needed	as needed	as needed	as needed	-	Flow-able	-	-	100	as needed
Pavement	4,500 design, field 650 flexural, design only	0.559	0.559	-	-	1.5 slip form 3.0 hand place	-	526	-	-	-
Precast	See Table 1077-1	as needed	as needed	-	-	6	as needed	as needed	as needed	as needed	as needed
Prestress	per contract	See Table 1078-1	See Table 1078-1	-	-	8	-	564	as needed	-	-

Page 10-6, Subarticle 1000-4(I), Use of Fly Ash, lines 36-2, replace the first paragraph with the following:

Fly ash may be substituted for cement in the mix design up to 30% at a rate of 1.0 lb of fly ash to each pound of cement replaced. Use Table 1000-1 to determine the maximum allowable water-cementitious material (cement + fly ash) ratio for the classes of concrete listed.

Page 10-7, Table 1000-3, MAXIMUM WATER-CEMENTITIOUS MATERIAL RATIO, delete the table.

Page 10-7, Article 1000-5, HIGH EARLY STRENGTH PORTLAND CEMENT CONCRETE, lines 30-31, delete the second sentence of the third paragraph.

Page 10-19, Article 1002-3, SHOTCRETE FOR TEMPORARY SUPPORT OF EXCAVATIONS, line 30, add the following at the end of Section 1002:

(H) Handling and Storing Test Panels

Notify the Area Materials Engineer when preconstruction or production test panels are made within 24 hours of shooting the panels. Field cure and protect test panels from damage in accordance with ASTM C1140 until the Department transports panels to the Materials and Tests Regional Laboratory for coring.

Page 10-23, Table 1005-1, AGGREGATE GRADATION-COARSE AGGREGATE, replace with the following:

TABLE 1005-1
AGGREGATE GRADATION - COARSE AGGREGATE

Std. Size #	Percentage of Total by Weight Passing											Remarks
	2"	1 1/2"	1"	3/4"	1/2"	3/8"	#4	#8	#10	#16	#40	#200	
4	100	90-100	20-55	0-15	-	0-5	-	-	-	-	-	A	Asphalt Plant Mix
467M	100	95-100	-	35-70	-	0-30	0-5	-	-	-	-	A	Asphalt Plant Mix
5	-	100	90-100	20-55	0-10	0-5	-	-	-	-	-	A	AST, Sediment Control Stone
57	-	100	95-100	-	25-60	-	0-10	0-5	-	-	-	A	AST, Structural Concrete, Shoulder Drain Stone, Sediment Control Stone
57M	-	100	95-100	-	25-45	-	0-10	0-5	-	-	-	A	AST, Concrete Pavement
6M	-	-	100	90-100	20-55	0-20	0-8	-	-	-	-	A	AST
67	-	-	100	90-100	-	20-55	0-10	0-5	-	-	-	A	Asphalt Plant Mix, AST, Structural Concrete
78M	-	-	-	100	98-100	75-100	20-45	0-15	-	-	-	A	Asphalt Plant Mix, AST, Structural Concrete, Weep Hole Drains
14M	-	-	-	-	100	98-100	35-70	5-20	-	0-8	-	A	Asphalt Plant Mix, AST, Structural Concrete, Weep Hole Drains
9M	-	-	-	-	100	98-100	85-100	10-40	-	0-10	-	A	AST
ABC	-	100	75-97	-	55-80	-	35-55	-	25-45	-	14-30	4-12[B]	Aggregate Base Course, Aggregate Stabilization
ABC(M)	-	100	75- 100	-	45-79	-	20-40	-	0- 25	-	-	0-12[B]	Maintenance Stabilization
Light-weight[C]	-	-	-	-	100	80-100	5- 40	0-20	-	0-10	-	0-2.5	AST

A. See Subarticle 1005-4(A).
B. See Subarticle 1005-4(B).
C. For Lightweight Aggregate used in Structural Concrete, see Subarticle 1014-2(E)(6).

Page 10-39, Article 1016-3, CLASSIFICATIONS , lines 27-32, replace with the following:

Select material is clean, unweathered durable, blasted rock material obtained from an approved source. While no specific gradation is required, the below criteria will be used to evaluate the materials for visual acceptance by the Engineer:

(A) At least 50% of the rock has a diameter of from 1.5 ft to 3 ft,

(B) 30% of the rock ranges in size from 2" to 1.5 ft in diameter, and

(C) Not more than 20% of the rock is less than 2" in diameter. No rippable rock will be permitted.

Page 10-40, Tables 1018-1 and 1018-2, PIEDMONT, WESTERN AND COASTAL AREA CRITERIA FOR ACCEPTANCE OF BORROW MATERIAL, under second column in both tables, replace second row with the following:

Acceptable, but not to be used in the top 3 ft of embankment or backfill

Page 10-46, Article 1024-1, PORTLAND CEMENT, line 33, add the following as the ninth paragraph:

Use Type IL blended cement that meets AASHTO M 240, except that the limestone content is limited to between 5 and 12% by weight and the constituents shall be interground. Class F fly ash can replace a portion of Type IL blended cement and shall be replaced as outlined in Subarticle 1000-4(I) for Portland cement. For mixes that contain cement with alkali content between 0.6% and 1.0% and for mixes that contain a reactive aggregate documented by the Department, use a pozzolan in the amount shown in Table 1024-1.

Page 10-46, Table 1024-1, POZZOLANS FOR USE IN PORTLAND CEMENT CONCRETE, replace with the following:

TABLE 1024-1
POZZOLANS FOR USE IN PORTLAND CEMENT CONCRETE

Pozzolan	Rate
Class F Fly Ash	20% - 30% by weight of required cement content with 1.0 lb Class F fly ash per lb of cement replaced
Ground Granulated Blast Furnace Slag	35%-50% by weight of required cement content with 1.0 lb slag per lb of cement replaced
Microsilica	4%-8% by weight of required cement content with 1.0 lb microsilica per lb of cement replaced

Page 10-47, Subarticle 1024-3(B), Approved Sources, lines 16-18, replace the second sentence of the second paragraph with the following:

Tests shall be performed by AASHTO's designated National Transportation Product Evaluation Program (NTPEP) laboratory for concrete admixture testing.

Page 10-65, Article 1050-1, GENERAL, line 41, replace the first sentence with the following:

All fencing material and accessories shall meet Section 106.

Page 10-115, Subarticle 1074-7(B), Gray Iron Castings, lines 10-11, replace the first two sentences with the following:

Supply gray iron castings meeting all facets of AASHTO M 306 excluding proof load. Proof load testing will only be required for new casting designs during the design process, and conformance to M306 loading (40,000 lb.) will be required only when noted on the design documents.

Page 10-126, Table 1078-1, REQUIREMENTS FOR CONCRETE, replace with the following:

TABLE 1078-1
REQUIREMENTS FOR CONCRETE

Property	28 Day Design Compressive Strength 6,000 psi or less	28 Day Design Compressive Strength greater than 6,000 psi
Maximum Water/Cementitious Material Ratio	0.45	0.40
Maximum Slump without HRWR	3.5"	3.5"
Maximum Slump with HRWR	8"	8"
Air Content (upon discharge into forms)	5 + 2%	5 + 2%

Page 10-151, Article 1080-4, INSPECTION AND SAMPLING, lines 18-22, replace (B), (C) and (D) with the following:

(B) At least 3 panels prepared as specified in 5.5.10 of AASHTO M 300, Bullet Hole Immersion Test.

(C) At least 3 panels of 4"x6"x1/4" for the Elcometer Adhesion Pull Off Test, ASTM D4541.

(D) A certified test report from an approved independent testing laboratory for the Salt Fog Resistance Test, Cyclic Weathering Resistance Test, and Bullet Hole Immersion Test as specified in AASHTO M 300.

(E) A certified test report from an approved independent testing laboratory that the product has been tested for slip coefficient and meets AASHTO M253, Class B.

Page 10-161, Subarticle 1081-1(A), Classifications, lines 29-33, delete first 3 sentences of the description for Type 2 and replace with the following:

Type 2 - A low-modulus, general-purpose adhesive used in epoxy mortar repairs. It may be used to patch spalled, cracked or broken concrete where vibration, shock or expansion and contraction are expected.

Page 10-162, Subarticle 1081-1(A), Classifications, lines 4-7, delete the second and third sentences of the description for Type 3A. **Lines 16-22,** delete Types 6A, 6B and 6C.

Page 10-162, Subarticle 1081-1(B), Requirements, lines 26-30, replace the second paragraph with the following:

For epoxy resin systems used for embedding dowel bars, threaded rods, rebar, anchor bolts and other fixtures in hardened concrete, the manufacturer shall submit test results showing that the bonding system will obtain 125% of the specified required yield strength of the fixture. Furnish certification that, for the particular bolt grade, diameter and embedment depth required, the anchor system will not fail by adhesive failure and that there is no movement of the anchor bolt. For certification and anchorage, use 3,000 psi as the minimum Portland cement concrete compressive strength used in this test. Use adhesives that meet Section 1081.

List the properties of the adhesive on the container and include density, minimum and maximum temperature application, setting time, shelf life, pot life, shear strength and compressive strength.

Page 10-163, Table 1081-1, PROPERTIES OF MIXED EPOXY RESIN SYSTEMS, replace with the following:

TABLE 1081-1
PROPERTIES OF MIXED EPOXY RESIN SYSTEMS

Property	Type 1	Type 2	Type 3	Type 3A	Type 4A	Type 4B	Type 5
Viscosity-Poises at 77°F ± 2°F	Gel	10-30	25-75	Gel	40-150	40-150	1-6
Spindle No.	-	3	4	--	4	4	2
Speed (RPM)	-	20	20	--	10	10	50
Pot Life (Minutes)	20-50	30-60	20-50	5-50	40-80	40-80	20-60
Minimum Tensile Strength at 7 days (psi)	1,500	2,000	4,000	4,000	1,500	1,500	4,000
Tensile Elongation at 7 days (%)	30 min.	30 min.	2-5	2-5	5-15	5-15	2-5
Min. Compressive Strength of 2". mortar cubes at 24 hours	3,000 (Neat)	4,000-	6,000-	6,000 (Neat)	3,000	3,000	6,000
Min. Compressive Strength of 2" mortar cubes at 7 days	5,000 (Neat)	-	-	-	-	5,000	-
Maximum Water Absorption (%)	1.5	1.0	1.0	1.5	1.0	1.0	1.0
Min. Bond Strength Slant Shear Test at 14 days (psi)	1,500	1,500	2,000	2,000	1,500	1,500	1,500

Page 10-164, Subarticle 1081-1(E), Prequalification, lines 31-33, replace the second sentence of the first paragraph with the following:

Manufacturers choosing to supply material for Department jobs must submit an application through the Value Management Unit with the following information for each type and brand name:

Page 10-164, Subarticle 1081-1(E)(3), line 37, replace with the following:

(3) Type of the material in accordance with Articles 1081-1 and 1081-4,

Page 10-165, Subarticle 1081-1(E)(6), line 1, in the first sentence of the first paragraph replace "AASHTO M 237" with "the specifications".

Page 10-165, Subarticle 1081-1(E), Prequalification, line 9-10, delete the second sentence of the last paragraph.

Page 10-165, Subarticle 1081-1(F), Acceptance, line 14, in the first sentence of the first paragraph replace "Type 1" with "Type 3".

Page 10-169, Subarticle 1081-3(G), Anchor Bolt Adhesives, delete this subarticle.

Page 10-170, Article 1081-3, HOT BITUMEN, line 9, add the following at the end of Section 1081:

1081-4 EPOXY RESIN ADHESIVE FOR BONDING TRAFFIC MARKINGS

(A) General

This section covers epoxy resin adhesive for bonding traffic markers to pavement surfaces.

(B) Classification

The types of epoxies and their uses are as shown below:

Type I – Rapid Setting, High Viscosity, Epoxy Adhesive. This type of adhesive provides rapid adherence to traffic markers to the surface of pavement.

Type II – Standard Setting, High Viscosity, Epoxy Adhesive. This type of adhesive is recommended for adherence of traffic markers to pavement surfaces when rapid set is not required.

Type III – Rapid Setting, Low Viscosity, Water Resistant, Epoxy Adhesive. This type of rapid setting adhesive, due to its low viscosity, is appropriate only for use with embedded traffic markers.

Type IV – Standard Set Epoxy for Blade Deflecting-Type Plowable Markers.

(C) Requirements

Epoxies shall conform to the requirements set forth in AASHTO M 237.

(D) Prequalification

Refer to Subarticle 1081-1(E).

(E) Acceptance

Refer to Subarticle 1081-1(F).

Page 10-173, Article 1084-2, STEEL SHEET PILES, lines 37-38, replace first paragraph with the following:

Steel sheet piles detailed for permanent applications shall be hot rolled and meet ASTM A572 or ASTM A690 unless otherwise required by the plans. Steel sheet piles shall be coated as required by the plans. Galvanized sheet piles shall be coated in accordance with Section 1076. Metallized sheet piles shall be metallized in accordance to the Project Special Provision "Thermal Sprayed Coatings (Metallization)" with an 8 mil, 99.9% aluminum alloy coating and a 0.5 mil seal coating. Any portion of the metallized sheet piling encased in concrete shall receive a barrier coat. The barrier coat shall be an approved waterborne coating with a low-

viscosity which readily absorbs into the pores of the aluminum thermal sprayed coating. The waterborne coating shall be applied at a spreading rate that results in a theoretical 1.5 mil dry film thickness. The manufacturer shall issue a letter of certification that the resin chemistry of the waterborne coating is compatible with the 99.9% aluminum thermal sprayed alloy and suitable for tidal water applications.

Page 10-174, Subarticle 1086-1(B)(1), Epoxy, lines 18-24, replace with the following:

The epoxy shall meet Article 1081-4.

The 2 types of epoxy adhesive which may be used are Type I, Rapid Setting, and Type II, Standard Setting. Use Type II when the pavement temperature is above 60°F or per the manufacturer's recommendations whichever is more stringent. Use Type I when the pavement temperature is between 50°F and 60°F or per the manufacturer's recommendations whichever is more stringent. Epoxy adhesive Type I, Cold Set, may be used to attach temporary pavement markers to the pavement surface when the pavement temperature is between 32°F and 50°F or per the manufacturer's recommendations whichever is more stringent.

Page 10-175, Subarticle 1086-2(E), Epoxy Adhesives, line 27, replace "Section 1081" with "Article 1081-4".

Page 10-177, Subarticle 1086-3(E), Epoxy Adhesives, line 22, replace "Section 1081" with "Article 1081-4".

Page 10-179, Subarticle 1087-4(A), Composition, lines 39-41, replace the third paragraph with the following:

All intermixed and drop-on glass beads shall not contain more than 75 ppm arsenic or 200 ppm lead.

Page 10-180, Subarticle 1087-4(B), Physical Characteristics, line 8, replace the second paragraph with the following:

All intermixed and drop-on glass beads shall comply with NCGS § 136-30.2 and 23 USC § 109(r).

Page 10-181, Subarticle 1087-7(A), Intermixed and Drop-on Glass Beads, line 24, add the following after the first paragraph:

Use X-ray Fluorescence for the normal sampling procedure for intermixed and drop-on beads, without crushing, to check for any levels of arsenic and lead. If any arsenic or lead is detected, the sample shall be crushed and repeat the test using X-ray Fluorescence. If the X-ray Fluorescence test shows more than a LOD of 5 ppm, test the beads using United States Environmental Protection Agency Method 6010B, 6010C or 3052 for no more than 75 ppm arsenic or 200 ppm lead.

GROUT PRODUCTION AND DELIVERY:
(3-17-15) 1003 SP10 R20

Revise the *2012 Standard Specifications* as follows:

Replace Section 1003 with the following:

SECTION 1003
GROUT PRODUCTION AND DELIVERY

1003-1 DESCRIPTION

This section addresses cement grout to be used for structures, foundations, retaining walls, concrete barriers, embankments, pavements and other applications in accordance with the contract. Produce non-metallic grout composed of Portland cement and water and at the Contractor's option or as required, aggregate and pozzolans. Include chemical admixtures as required or needed. Provide sand cement or neat cement grout as required. Define "sand cement grout" as grout with only fine aggregate and "neat cement grout" as grout without aggregate.

The types of grout with their typical uses are as shown below:

Type 1 – A cement grout with only a 3-day strength requirement and a fluid consistency that is typically used for filling subsurface voids.

Type 2 – A nonshrink grout with strength, height change and flow conforming to ASTM C1107 that is typically used for foundations, ground anchors and soil nails.

Type 3 – A nonshrink grout with high early strength and freeze-thaw durability requirements that is typically used in pile blockouts, grout pockets, shear keys, dowel holes and recesses for concrete barriers and structures.

Type 4 – A neat cement grout with low strength, a fluid consistency and high fly ash content that is typically used for slab jacking.

Type 5 – A low slump, low mobility sand cement grout with minimal strength that is typically used for compaction grouting.

1003-2 MATERIALS

Refer to Division 10.

Item	Section
Chemical Admixtures	1024-3
Fine Aggregate	1014-1
Fly Ash	1024-5
Ground Granulated Blast Furnace Slag	1024-6
Portland Cement	1024-1
Silica Fume	1024-7
Water	1024-4

Do not use grout that contains soluble chlorides or more than 1% soluble sulfate. At the Contractor's option, use an approved packaged grout instead of the materials above except for water. Use packaged grouts that are on the NCDOT Approved Products List.

Use admixtures for grout that are on the NCDOT Approved Products List or other admixtures in accordance with Subarticle 1024-3(E) except do not use concrete additives or unclassified or other admixtures in Type 4 or 5 grout. Use Class F fly ash for Type 4 grout and Type II Portland cement for Type 5 grout.

Use well graded rounded aggregate with a gradation, liquid limit (LL) and plasticity index (PI) that meet Table 1003-1 for Type 5 grout. Fly ash may be substituted for a portion of the fines in the aggregate. Do not use any other pozzolans in Type 5 grout.

TABLE 1003-1
AGGREGATE REQUIREMENTS FOR TYPE 5 GROUT

Gradation		**Maximum Liquid Limit**	**Maximum Plasticity Index**
Sieve Designation per AASHTO M 92	**Percentage Passing (% by weight)**		
3/8"	100	N/A	N/A
No. 4	70 – 95		
No. 8	50 – 90		
No. 16	30 – 80		
No. 30	25 – 70		
No. 50	20 – 50		
No. 100	15 – 40		
No. 200	10 – 30	25	10

1003-3 COMPOSITION AND DESIGN

When using an approved packaged grout, a grout mix design submittal is not required. Otherwise, submit proposed grout mix designs for each grout mix to be used in the work. Mixes for all grout shall be designed by a Certified Concrete Mix Design Technician or an Engineer licensed by the State of North Carolina. Mix proportions shall be determined by a testing laboratory approved by the Department. Base grout mix designs on laboratory trial batches that meet Table 1003-2 and this section. With permission, the Contractor may use a quantity of chemical admixture within the range shown on the current list of approved admixtures maintained by the Materials and Tests Unit.

Submit grout mix designs in terms of saturated surface dry weights on Materials and Tests Form 312U at least 35 days before proposed use. Adjust batch proportions to compensate for surface moisture contained in the aggregates at the time of batching. Changes in the saturated surface dry mix proportions will not be permitted unless revised grout mix designs have been submitted to the Engineer and approved.

Accompany Materials and Tests Form 312U with a listing of laboratory test results of compressive strength, density and flow or slump and if applicable, aggregate gradation,

durability and height change. List the compressive strength of at least three 2" cubes at the age of 3 and 28 days.

The Engineer will review the grout mix design for compliance with the contract and notify the Contractor as to its acceptability. Do not use a grout mix until written notice has been received. Acceptance of the grout mix design or use of approved packaged grouts does not relieve the Contractor of his responsibility to furnish a product that meets the contract. Upon written request from the Contractor, a grout mix design accepted and used satisfactorily on any Department project may be accepted for use on other projects.

Perform laboratory tests in accordance with the following test procedures:

Property	**Test Method**
Aggregate Gradation[A]	AASHTO T 27
Compressive Strength	AASHTO T 106
Density (Unit Weight)	AASHTO T 121, AASHTO T 133[B], ANSI/API RP[C] 13B-1[B] (Section 4, Mud Balance)
Durability	AASHTO T 161[D]
Flow	ASTM C939 (Flow Cone)
Height Change	ASTM C1090[E]
Slump	AASHTO T 119

A. Applicable to grout with aggregate.
B. Applicable to Neat Cement Grout.
C. American National Standards Institute/American Petroleum Institute Recommended Practice.
D. Procedure A (Rapid Freezing and Thawing in Water) required.
E. Moist room storage required.

1003-4 GROUT REQUIREMENTS

Provide grout types in accordance with the contract. Use grouts with properties that meet Table 1003-2. The compressive strength of the grout will be considered the average compressive strength test results of three 2" cubes at each age. Make cubes that meet AASHTO T 106 from the grout delivered for the work or mixed on-site. Make cubes at such frequencies as the Engineer may determine and cure them in accordance with AASHTO T 106.

TABLE 1003-2 GROUT REQUIREMENTS					
Type of Grout	**Minimum Compressive Strength at**		**Height Change at 28 days**	**Flow[A]/Slump[B]**	**Minimum Durability Factor**
	3 days	**28 days**			
1	3,000 psi	–	–	10 – 30 sec	–
2	Table 1[C]			Fluid Consistency[C]	–
3	5,000 psi	–	0 – 0.2%	Per Accepted Grout Mix Design/ Approved Packaged Grout	80
4[D]	600 psi	1,500 psi	–	10 – 26 sec	–
5	–	500 psi	–	1 – 3"	–

A. Applicable to Type 1 through 4 grouts.
B. Applicable to Type 5 grout.
C. ASTM C1107.
D. Use Type 4 grout with proportions by volume of 1 part cement and 3 parts fly ash.

1003-5 TEMPERATURE REQUIREMENTS

When using an approved packaged grout, follow the manufacturer's instructions for grout and air temperature at the time of placement. Otherwise, the grout temperature at the time of placement shall be not less than 50°F nor more than 90°F. Do not place grout when the air temperature measured at the location of the grouting operation in the shade away from artificial heat is below 40°F.

1003-6 ELAPSED TIME FOR PLACING GROUT

Agitate grout continuously before placement. Regulate the delivery so the maximum interval between the placing of batches at the work site does not exceed 20 minutes. Place grout before exceeding the times in Table 1003-3. Measure the elapsed time as the time between adding the mixing water to the grout mix and placing the grout.

TABLE 1003-3 ELAPSED TIME FOR PLACING GROUT (with continuous agitation)		
Air or Grout Temperature, Whichever is Higher	**Maximum Elapsed Time**	
	No Retarding Admixture Used	**Retarding Admixture Used**
90°F or above	30 minutes	1 hr. 15 minutes
80°F through 89°F	45 minutes	1 hr. 30 minutes
79°F or below	60 minutes	1 hr. 45 minutes

1003-7 MIXING AND DELIVERY

Use grout free of any lumps and undispersed cement. When using an approved packaged grout, mix grout in accordance with the manufacturer's instructions. Otherwise, comply with Articles 1000-8 through 1000-12 to the extent applicable for grout instead of concrete.

TRUCK MOUNTED CHANGEABLE MESSAGE SIGNS:

(8-21-12) 1101.02 SP11 R10

Revise the *2012 Roadway Standard Drawings* as follows:

Drawing No. 1101.02, Sheet 12, TEMPORARY LANE CLOSURES, replace General Note #11 with the following:

11- TRUCK MOUNTED CHANGEABLE MESSAGE SIGNS (TMCMS) USED ON SHADOW VEHICLES FOR "IN LANE" ACTIVITIES SHALL BE A MINIMUM OF 43" X 73". THE DISPLAY PANEL SHALL HAVE FULL MATRIX CAPABILITY WITH THE CAPABILITY TO PROVIDE 2 MESSAGE LINES WITH 7 CHARACTERS PER LINE WITH A MINIMUM CHARACTER HEIGHT OF 18". FOR ADDITIONAL MESSAGING, CONTACT THE WORK ZONE TRAFFIC CONTROL SECTION.

12- TMCMS USED FOR ADVANCED WARNING ON VEHICLES LOCATED ON THE SHOULDER MAY BE SMALLER THAN 43" X 73". THE DISPLAY PANEL SHALL HAVE THE CAPABILITY TO PROVIDE 2 MESSAGE LINES WITH 7 CHARACTERS PER LINE WITH A MINIMUM CHARACTER HEIGHT OF 18". FOR ADDITIONAL MESSAGING, CONTACT THE WORK ZONE TRAFFIC CONTROL SECTION.

Drawing No. 1101.02, Sheet 13, TEMPORARY LANE CLOSURES, replace General Note #12 with the following:

12- TRUCK MOUNTED CHANGEABLE MESSAGE SIGNS (TMCMS) USED ON SHADOW VEHICLES FOR "IN LANE" ACTIVITIES SHALL BE A MINIMUM OF 43" X 73". THE DISPLAY PANEL SHALL HAVE FULL MATRIX CAPABILITY WITH THE CAPABILITY TO PROVIDE 2 MESSAGE LINES WITH 7 CHARACTERS PER LINE WITH A MINIMUM CHARACTER HEIGHT OF 18". FOR ADDITIONAL MESSAGING, CONTACT THE WORK ZONE TRAFFIC CONTROL SECTION.

13- TMCMS USED FOR ADVANCED WARNING ON VEHICLES LOCATED ON THE SHOULDER MAY BE SMALLER THAN 43" X 73". THE DISPLAY PANEL SHALL HAVE THE CAPABILITY TO PROVIDE 2 MESSAGE LINES WITH 7 CHARACTERS PER LINE WITH A MINIMUM CHARACTER HEIGHT OF 18". FOR ADDITIONAL MESSAGING, CONTACT THE WORK ZONE TRAFFIC CONTROL SECTION.

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(E) of the *2012 Standard Specifications*.

STANDARD SPECIAL PROVISION

ERRATA

(1-17-12) (Rev. 04-21-15) Z-4

Revise the *2012 Standard Specifications* as follows:

Division 2

Page 2-7, line 31, Article 215-2 Construction Methods, replace "Article 107-26" with "Article 107-25".

Page 2-17, Article 226-3, Measurement and Payment, line 2, delete "pipe culverts,".

Page 2-20, Subarticle 230-4(B), Contractor Furnished Sources, change references as follows:
Line 1, replace "(4) Buffer Zone" with "(c) Buffer Zone"; **Line 12,** replace "(5) Evaluation for Potential Wetlands and Endangered Species" with "(d) Evaluation for Potential Wetlands and Endangered Species"; and **Line 33,** replace "(6) Approval" with "(4) Approval".

Division 3

Page 3-1, after line 15, Article 300-2 Materials, replace "1032-9(F)" with "1032-6(F)".

Division 4

Page 4-77, line 27, Subarticle 452-3(C) Concrete Coping, replace "sheet pile" with "reinforcement".

Division 6

Page 6-7, line 31, Article 609-3 Field Verification of Mixture and Job Mix Formula Adjustments, replace "30" with "45".

Page 6-10, line 42, Subarticle 609-6(C)(2), replace "Subarticle 609-6(E)" with "Subarticle 609-6(D)".

Page 6-11, Table 609-1 Control Limits, replace "Max. Spec. Limit" for the Target Source of $P_{0.075}/P_{be}$ Ratio with "1.0".

Page 6-40, Article 650-2 Materials, replace "Subarticle 1012-1(F)" with "Subarticle 1012-1(E)"

Division 7

Page 7-1, Article 700-3, CONCRETE HAULING EQUIPMENT, line 33, replace "competion" with "completion".

Division 8

Page 8-23, line 10, Article 838-2 Materials, replace "Portland Cement Concrete, Class B" with "Portland Cement Concrete, Class A".

Division 10

Page 10-166, Article 1081-3 Hot Bitumen, replace "Table 1081-16" with "Table 1081-2", replace "Table 1081-17" with "Table 1081-3", and replace "Table 1081-18" with "Table 1081-4".

Division 12

Page 12-7, Table 1205-3, add "FOR THERMOPLASTIC" to the end of the title.
Page 12-8, Subarticle 1205-5(B), line 13, replace "Table 1205-2" with "Table 1205-4".
Page 12-8, Table 1205-4 and 1205-5, replace "THERMOPLASTIC" in the title of these tables with "POLYUREA".
Page 12-9, Subarticle 1205-6(B), line 21, replace "Table 1205-4" with "Table 1205-6".
Page 12-11, Subarticle 1205-8(C), line 25, replace "Table 1205-5" with "Table 1205-7".

Division 15

Page 15-4, Subarticle 1505-3(F) Backfilling, line 26, replace "Subarticle 235-4(C)" with "Subarticle 235-3(C)".
Page 15-6, Subarticle 1510-3(B), after line 21, replace the allowable leakage formula with the following: $\mathbf{W=LD\sqrt{P} \div 148{,}000}$
Page 15-6, Subarticle 1510-3(B), line 32, delete "may be performed concurrently or" and replace with "shall be performed".
Page 15-17, Subarticle 1540-3(E), line 27, delete "Type 1".

Division 17

Page 17-26, line 42, Subarticle 1731-3(D) Termination and Splicing within Interconnect Center, delete this subarticle.

Revise the *2012 Roadway Standard Drawings* as follows:

1633.01 Sheet 1 of 1, English Standard Drawing for Matting Installation, replace "1633.01" with "1631.01".

STANDARD SPECIAL PROVISION

PLANT AND PEST QUARANTINES
(Imported Fire Ant, Gypsy Moth, Witchweed, Emerald Ash Borer, And Other Noxious Weeds)

(3-18-03) (Rev. 12-20-16) 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 *http://www.ncagr.gov/plantindustry/* to determine those specific project sites located in the quarantined area or for any regulated article used on this project originating in a quarantined county.

Regulated Articles Include

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

AWARD OF CONTRACT

(6-28-77)(Rev 2/16/2016) Z-6

"The North Carolina Department of Transportation, in accordance with the provisions of *Title VI of the Civil Rights Act of 1964* (78 Stat. 252) and the Regulations of the Department of Transportation (*49 C.F.R., Part 21*), issued pursuant to such act, hereby notifies all bidders that it will affirmatively insure that the contract entered into pursuant to this advertisement will be awarded to the lowest responsible bidder without discrimination on the ground of race, color, or national origin".

TITLE VI AND NONDISCRIMINATION

I. Title VI Assurance

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:

(1) Compliance with Regulations: The contractor shall comply with the Regulation relative to nondiscrimination in Federally-assisted programs of the Department of Transportation (hereinafter, "DOT") Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.

(2) 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 either directly or indirectly in the discrimination prohibited by section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.

(3) 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 Regulations relative to nondiscrimination on the grounds of race, color, or national origin.

(4) Information and Reports: The contractor shall provide all information and reports required by the Regulations or 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 North Carolina Department of Transportation (NCDOT) or the Federal Highway Administration (FHWA) to be pertinent to ascertain compliance with such Regulations, orders and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information the contractor shall so certify to the NCDOT, or the FHWA as appropriate, and shall set forth what efforts it has made to obtain the information.

(5) Sanctions for Noncompliance: In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the NCDOT shall impose such contract sanctions as it or the FHWA may determine to be appropriate, including, but not limited to:

(a) Withholding of payments to the contractor under the contract until the contractor complies, and/or

(b) Cancellation, termination or suspension of the contract, in whole or in part.

(6) Incorporation of Provisions: The contractor shall include the provisions of paragraphs (1) through (6) in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto.

The contractor shall take such action with respect to any subcontractor procurement as the NCDOT or the FHWA may direct as a means of enforcing such provisions including sanctions for noncompliance: provided, however, that, in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the NCDOT to enter into such litigation to protect the interests of the NCDOT, and, in addition, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

II. Title VI Nondiscrimination Program

Title VI of the 1964 Civil Rights Act, 42 U.S.C. 2000d, provides that: "No person in the United States shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance." The broader application of nondiscrimination law is found in other statutes, executive orders, and regulations (see Section III, Pertinent Nondiscrimination Authorities), which provide additional protections based on age, sex, disability and religion. In addition, the 1987 Civil Rights Restoration Act extends nondiscrimination coverage to all programs and activities of federal-aid recipients and contractors, including those that are not federally-funded.

Nondiscrimination Assurance

The North Carolina Department of Transportation (NCDOT) hereby gives assurance that no person shall on the ground of race, color, national origin, sex, age, and disability, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity conducted by the recipient, as provided by Title VI of the Civil Rights Act of 1964, the Civil Rights Restoration Act of 1987, and any other related Civil Rights authorities, whether those programs and activities are federally funded or not.

Obligation

During the performance of this contract, the Contractor and its subcontractors are responsible for complying with NCDOT's Title VI Program. The Contractor must ensure that NCDOT's Notice of Nondiscrimination is posted in conspicuous locations accessible to all employees and subcontractors on the jobsite, along with the Contractor's own Equal Employment Opportunity (EEO) Policy Statement. The Contractor shall physically incorporate this "**TITLE VI AND NONDISCRIMINATION**" language, in its entirety, into all its subcontracts on federally-assisted and state-funded NCDOT-owned projects, and ensure its inclusion by subcontractors into all subsequent lower tier subcontracts. The Contractor and its subcontractors shall also physically incorporate the **FHWA-1273**, in its entirety, into all subcontracts and subsequent lower tier subcontracts on **Federal-aid highway** construction contracts only. The Contractor is also responsible for making its subcontractors aware of NCDOT's Discrimination Complaints Process, as follows:

FILING OF COMPLAINTS

1. **Applicability** – These complaint procedures apply to the beneficiaries of the NCDOT's programs, activities, and services, including, but not limited to, members of the public, contractors, subcontractors, consultants, and other sub-recipients of federal and state funds.
2. **Eligibility** – Any person or class of persons who believes he/she has been subjected to discrimination or retaliation prohibited by any of the Civil Rights authorities, based upon race, color, sex, age, national origin, or disability, may file a written complaint with NCDOT's Civil Rights office. The law prohibits intimidation or retaliation of any sort. The complaint may be filed by the affected individual or a representative, and must be in writing.
3. **Time Limits and Filing Options** – A complaint must be filed no later than 180 calendar days after the following:
   - The date of the alleged act of discrimination; or
   - The date when the person(s) became aware of the alleged discrimination; or
   - 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 other discrimination complaints may be submitted to the following entities:
   - **North Carolina Department of Transportation**, Office of Equal Opportunity & Workforce Services (EOWS), External Civil Rights Section, 1511 Mail Service Center, Raleigh, NC 27699-1511; 919-508-1808 or toll free 800-522-0453
   - **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

     Federal Highway Administration, North Carolina Division Office, 310 New Bern Avenue, Suite 410, Raleigh, NC 27601, 919-747-7010

     Federal Highway Administration, Office of Civil Rights, 1200 New Jersey Avenue, SE, 8th Floor, E81-314, Washington, DC 20590, 202-366-0693 / 366-0752

     Federal Transit Administration, Office of Civil Rights, ATTN: Title VI Program Coordinator, East Bldg. 5th Floor – TCR, 1200 New Jersey Avenue, SE, Washington, DC 20590

     Federal Aviation Administration, Office of Civil Rights, 800 Independence Avenue, SW, Washington, DC 20591, 202-267-3258
   - **US Department of Justice**, Special Litigation Section, Civil Rights Division, 950 Pennsylvania Avenue, NW, Washington, DC 20530, 202-514-6255 or toll free 877-218-5228
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 EOWS at the phone number above 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, sex, age, or disability. The term "basis" refers to the complainant's membership in a protected group category. Contact this office to receive a Discrimination Complaint Form.

Protected Categories	Definition	Examples	Applicable Statutes and Regulations	
			FHWA	FTA
Race	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	Title VI of the Civil Rights Act of 1964; 49 CFR Part 21; Circular 4702.1B
Color	Color of skin, including shade of skin within a racial group	Black, White, brown, yellow, etc.		
National Origin	Place of birth. Citizenship is not a factor. Discrimination based on language or a person's accent is also covered.	Mexican, Cuban, Japanese, Vietnamese, Chinese		
Sex	Gender	Women and Men	1973 Federal-Aid Highway Act	Title IX of the Education Amendments of 1972
Age	Persons of any age	21 year old person	Age Discrimination Act of 1975	
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	

III. Pertinent Nondiscrimination Authorities

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

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq*., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21.
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 *et seq*.), (prohibits discrimination on the basis of sex);
- Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 *et seq*.), as amended, (prohibits discrimination on the basis of disability); and 49 CFR Part 27;
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 *et seq*.), (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
- 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);

- 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;
- The Federal Aviation Administration's Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures discrimination 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;
- 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);
- 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).
- 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);
- 49 CFR Part 26, regulation to ensure nondiscrimination in the award and administration of DOT-assisted contracts in the Department's highway, transit, and airport financial assistance programs, as regards the use of Disadvantaged Business Enterprises (DBEs);
- Form FHWA-1273, "Required Contract Provisions," a collection of contract provisions and proposal notices that are generally applicable to *all Federal-aid construction projects* and must be made a part of, and physically incorporated into, *all federally-assisted contracts*, as well as appropriate subcontracts and purchase orders, particularly Sections II (Nondiscrimination) and III (Nonsegregated Facilities).

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.

STANDARD SPECIAL PROVISION

NAME CHANGE FOR NCDENR

(1-19-16) Z-11

Description

Wherever in the 2012 Standard Specifications, Project Special Provisions, Standard Special Provisions, Permits or Plans that reference is made to “NCDENR” or “North Carolina Department of Environment and Natural Resources”, replace with “NCDEQ” or “North Carolina Department of Environmental Quality” respectively, as the case may be.

TC-1

B-5938/B-5939 Carteret County

WORK ZONE TRAFFIC CONTROL
Project Special Provisions

Law Enforcement:
(05/14/2013)

Description

Furnish Law Enforcement Officers and marked Law Enforcement vehicles to direct traffic in accordance with the contract.

Construction Methods

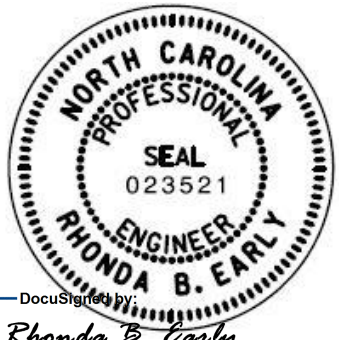
Use uniformed Law Enforcement Officers and marked Law Enforcement vehicles equipped with blue lights mounted on top of the vehicle, and Law Enforcement vehicle emblems to direct or control traffic as required by the plans or by the Engineer.

Measurement and Payment

Law Enforcement will be measured and paid for in the actual number of hours that each Law Enforcement Officer is provided during the life of the project as approved by the Engineer. There will be no direct payment for marked Law Enforcement vehicles as they are considered incidental to the pay item.

Payment will be made under:

Pay Item	Pay Unit
Law Enforcement	Hour



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PROJECT SPECIAL PROVISIONS
LIGHTING

1.00 DESCRIPTION

The work covered by this Section consists of removing existing light standards with HPS luminaires, removing existing concrete foundations of ground mounted light standards, providing and installing new light standard foundations, providing and installing new light standards with LED luminaires, replacing existing conductors where needed, and ensuring proper operation of bridge lighting at locations shown on the plans. Perform all work in accordance with these Special Provisions, the Plans, the National Electrical Code, and North Carolina Department of Transportation "Standard Specifications for Roads and Structures" (*2012 Standard Specifications*).

Perform all work in conformance with Division 14 of the *2012 Standard Specifications* except as modified or added to by these Special Provisions. Install all bore pits outside the clear zone, as defined in the AASHTO Roadside Design Guide or as directed by the Engineer.

In addition to the requirements of Division 1400, other specific Sections of the *2012 Standard Specifications* applicable to the work on this project are listed below.

Section 1405	Standard Foundation
Section 1409	Electrical Duct
Section 1410	Feeder Circuits

2.00 CONSTRUCTION METHODS

Modify the fourth paragraph of Standard Specification 1400-4(F) to read as follows:

Install manufactured set screw type connectors, suitable for connecting multiple wires, and which are UL Listed (UL486D) for all phase conductor splices. These precise fit connectors are insulated with high–strength dielectric material and have removable access plugs over the set screws. Direct buried and/or submersible versions of these connectors, equipped with factory made waterproof insulating boots, are required for splicing inside junction boxes. Non-direct buried and/or non-submersible connectors may be used for phase conductor splicing in normally dry areas such as inside poles and transformer bases. After tightening set screw, tape down the access plugs to keep them securely in place. Split-bolt connectors may be used for ground wire splicing. Wire nut and compression type connectors will not be allowed.

Add the following to the end of Standard Specification 1400-4:

(K) Foundations
Form foundations with prefabricated cardboard forms down to 12" min. below top of ground.

Do not erect standards before test cylinders representing the foundation concrete have attained the minimum compressive strength detailed in Section 1000 of the *2012 Standard Specifications.*

Test cylinders shall be provided for each truckload of concrete used for light pole foundations. Tests shall be conducted as described in Section 1000 of the *2012 Standard Specifications.*

To avoid vehicle undercarriage snagging of any substantial remains of a breakaway support (when it is broken away), the edge of the foundation or top of anchor bolt should not extend more than four inches (4") above a sixty inch (60") chord aligned radially to the centerline of the highway, and connecting any point within the length of the chord on the ground surface on one side of the foundation to a point on the ground surface on the other side.

3.00 BURN IN TEST

Add the following to the end of Standard Specification 1400-6:

The Contractor is responsible for all maintenance of the lighting system(s) installed or renovated as part of this contract until contract completion. The Department will assume maintenance responsibility for the completed lighting systems after the entire project is accepted and there is no chance of construction related damage.

4.00 REMOVE LIGHT STANDARD

4.10 DESCRIPTION

The work covered by this section consists of the removal of existing metal light standards on outriggers on the Atlantic Beach Bridge (NCDOT Bridge No. 150068) and ground mounted metal light standards on SR 1182 from US70 to the Atlantic Beach Bridge. The standards are single arm at 35' or less mounting height and are attached to the outrigger or ground mounted foundation with anchor bolts.

4.20 MATERIALS

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

4.30 CONSTRUCTION METHODS

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

Coordinate work with the NC DOT Traffic Services Supervisor to assure that circuits can be de-energized where and when necessary.

Remove luminaires from pole-arms. Coordinate luminaire removal with the Engineer. Dispose of removed luminaires in accordance with North Carolina Department of Environmental Quality guidelines for State owned hazardous waste recycling.

Remove light standard and arms, couplings, anchor nuts, washers and connecting bolts. Removed items shall be disposed of in a manner acceptable to the Engineer.

All hoisting and lifting shall be with rope or web slings fastened in such a manner as to prevent the light standard from falling into the Bogue Sound or onto Bridge 150068 during removal. To aid in pole location in the event of a light standard becoming detached and falling into the Bogue Sound, a buoy with a rope of appropriate length shall be fastened to each light standard removed from the Atlantic Beach Bridge prior to removal operations commencing. In the event that a light standard falls into the Sound or on the bridge, the contractor is responsible for all costs associated with locating and removing the standard from the Sound; repairs to damage to the Bridge; and damage and injury to the marine, vehicular, cycling, or pedestrian public.

After removal of the light standard from the Atlantic Beach Bridge outriggers, the existing grout from the outrigger to the base plate of the light standard must be removed and the anchor bolt cleaned and analyzed for deterioration and corrosion.

Blast clean the corrosion from the anchor bolts. Using a micrometer, measure and record the diameter of each existing 1” anchor bolt.

Anchor bolts showing a sectional loss of less than 10% (in which the diameter measures 0.95” or larger) are considered acceptable. When all existing anchor bolts in a single outrigger are acceptable, apply new protection in the form of a zinc rich paint to all exposed anchor bolt surfaces. After paint has cured, install new light standard as described in Section 7.00 of these Project Special Provisions.

When the measured diameter of an any existing anchor bolt in a single outrigger shows a sectional loss of greater than 10% (in which the diameter measures less than 0.95”), the contractor shall install an Alternate Outrigger Mount as detailed in Section 8.00 of these Project Special Provisions.

If existing anchor bolts are damaged due to Contractor negligence during light standard removal, the Contractor is responsible to provide the Alternate Outrigger Mount at no charge to the Department.

4.40 MEASUREMENT AND PAYMENT

The quantity of removed light standards to be paid for will be the actual number of light standards which have been dismounted from existing outriggers or ground mounted foundations and properly disposed of.

The removed light standards measured as provided above will be paid for at the contract unit price per each "Remove Light Standard from Outrigger" or “Remove Light Standard from Foundation”. Such price and payment will be considered full compensation for disassembly and disposal of the base, shaft with arm, luminaire and hardware. For “Remove Light Standard from Outrigger”, the price also includes removing the existing grout between the outrigger and

baseplate, blast cleaning the existing anchor bolts, measuring and recording sectional area and repainting the exposed area of the anchor bolt with a zinc rich paint.

Payment will be made under:

Remove Light Standard from Outrigger.....Each
Remove Light Standard from Foundation.....Each

5.00 REMOVE FOUNDATION

5.10 DESCRIPTION

The work covered by this section consists of the removal of existing concrete foundations for ground mounted light standards.

Concrete foundations to be removed may be located in areas where, due to knockdowns, there are no light standards to be removed.

5.20 MATERIALS

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

5.30 CONSTRUCTION METHODS

Locate existing conduit entering foundation, and cut existing conduit flush with edge of foundation prior to foundation removal. Existing underground conduit will be retained and reused.

Remove the existing concrete light standard foundations for ground mounted light standards as defined in Standard Specifications Section 1400-10. Dispose of the removed concrete, reinforcing steel and anchor bolts in a manner acceptable to the Engineer. New light standards and foundations will be installed in the same location as removed standards and foundations, so backfilling is not required.

5.40 MEASUREMENT AND PAYMENT

The quantity of removed foundations to be paid for will be the actual number of foundations which have been removed and property disposed of.

The removed foundations measured as provided above will be paid for at the contract unit price per each “Remove Light Standard Foundation”. Such price and payment will be considered full compensation for removing and disposing of foundation concrete, reinforcing steel and anchor bolts.

Payment will be made under:

Remove Light Standard Foundation.....Each

6.00 LIGHT STANDARD FOUNDATION

6.10 DESCRIPTION

Same as Article 1405-1 of the *2012 Standard Specifications.*

6.20 MATERIALS

Same as Article 1405-2 of the *2012 Standard Specifications.*

6.30 CONSTRUCTION METHODS

Same as Article 1405-3 of the *2012 Standard Specifications.*

Connect conduit in new foundation to existing underground conduit system so that a continuous conduit system is formed between foundations and from control system to foundation. Install new conductor as detailed in Section 10 of these Project Special Provisions.

6.40 MEASUREMENT AND PAYMENT

Same as Article 1405-4 of the *2012 Standard Specifications*.

Payment will be made under:

Standard Foundation, _____..……Each

7.00 LIGHT STANDARDS

7.10 DESCRIPTION

Furnish and install light standards 35 ft. high complete with light bracket arms, brackets for banners or flags (standards on bridge only), and an AASHTO approved impact attenuation device (standards on mainland only) as shown on the plans.

7.20 MATERIALS

All light standards shall be designed for 110 MPH wind speed.

Light standards to be installed at locations on the mainland shall have a mounting height of 35 feet, a single arm length of 6 feet and shall meet the requirements of Article 1404-2 of the *2012 Standard Specifications.*

Light standards to be installed at locations on the Atlantic Beach Bridge shall have a mounting height of 35 feet, a single arm length of 6 feet, and shall meet the requirements of Article 1404-2 of the *2012 Standard Specifications*, except brackets for banner or flag display shall be included and the baseplate shall have a 4 bolt square base with bolt circle (B.C.) of 11 inches to attach to existing outriggers. Impact attenuation devices are not required for light standards installed on the Atlantic Beach Bridge. The additional wind loading of the flag and bracket assemblies shall be included in the design for the poles mounted on the Atlantic Beach Bridge. Include any required vibration dampeners.

7.30 CONSTRUCTION METHODS

Same as Article 1404-3 of the *2012 Standard Specifications*, except as modified as follows:

All hoisting and lifting shall be with rope or web slings fastened in such a manner as to prevent light standards on the Atlantic Beach Bridge from falling into the Bogue Sound or onto Bridge 150068 during installation. To aid in pole location in the event of a light standard becoming detached and falling into the Bogue Sound, a buoy with a rope of appropriate length shall be fastened to each light standard to be installed on the Atlantic Beach Bridge prior to erecting the standard. In the event that a light standard falls into the Sound or on the bridge, the contractor is responsible for all costs associated with locating and removing the standard from the Sound; repairs to damage to the Bridge; damage and injury to the marine, vehicular, cycling, or pedestrian public; and for providing a replacement light standard. Remove the rope and buoy once the standard is securely mounted.

Light standards on the Atlantic Beach Bridge shall be erected and placed on existing outrigger assemblies. Attach standard to existing outrigger using existing anchor bolts or an Alternate Outrigger Mount. Use new galvanized steel anchor nuts and washers. Use leveling nuts as shown in the plans. Do not grout between baseplate and outrigger. Where anchor bolts are damaged or deteriorated as described in Section 4.30 of these Project Special Provisions, provide an alternate outrigger mount as described in Section 8.00 of these Project Special Provisions. If galvanizing is damaged during installation, coat damaged areas with a zinc rich paint.

Install any required vibration dampeners for the Atlantic Beach Bridge light standards.

Torque all newly installed hex nuts to 270 ft-lbs and coat any areas of damaged galvanizing with a zinc rich paint.

7.40 MEASUREMENT AND PAYMENT

Mainland Light Standards will be measured and paid for as the actual number of light standards with luminaire arm assemblies of the appropriate mounting height and bracket arm type and length, including impact attenuation device that have been installed and accepted.

Bridge Light Standards will be measured and paid as the actual number of bridge light standards with luminaire arm assemblies, of the appropriate mounting height and luminaire bracket arm

type and length, including brackets for banner or flag display that have been installed and accepted.

Payment will be made under:

Mainland Light Standards.....	Each
Bridge Light Standards.....	Each

8.00 ALTERNATE OUTRIGGER MOUNTING

8.10 DESCRIPTION

The work covered by this section consists of replacing existing anchor bolts on outriggers by coring out existing anchor bolt and installing new anchor bolts.

8.20 MATERIALS

Provide Type 3 material certifications in accordance with Article 106-3 of the *2012 Standard Specifications* for anchor bolt assemblies. Load, transport, unload and store anchor bolt assembly materials so materials are kept clean and free of damage.

Provide anchor bolt assemblies in accordance with Sheet L-4 of the plans consisting of the following:

A. Straight, continuously threaded anchor bolts
B. Heavy hex nuts, leveling nuts, flat washers and lock washers
C. Nuts and flat bars on the other ends of straight anchor bolts.

Use steel anchor bolts, nuts and flat washers that meet ASTM F1554 for Grade 55 bolts and Grade A nuts. Provide steel lock washers. Galvanize anchor bolts and exposed nuts and washers in accordance with Article 1076-4 of the *2012 Standard Specifications.*

Provide a 4-1/2”x4-1/2”x3/4” galvanized steel plate for each anchor bolt. Plates shall meet ASTM A-36.

Provide epoxy adhesive meeting classification Type 2, 3, 4, or 5 of Section 1081 of the *2012 Standard Specifications.*

8.30 CONSTRUCTION METHODS

Remove light standards and remove grout from outrigger and clean and analyze anchor bolts as described in Section 4.00.

Where any anchor bolt diameter in any outrigger is measured to be less than 0.95” as described in Section 4.30 of these Project Special Provisions, the contractor shall remove all of the anchor bolts in the outrigger and provide an alternate outrigger mount as detailed below.

Cut all anchor bolts in the outrigger flush with top of outrigger. Center a 1-1/4" bit over an existing 1" anchor bolt and core out existing anchor bolt. Continue core through the entire thickness of the outrigger. The contractor shall take measures to prevent debris from falling into the Bogue Sound. After coring through entire outrigger thickness, coat the existing embedded hex nut and bottom plate left in the outrigger with zinc rich paint. Allow paint to dry thoroughly before proceeding. Repeat this process for each anchor bolt in the outrigger.

Attach a 4-1/2"x4-1/2"x3/4" galvanized steel plate, a flat washer, lock washer and a heavy hex nut near the midpoint of the anchor bolt. As a temporary measure, use a wire tie or clamp under the steel plate to keep the plate and washers in place. Insert new anchor bolt through cored hole and attach a 4-1/2"x4-1/2"x3/4" galvanized steel plate, a flat washer, lock washer and a heavy hex nut to the bottom of the anchor bolt where the bolt protrudes through the outrigger. Center and plumb the anchor bolt in the cored hole. Use a hollow ram hydraulic jack, coupled directly to the top of the anchor rod with a pull rod assembly, to pretension the anchor bolt to 13,000 pound-force (lbf). Fill the gap between the cored hole and the anchor bolt with epoxy, leaving approximately ½" at the top of the core for epoxy expansion. Remove the wire tie or clamp holding the upper steel plate and washers and thread the hex nut to the top of the outrigger. Torque upper and lower hex nuts to 270 ft-lbs while maintaining 13,000 lbf tension on anchor bolt. After torqueing is complete, release tension, remove the jack and proceed to the next anchor bolt. See Alternate Outrigger Mounting details on sheet L-4 of the plans.

Install a leveling nut and flat washer above the upper hex nut, then install light standards per Section 7.00 of these Project Special Provisions.

Coat any areas of damaged galvanizing with a zinc rich paint.

8.40 MEASUREMENT AND PAYMENT

The quantity of alternate outrigger mounts to be paid for will be the actual number of alternate outrigger mounts which have been properly installed.

The alternate outrigger mounts measured as provided above will be paid for at the contract unit price per each "Alternate Outrigger Mounting". Such price and payment will be considered full compensation for coring four existing anchor bolts in a single outrigger, coating embedded anchor nuts and plate with zinc rich paint, installing four new anchor bolts as described with two 4-1/2"x4-1/2"x3/4" galvanized steel plates and associated hardware per anchor bolt.

Payment will be made under:

Alternate Outrigger Mounting …….Each

9.00 LIGHT STANDARD LIGHT EMITTING DIODE (LED) LUMINAIRES

9.10 DESCRIPTION

Furnish, install and place into satisfactory operation luminaire on a bracket arm , complete with

all light sources, drivers, wiring inside standard from circuit conductors to luminaire, in-line fuse holders (breakaway fuse holders required for mainland light standards) and fuses and ground wiring at the pole on light standards 35 ft. in height.

Type	Color Temp	Min. % of initial output at 70k hours	Min. Maintained Delivered Lumens
220W LED	4000K ±500K	83%	19,000

Third party certified photometric files in IES format are required to be submitted with the catalog cuts for the proposed LED roadway luminaire. Photometric files must show that proposed luminaire will meet or exceed the design shown in the plans.

The manufacturer shall state the Light Loss Factor (LLF) used in the photometric calculations for the proposed luminaire. LLF shall be calculated as follows:

LLF = Lamp Lumen Depreciation (LLD) x Luminaire Dirt Depreciation (LDD)

- Lamp Lumen Depreciation (LLD) shall be the value calculated and reported by the manufacturer based on the LM-80 and TM-21 reports for the proposed fixture for 70,000 hours at 25° C.
- Luminaire Dirt Depreciation (LDD) = 0.90

9.20 MATERIALS

9.21 LUMINAIRE REQUIREMENTS

A. General Requirements

- LM-79 photometric test reports shall be provided for all LED luminaires. LM-79 luminaire photometric reports shall be produced by an independent test laboratory and include the following:
  - Name of test laboratory. The test laboratory must hold National Voluntary Laboratory Accreditation Program (NVLAP) accreditation for the IES LM-79 test procedure or must be qualified, verified, and recognized through the U.S. Department of Energy's CALiPER program.
  - Report number
  - Date
  - Complete luminaire catalog number. Catalog number tested must match the catalog number of the luminaire submitted, except for variations which do not affect performance.
  - Description of luminaire, LED light source(s), and LED driver(s)
  - Gonio photometry
  - Colorimetry

- LM-80 lumen maintenance test report shall be provided for each respective LED light source.
- Luminaire shall be constructed of a single piece die cast aluminum housing. Each luminaire shall be finished gray in color unless otherwise noted.

- The luminaire shall have a 7 pin ANSI C136.41 compliant photo control receptacle for future expansion capabilities. Provide shorting caps to cover photocontrol receptacle for all luminaires.
- Provide a summary of reliability testing performed for LED driver.
- Luminaires maximum total power consumption shall not exceed the values shown in the table above. Nominal luminaire input wattage shall account for nominal applied voltage and any reduction in driver efficiency due to sub-optimal driver loading.
- Luminaire shall have a maximum Backlight, Uplight & Glare (BUG) rating of 3-0-3 and an IESNA distribution of Type II or Type III as required to meet the spacing, the average maintained footcandle level and the average to minimum uniformity ratio requirements shown on the plans. The same BUG rating and distribution type shall be used throughout the project.
- Luminaire electrical components (driver and surge protection) shall meet the dust and moisture requirements of ingress protection (IP) rating of IP65 and IP66 for the optical compartments as specified in ANSI C136.25, minimum.
- Luminaire shall have external and internal labels per ANSI C136.15 and ANSI C136.22, respectively. Internal label shall identify the manufacturer, year and month of manufacture and the manufacturer's part number.
- Luminaire shall have an internal bubble level.
- Luminaires shall start and operate in -20°C to +40°C ambient.
- Luminaires shall be rated for continuous service at an ambient temperature of 40°C (104°F)
- Electrically test fully assembled luminaires before shipment from factory.
- Effective Projected Area (EPA) and weight of the luminaires shall not exceed 1.4 square feet and 46 lbs.
- Luminaires shall be designed for ease of electrical component replacement.
- Luminaires shall be rated for minimum 2G vibration, minimum, per ANSI C136.31.
- LED light sources and drivers shall be RoHS compliant.
- The luminaire manufacturer shall have no less than five (5) years of experience in manufacturing LED-based lighting products and the manufacturing facility must be ISO 9001 certified.
- Luminaire shall have a 1.25" to 2.0" adjustable tenon mount for connection to luminaire bracket arm assembly.
- Pole hardware, nuts, bolts, and washers, etc. shall be made from 18-8 stainless steel, or steel conforming to ASTM A307 galvanized in accordance with ASTM A153.
- Grommets shall be installed in cable entry holes. Cable entry holes shall be free from sharp edges which might cut conductors or an ungloved hand.
- All conductors inside the luminaire shall be neatly secured with tie-wraps as needed to prevent pinch points and assist in trouble shooting.

B. Driver
- Shall be 0V-10V dimmable.

- Rated case temperature shall be suitable for operation in the luminaire operating in the ambient temperature range of -20°C to +40°C.
- Shall be rated for 480VAC at 50/60 Hz, and shall operate normally for input voltage fluctuations of ± 10%.
- Shall have a minimum Power Factor (PF) of 0.90 at full input power and across specified voltage range.
- Shall provide UL Class II output.

C. Surge Suppression
- Integral surge protection shall meet ANSI/IEEE C62.45 procedures based on ANSI/IEEE C62.41.2 definitions for standard and optional waveforms for location category C-High 10kV/10kA test, IEC 61000-4-2 (Electrostatic Discharge) 8kV Air/4kV Contact test and IEC 61000-4-4 (Fast Transients).

D. Electromagnetic interference
- Luminaires shall have a maximum Total Harmonic Distortion (THD) of 20% at full input power and across specified voltage range.
- Luminaires shall comply with FCC 47 CFR part 15 non-consumer RFI/EMI standards.

E. Electrical safety testing
- Luminaires shall be listed for wet locations.
- Luminaires shall be UL listed and labeled.

F. Finish
- Luminaires shall be painted with a corrosion resistant polyester powdered paint with a minimum 2.0 mil thickness.
- Luminaires shall exceed a rating of six per ASTM D1654 after 1000 hours of salt spray fog testing per ASTM B117.
- The coating shall exhibit no greater than 30% reduction of gloss per ASTM D523, after 500 hours of QUV testing at ASTM G154 Cycle 6.
- Exterior surfaces shall be smooth and free of burrs.

G. Thermal management
- Mechanical design of protruding external surfaces (heat sink fins) on roadway luminaries shall facilitate hose-down cleaning and discourage debris accumulation.
- Liquids or moving parts will not be allowed for thermal management.

H. Color Quality
- Minimum Color Rendering Index (CRI) of 70 with a Correlated Color Temperature (CCT) of 3500K to 4500K

I. Optics

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

J. The following shall be in accordance with corresponding sections of ANSI C136.37
   - All internal components shall be assembled and pre-wired using modular electrical connections.
   - Terminal blocks shall be used for incoming AC lines. Terminal blocks shall be easily accessible to installers or repair personnel. Wire nuts are prohibited inside the luminaire housing.

K. Latching and hinging
   - Refractor and housing door holders and hinges shall be designed to maintain positive control of door to the luminaire body so as not to allow the accidental disengagement of either door.
   - Drivers shall be mounted to a housing door designed to be opened from the bottom of the luminaire. Housing door shall allow easy removal for troubleshooting/repair on the ground.

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

9.30 WARRANTY

Provide a minimum ten-year warranty covering maintained integrity and functionality of the luminaire housing, wiring, and connections, LED light source(s) and LED driver. Negligible light output from more than 10 percent of the LED packages constitutes luminaire failure.

Warranty period shall begin after project acceptance by the Department. Supplier shall furnish documentation of warranty procedures to the Contractor stating that warranty is for NCDOT.

9.40 CONSTRUCTION METHODS

Level and secure each luminaire in all directions. Adjust any luminaires, as directed by the Engineer, to provide optimal illumination distribution.

All LED packages on all luminaires must be operating normally at contract completion. Any luminaire displaying improper operating characteristics prior to contract completion will be replaced by the Contractor at no additional cost to the Department.

9.50 MEASUREMENT AND PAYMENT

The roadway luminaries measured as provided above will be paid for at the contract unit price per each “Roadway Light Standard Luminaires – LED”. Such price and payment will be considered full compensation for providing and installing the LED roadway luminaire on the bracket arm, wiring inside the standard from the circuit conductors to the LED roadway

luminaire, in-line breakaway fuseholders with fuses and ground wiring at the pole on the light standard.

Payment will be made under:

Roadway Light Standard Luminaire – ____LED……. Each

10.00 MOREHEAD CITY LIGHTING SYSTEM

10.10 DESCRIPTION

The work covered in this section consists of removing existing conductor in conduit and furnishing and installing new conductor in existing conduit.

10.20 MATERIALS

Provide USE or USE-2 conductor sized as shown in the plans.

10.30 CONSTRUCTION METHODS

Remove all conductor between ground mounted foundations and from the Control System to the ground mounted foundations at the Morehead City Control System. Dispose of the removed conductor in a manner acceptable to the Engineer.

Install new conductor, sized as shown in the plans, between the ground mounted foundations and from the Control System to the ground mounted foundations at the Morehead City Control System. Conductor shall be installed in existing conduit.

10.40 MEASUREMENT AND PAYMENT

The work as provided above will be paid for at the lump sum price for “Morehead City Lighting System”. Such price and payment will be considered full compensation for removing existing conductors and installing new conductors in existing conduit.

Payment will be made under:

Morehead City Lighting System.....…….Lump Sum

B-5938 **LT-14** Carteret County

DocuSigned by:
Paul Chan
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1/23/2017

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

Project Special Provisions
Structures
Table of Contents

DocuSigned by:
Greg Dickey
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4/10/2017

SCOPE OF WORK

Location and Description of Bridge #6
Carteret County Bridge No. 6 is located on NC 58 over the Intracoastal Waterway between Swansboro and Emerald Isle, NC. The bridge was built in 1971 and is approximately 4,613' long and consists of 59 spans of 45" and 54" prestressed concrete girders. The clear roadway width is 34'. The navigation channel has a vertical clearance of 65'.

Description of Work
This work shall consist of furnishing all labor, materials and equipment to rehabilitate the bridge rail, superstructure and substructure as shown in the contract documents and plans. Work includes; installation of metal rail on existing concrete post and beam rail, fiber reinforced polymer (FRP) strengthening of prestressed concrete girders, prestressed concrete girder repairs, cathodic protection system for prestressed concrete girders, re-setting of existing bearings, cleaning and painting bearings with HRCSA, shotcrete repairs to substructure elements, epoxy coating of substructure elements, epoxy resin injection, repairs to pile bent footings, and pile jackets with cathodic protection.

Location and Description of Bridge #68
Carteret County Bridge No. 68 is located on SR1182 over the Intracoastal Waterway/Bogue Sound between Morehead City and Atlantic Beach, NC. The bridge was built in 1987 and is approximately 3,920' long and consists of 48 spans of 36", 45", 54" and 72" prestressed concrete girders. The clear roadway width is 58'. The navigation channel has a vertical clearance of 65'. **Based on underwater & field inspection all substructure piles appear to be 20" square piles. Contractor is responsible for verifying field dimensions.**

Description of Work
This work shall consist of furnishing all labor, materials and equipment to rehabilitate the bridge deck, superstructure and substructure as shown in the contract documents and plans. Work includes; replacement of existing bridge roadway lighting, span re-positioning, overlay of bridge deck with polyester polymer concrete (PPC), prestressed concrete girder repairs, cathodic protection system for prestressed concrete girders, shotcrete repairs to substructure elements, epoxy coating of substructure elements, epoxy resin injection, pile encapsulation, and replacement of the existing bridge fender system.

Contractor shall provide all necessary access; barges, platforms, scaffolding, ladders, etc.; provide all traffic control; coordinate with the US Coast Guard; provide all staging area, material storage; provide environmental controls to limit loss of materials into water and air; jacking, drilling, sawing and chipping equipment; and all else necessary to complete the work.

No separate payment will be made for portable lighting as the cost of such is incidental to the work being performed.

The contractor shall be responsible for fulfilling all requirements of the NCDOT Standard Specifications for Roads and Structures dated January 2012, except as otherwise specified herein.

SUBMITTAL OF WORKING DRAWINGS (6-19-15)

A. 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.

B. ADDRESSES AND CONTACTS

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

Via US mail:

Mr. T. K. Koch, P. E.
State Structures Engineer
North Carolina Department
of Transportation
Structures Management Unit
1581 Mail Service Center
Raleigh, NC 27699-1581

Attention: Mr. P. D. Lambert, P. E.
P. E.

Via other delivery service:

Mr. T. K. Koch, P. E.
State Structures Engineer
North Carolina Department
of Transportation
Structures Management Unit
1000 Birch Ridge Drive
Raleigh, NC 27610

Attention: Mr. P. D. Lambert,

Submittals may also be made via email.

Send submittals to:

plambert@ncdot.gov (Paul Lambert)

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

jgaither@ncdot.gov (James Gaither)

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. K. J. Kim, Ph. D., 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. K. J. Kim, Ph. D., 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

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

Via US mail:

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 other delivery service:

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

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

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

Primary Structures Contact:	Paul Lambert (919) 250 – 4082 facsimile plambert@ncdot.gov	(919) 707 – 6407
Secondary Structures Contacts:	James Gaither	(919) 707 – 6409

Madonna Rorie (919) 707 – 6508

Eastern Regional Geotechnical Contact (Divisions 1-7):
K. J. Kim (919) 662 – 4710
(919) 662 – 3095 facsimile
kkim@ncdot.gov

Western Regional Geotechnical Contact (Divisions 8-14):
Eric Williams (704) 455 – 8902
(704) 455 – 8912 facsimile
ewilliams3@ncdot.gov

a. 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"

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
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

1. 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*.
2. Submittals for these items are necessary only when required by a note on plans.
3. Submittals for these items may not be required. A list of pre-approved sequences is available from the producer or the Materials & Tests Unit.
4. The fabricator may submit these items directly to the Structures Management Unit.
5. The two sets of preliminary submittals required by Article 1072-8 of the *Standard Specifications* are not required for these items.

6. Submittals for Fabrication Drawings are not required. Submittals for Catalogue Cuts of Proposed Material are required. See Section 5.A of the referenced provision.
7. Submittals are necessary only when the top slab thickness is 18" or greater.

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]	8 drawings, 2 calculations	2 drawings	Applicable Provisions
Temporary Shoring [4]	5 drawings, 2 calculations	2 drawings	"Temporary Shoring" & "Temporary Soil Nail Walls"

FOOTNOTES

1. 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*.

2. Submit one hard copy of submittal to the Engineer. Submit a second copy of submittal electronically (PDF via email) or by facsimile, US mail or other delivery service to the appropriate Geotechnical Engineering Unit regional office. Electronic submission is preferred.

3. 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.

4. Electronic copy of submittal is required. See referenced provision.

CRANE SAFETY (8-15-05)

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 regulations (OSHA).

Submit all items listed below to the Engineer prior to beginning crane operations involving critical lifts. A critical lift is defined as any lift that exceeds 75 percent of the manufacturer's crane chart capacity for the radius at which the load will be lifted or requires the use of more than one crane. 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.

Certifications: **By July 1, 2006**, crane operators performing critical lifts shall be certified by NC CCO (National Commission for the Certification of Crane Operators), or satisfactorily complete the Carolinas AGC's Professional Crane Operator's Proficiency Program. Other approved nationally accredited programs will be considered upon request. All crane operators shall also have a current CDL medical card. Submit a list of anticipated critical lifts and corresponding crane operator(s). Include current certification for the type of crane operated (small hydraulic, large hydraulic, small lattice, large lattice) and medical evaluations for each operator.

GROUT FOR STRUCTURES (9-30-11)

1.0 DESCRIPTION

This special provision addresses grout for use in pile blockouts, grout pockets, shear keys, dowel holes and recesses for structures. This provision does not apply to grout placed in post-tensioning ducts for bridge beams, girders, or decks. Mix and place grout in accordance with the manufacturer's recommendations, the applicable sections of the Standard Specifications and this provision.

2.0 MATERIAL REQUIREMENTS

Use a Department approved pre-packaged, non-shrink, non-metallic grout. Contact the Materials and Tests Unit for a list of approved pre-packaged grouts and consult the manufacturer to determine if the pre-packaged grout selected is suitable for the required application.

When using an approved pre-packaged grout, a grout mix design submittal is not required.

The grout shall be free of soluble chlorides and contain less than one percent soluble sulfate. Supply water in compliance with Article 1024-4 of the Standard Specifications.

Aggregate may be added to the mix only where recommended or permitted by the manufacturer and Engineer. The quantity and gradation of the aggregate shall be in accordance with the manufacturer's recommendations.

Admixtures, if approved by the Department, shall be used in accordance with the manufacturer's recommendations. The manufacture date shall be clearly stamped on each container. Admixtures with an expired shelf life shall not be used.

The Engineer reserves the right to reject material based on unsatisfactory performance.

Initial setting time shall not be less than 10 minutes when tested in accordance with ASTM C266.

Test the expansion and shrinkage of the grout in accordance with ASTM C1090. The grout shall expand no more than 0.2% and shall exhibit no shrinkage. Furnish a Type 4 material certification showing results of tests conducted to determine the properties listed in the Standard Specifications and to assure the material is non-shrink.

Unless required elsewhere in the contract the compressive strength at 3 days shall be at least 5000 psi. Compressive strength in the laboratory shall be determined in accordance with ASTM C109 except the test mix shall contain only water and the dry manufactured material. Compressive strength in the field will be determined by molding and testing 4" x 8" cylinders in accordance with AASHTO T22.

Construction loading and traffic loading shall not be allowed until the 3 day compressive strength is achieved.

When tested in accordance with ASTM C666, Procedure A, the durability factor of the grout shall not be less than 80.

3.0 SAMPLING AND PLACEMENT

Place and maintain components in final position until grout placement is complete and accepted. Concrete surfaces to receive grout shall be free of defective concrete, laitance, oil, grease and other foreign matter. Saturate concrete surfaces with clean water and remove excess water prior to placing grout.

Do not place grout if the grout temperature is less than 50°F or more than 90°F or if the air temperature measured at the location of the grouting operation in the shade away from artificial heat is below 45°F.

Provide grout at a rate that permits proper handling, placing and finishing in accordance with the manufacturer's recommendations unless directed otherwise by the Engineer. Use grout free of any lumps and undispersed cement. Agitate grout continuously before placement.

Control grout delivery so the interval between placing batches in the same component does not exceed 20 minutes.

The Engineer will determine the locations to sample grout and the number and type of samples collected for field and laboratory testing. The compressive strength of the grout will be considered the average compressive strength test results of 3 cube or 2 cylinder specimens at 28 days.

4.0 BASIS OF PAYMENT

No separate payment will be made for "Grout for Structures". The cost of the material, equipment, labor, placement, and any incidentals necessary to complete the work shall be considered incidental to the structure item requiring grout.

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. Screed 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 ½" 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 ¾".

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.

TEMPORARY WORK PLATFORM (SPECIAL)

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.

The platform shall be cleaned after each work day to prevent materials from falling or washing into the river.

No separate payment will be made for *Temporary Work Platform* as the cost of such is considered incidental to the work being performed and such cost shall be covered in payment of other work pay items.

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 Coast Guard. See *Removal of Existing Fender System* provision below.

Informal Commitments Made thru USCG Coordination:

1. The Contractor shall make the best possible effort to minimize impact to the existing channel by utilizing small work barges for fender construction.
2. The Contractor is especially forewarned that work barges shall be required to be removed from the channel to allow the passage of large vessels. The Contractor shall identify movable span bridges both up channel and down channel from the work site and establish a system for notification of incoming vessels that will require on demand channel clearance of all work barges.

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.

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.

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.

SPAN RE-POSITIONING AND BEARING REPLACEMENT (SPECIAL)

Scope of Work

Work includes jacking Spans 25 and 26 at Bents 24, 25 and 26 to install sliding plates for horizontal span re-positioning. While in the raised condition, install sliding plates. Install horizontal jacking system on the bridge deck as shown in the plans and jack the spans horizontally to achieve the joint gaps indicated in the plans. Provide blocking or other restraint to the spans during any time that traffic will be on the bridge while sliding plates are installed. After span re-positioning has occurred the spans will be re-jacked to replace the existing bearings. Spans 25 and 26 at Bents 24, 25 and 26 will be jacked to replace the existing bearings. Install blocking while the bridge is in the raised condition.

Remove existing elastomeric bearings and install new Type P1, P2 and P3 bearings as shown in the plans.

Measurement and Payment

Bridge Jacking for Span Re-Positioning will be paid for at the contract price bid per each span and will be full compensation for all materials, shop drawings, equipment, tools, labor, and incidentals necessary to vertically jack the spans.

Span Re-Positioning will be paid for at the contract price bid per each span and will be full compensation for all materials, shop drawings, equipment, tools, labor, and incidentals necessary to horizontally re-position the spans.

Replacement of Bridge Bearings, Type "__" will be paid for at the contract price bid per each bearing and will be full compensation for all materials, shop drawings, equipment, tools, labor, and incidentals necessary to furnish and install the bearings.

All costs to drill and install anchor bolts, welding and painting of bearings is incidental to the work and will be included in the price bid for the various items.

Payment will be made under:

Pay Item	Pay Unit
Bridge Jacking for Span Re-Positioning	Each
Span Re-Positioning	Each
Replacement of Bridge Bearings, Type "__"	Each

OVERLAY SURFACE PREPARATION FOR POLYESTER POLYMER CONCRETE (SPECIAL)

DESCRIPTION

This provision addresses the surface preparation activities required prior to the placement of polyester polymer concrete (PPC). 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 and limits shown on the plans.

Shotblasting shall consist of steel beads (or other materials as approved by the Engineer) "shot" out of a machine onto the bridge concrete deck to remove soft or deteriorated concrete, and to clean the concrete deck surface for the application of the PPC overlay. The Contractor shall vary the speed of the shotblaster or make multiple passes, as necessary, to achieve the required surface preparation for the PPC overlay. Areas inaccessible with shotblasting equipment may require surface preparation with sandblasting equipment and hand equipment.

EQUIPMENT

All equipment for cleaning the existing concrete surface and mixing and applying the overlay system shall be in accordance with the System Provider's recommendations, as approved by the Engineer prior to commencement of any work:

- Scarifying equipment that is a power-operated, mechanical grinder capable of removing a minimum depth of ¼" for each pass.
- Shotblasting and sandblasting equipment to adequately prepare the bridge deck substrate, as required in this provision. Provide equipment to supply oil-free and moisture-free compressed air for final surface preparation.
- Equipment capable of sawing concrete to the specified plan depth.

- Hand-held high velocity (7,500 psi minimum) water-jet equipment capable of removing rust scale from reinforcing steel, removing small chips of concrete partially loosened by the scarifying or chipping operation, and for removing rehydrated dust left from scarification.
- Power driven hand tools for removal of unsound concrete are required that meet the following requirements:
    - Pneumatic hammers weighing a nominal 15 lb or less.
    - Pneumatic hammer chisel-type bits that do not exceed the diameter of the shaft in width.
- Hand tools such as hammers and chisels for removal of final particles of unsound concrete.
- Self-propelled vacuum capable of picking up water, dust, and other loose material from prepared deck surface.
- Equipment to supply oi-free and moisture-free compressed air for final surface preparation.

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

MANAGEMENT AND DISPOSAL OF CONCRETE DEBRIS

All concrete debris shall become the property of the Contractor. The Contractor shall be responsible for disposing of all debris generated by scarification, shotblasting, sandblasting, and any other surface preparation operations, in compliance with applicable regulations concerning such disposal.

All costs associated with management and disposal of all debris shall be included in the payment of other items.

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:

- Estimate depth of reinforcing steel.
- Scarification of deck to depth required.
- Measure depth of scarification to show completed within limits.
- Measure depth of shotblasting to show completed 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. During surface preparation, precautions shall be taken to assure that traffic is protected from rebound, dust, and construction activities. Appropriate shielding shall be provided as required and directed by the Engineer.

A. Sealing of Bridge Deck: Seal all expansion joints subject to run-off water from the scarification, shotblasting, and PPC placement process with material approved by the Engineer, prior to beginning any demolition. The expansion joints shall remain sealed until it has been determined that water and materials from the scarification, shotblasting, and PPC placement operations cannot be discharged through them any longer. Take all steps necessary to eliminate the flow of water or materials through the expansion joints, and any other locations water or materials could leak from the deck.

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

B. Scarifying Bridge Deck: Removal of any asphalt wearing surface from the bridge deck and scarify the concrete deck to remove the entire concrete surface of the deck to a uniform depth and limits shown on the plans.

   It will be the Contractor's responsibility to determine the amount of cover for the reinforcing steel. Use a pachometer or other approved device, as approved by Engineer, prior to scarification. Readings shall be read and recorded in the presence of the Engineer. Readings shall be recorded for each span at 1/5 points longitudinally and 1/3 points transversely. The cost for this work will be considered incidental to the cost of surface preparation of the bridge deck.

   Estimated average cover to top mat:
   Carteret Bridge No. 68: 2 ¼" ± ⅜"

   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. Care shall be taken not to cut, stretch, or damage any exposed reinforcing steel. If reinforcing bars or bridge drainage devices are pulled up or snagged during scarification operations, then cease work and consult with the Engineer to determine any necessary adjustments to the roto-milling operation.

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

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

Regardless of the method of removal, the removal operation shall be stopped if it is determined that sound concrete is being removed to a depth greater than required by the plans.

C. 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 scarification. Remove by additional scarification 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 scarification.

All patches shall be removed under Class II surface preparation. If any patch cannot be removed by means of scarification, 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 ft^2/ft. length of bridge without overhang support is permitted unless the Engineer directs otherwise. Overhang support is required for areas removed greater than 0.60 ft^2/ft. length of bridge. Submit details of overhang support to the Engineer for approval prior to beginning the work.

Repair and fill the areas of Class II surface preparation and bridge joint demolition of the existing bridge concrete deck prior to the final surface preparation and application of the PPC overlay, at locations shown in the plans, or as determined by the Engineer, if necessary. Materials other than PPC may be used for concrete deck repairs, but shall be approved by the PPC System Provider's Technical Representative and shall be applied and prepared as required by the PPC System Provider. For concrete deck repairs with PPC, materials, equipment, surface preparation, placement, and finishing of PPC used for deck repairs shall meet the requirements of the Polyester Polymer Concrete Bridge Deck Overlay special provision

D. 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.

For reinforcing steel left unsupported by the concrete removal process, the Contractor shall support and protect the exposed reinforcing steel against displacement and

damage from loads, such as those caused by removal equipment and delivery buggies. All reinforcing steel damaged or dislodged by these operations shall be replaced with bars of the same size at the Contractor's expense.

Reinforcing steel exposed and satisfactorily cleaned and prepared will not require additional cleaning if encased in concrete within seven (7) days. Rebar exposed for more than seven (7) days shall be satisfactorily cleaned and prepared, prior to placement of the new concrete. The satisfactory cleanliness and preparation of the reinforcing steel shall be determined by the Engineer.

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

E. Surface Cleaning: The surface of concrete substrate shall be prepared for application of the overlay 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 of the overlay system. The final prepared surface shall adhere to the following requirements:

1. 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.

2. The areas to receive overlay shall be cleaned by shotblasting, or abrasive sandblasting in the event that the shotblaster cannot access areas to be prepared. Do not begin shotblasting until all grinding or milling operations are completed. Cleaning shall not commence until work involving the repair of the concrete deck surface has been completed and the deck is dry. All contaminants shall be picked up and stored in the vacuum unit and no dust shall be created during the blasting operation that will obstruct the view of motorists in adjacent roadways. The travel speed and/or number of passes of the shotblasting unit shall be adjusted so as to result in all weak or loose surface mortar being removed, aggregates within the orete being exposed, and open pores in the concrete exposed, as well as a visible change in the concrete color. Cleaned surfaces shall not be exposed to vehicular traffic unless approved by the Engineer. If the deck becomes contaminated before placing the overlay, the Contractor shall shotblast or abrasive sandblast the contaminated areas to the satisfaction of the Engineer at no additional cost.

3. Prior to the overlay placement, any loose particles shall be removed by magnets and oil free compressed air and vacuuming, such that no trapped particles remain. Power washing will not be allowed.

4. The areas to be overlaid shall be blown off with oil and moisture free compressed air just prior to placement of the primer and shall be completely dry.

5. Cleaning methods other than those detailed by specification may be suggested by the PPC System Provider and approved by the Enginner.

6. All steel surfaces that will be in contact with PPC overlay shall be cleaned in accordance with SSPC-SP No. 10, Near-White Blast Cleaning, except that wet blasting methods will not be allowed.

F. Safety: Provide a containment system for handling expected and unexpected blow thru of the deck. The containment system shall retain runoff water and debris and protect the area under the bridge deck. The 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 attained minimum strength.

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

BASIS OF 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.

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.

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 deck preparation where required by the plans and not attained by the initial scarification 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.

Payment will be made under:

Pay Item	Pay Unit
Scarifying Bridge Deck	Square Yard
Shotblasting Bridge Deck	Square Yard
Class II, Surface Preparation	Square Yard

POLYESTER POLYMER CONCRETE BRIDGE DECK OVERLAY (SPECIAL)

DESCRIPTION

This work consists of furnishing and placing a Polyester Polymer Concrete (PPC) overlay system with a High Molecular Weight Methacrylate (HMWM) resin primer on concrete

surfaces. The surface of the concrete shall be prepared and the PPC overlay system shall be applied in accordance with this provision in conformity with the lines, grades, thickness, and typical cross-sections shown on the plans or as approved by the Engineer. Unless specifically mentioned below, all requirements specified for the bridge deck are also required for the approach slabs.

Work includes: placement of HMWM primer; placement of PPC surface patching and/or overlay; and any incidentals necessary to complete the project as specified or as shown on the plans.

The System Provider is the manufacturer that will provide the PPC system for the PPC overlay. System shall include the necessary and appropriate PPC components, as well as the necessary and appropriate HMWM resin primer components. Contractor shall not change System Provider during project, without approval from the Engineer.

Qualifications And Submittals

The Contractor shall submit the following requested items and any other relevant documents at least two weeks prior to the PPC Overlay Pre-placement Conference. These submittals are for approval and shall be directed to the Engineer.

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

B. System Provider Qualifications: The Contractor shall install an overlay system with all components provided through a single System Provider with documented experience successfully supplying at least 5 PPC overlay projects of similar size and scope within the past 5 years. The Contractor shall submit documentation of the System Provider's project experience including the following:
   1) Project Location
   2) Owner Agency
   3) Project construction date
   4) Overlay quantities
   5) Reference name and contact information for owner representative

C. Contractor Qualifications: The Contractor shall submit documentation of successful projects placing structural concrete bridge decks, modified concrete bridge deck overlays, or PPC overlay systems to finished grade using similar equipment as specified herein within the past 5 years. A minimum of two (2) employees on site must have the equivalent work experience qualifications of the Contractor The documentation of Contractors qualifications shall include the following:
   1) Project Location
   2) Owner Agency
   3) Project construction date
   4) Overlay quantities
   5) Reference name and contact information for owner representative

D. System Provider Technical Representative Qualifications: The System Provider Technical Representative shall have a minimum of 5 years of experience with PPC and be completely competent in all aspects of the work, including surface preparation, mixing, placement, curing, and testing of the PPC Overlay System. The Technical

Representative shall have experience on a minimum of 5 successful projects of similar size and scope. The Contractor shall submit documentation of the System Provider Technical Representative's experience including the following:

1) Years of Experience with PPC
2) Project location
3) Project construction date
4) Overlay quantities
5) Reference name and contact information for owner representative

The Technical Representative shall be available on site, for a minimum of three (3) days per project, to give the installer advice and guidance on the installation of PPC. This includes, but not limited to deck concrete surface preparation, PPC application, and PPC cure.

E. Overlay Placement Plan: The Contractor shall submit an Overlay Placement Plan that includes the following:
   1) Schedule of overlay work and testing for each bridge
   2) Anticipated concrete deck repair locations and repair method
   3) Staging plan describing overlay placement sequence including:
      a) Construction joint locations. Longitudinal construction joints between passes shall be located along the centerline or edge of travel lanes.
      b) Sequence of placement
      c) Placement widths
      d) Anticipated placement lengths
      e) Placement direction
      f) Joint locations
      g) Location of proposed trial overlay(s)
   4) Description of equipment used for:
      a) Surface preparation including grinding and shotblasting
      b) Applying HMWM Primer resin
      c) Measuring, mixing, placing, and finishing the PPC
      d) Applying surface finish sand
   5) Method of protecting and finishing inlets and bridge drains
   6) Method for isolating expansion joints
   7) Method for measuring and maintaining overlay thickness and profile
   8) Cure time for PPC
   9) Storage and handling of HMWM resin and PPC components
   10) Procedure for disposal of excess HMWM resin, PPC, and containers
   11) Procedure for cleanup of mixing and placement equipment

F. Equipment: The Contractor shall submit documentation of current certification that mixing equipment has been calibrated (Caltrans California test CT 109 or similar accepted). The Contractor shall submit a documented history of the use of the placement equipment to successfully place PPC overlays on bridge projects for review and approval by the Engineer.

MATERIALS

The PPC shall consist of polyester resin binder and aggregate as specified below. It shall also include a compatible primer which when mixed with other specified ingredients and

applied as specified herein, is capable of producing a PPC meeting the requirements of this specification.

1) Verification. The Contractor shall submit a Certified Test Report from independent labs for all of the materials associated with the PPC overlay in accordance with this special provision.
2) Packaging and Shipment. All components shall be shipped in strong, substantial containers, bearing the manufacturer's label specifying batch/lot number, brand name, and quantity. If bulk resin is to be used, the contractor shall notify the Engineer in writing 10 days prior to the delivery of the bulk resin to the job site. Bulk resin is any resin that is stored in containers in excess of 55 gallons.
3) Sampling. NCDOT reserves the right to retain and test samples of components of the PPC Overlay system. This includes requiring submittal of samples prior to the first installation or on-site sampling during construction.

C. Polyester Resin Binder: Polyester resin binder shall have the following properties:
1) Be an unsaturated isophthalic polyester-styrene co-polymer. The resin content shall be 12% +/-1% of the weight of the dry aggregate.
2) Contain at least 1 percent by weight gamma-methacryloxypropyltrimethoxysilane, an organosilane ester silane coupler.
3) Be used with a promoter that is compatible with suitable methyl ethyl ketone peroxide and cumene hydroperoxide initiators.
4) Meet the required values for the material properties shown in Table 1, below.

Accelerators or inhibitors may be required to achieve proper setting time of PPC. They shall be used as recommended by the overlay System Provider.

Table 1
POLYESTER RESIN BINDER PROPERTIES
(Each lot sent to job shall be tested)

Property	Test Method	Requirement
Viscosity*	ASTM D 2196	75 – 200 cps (RVT No.1 Spindle, 20 RPM at 77 °F)
Specific Gravity*	ASTM D 1475	1.05 to 1.10 at 77 °F
Elongation	ASTM D 638	35 percent, minimum Type I specimen, thickness 0.25 ± 0.03" at Rate = 0.45 inch/minute.
	ASTM D 618	Sample Conditioning: 18/25/50+5/70
Tensile Strength	ASTM D 638	2,500 psi, minimum Type I specimen, thickness 0.25 ± 0.03" at Rate = 0.45 inch/minute.
	ASTM D 618	Sample Conditioning: 18/25/50+5/70
* Test shall be performed before adding initiator.		

D. High Molecular Weight Methacrylate (HMWM) Primer: Primer for the substrate concrete surface shall be a wax-free, low odor, high molecular weight methacrylate primer, and consist of a resin, initiator, and promoter. The primer shall conform to

requirements indicated in Table 2, below, and all components shall be supplied by the System Provider.

Initiator for the methacrylate resin shall consist of a metal drier and peroxide. If supplied separately from the resin, the metal drier shall not be mixed with the peroxide directly; a VIOLENT EXOTHERMIC REACTION will occur. The containers and measuring devices shall not be stored in a manner that allows leakage or spilling to contact the containers or materials of the other.

Table 2
HIGH MOLECULAR WEIGHT METHACRYLATE RESIN PROPERTIES
(Tested yearly)

Property	Test Method	Requirement
Viscosity**	ASTM D 2196	25 cps maximum (Brookfield RVT with UL adapter, 50 RPM at 77 °F)
Volatile Content**	ASTM D 2369	30 percent, maximum
Specific Gravity**	ASTM D 1475	0.90 minimum at 77 °F
Flash Point	ASTM D 3278	180 °F minimum
Vapor Pressure**	ASTM D 323	1.0 mm Hg, maximum at 77 °F
PCC Saturated Surface-Dry Bond Strength (Adhesive)	California Test 551, part 5	700 psi, minimum at 24 hours and 70 ± 1°F (with PPC at 12% resin content by weight of the dry aggregate), primed surface
**Test shall be performed before initiator is added		

E. Aggregates: PPC aggregate shall have the following properties:
   1) No more than 45 percent crushed particles retained on the No. 8 sieve when tested in accordance with AASHTO Test Method T335.
   2) Fine aggregate consists of natural sand only.
   3) Weighted-average aggregate absorption of no more than 1.0 percent when tested under AASHTO Test Methods T84 and T85.
   4) At the time of mixing with resin, have moisture content of not more than one-half of the weighted-average aggregate absorption when tested under AASHTO Test Method T255.
   5) Moh's hardness of 7 or greater.
   6) Comply with the requirements for the aggregate gradation indicated in Table 3, below:

Table 3
AGGREGATE GRADATION
(Tested yearly)

Sieve Size	Percent Passing
3/8”	100
No. 4	60-85
No. 8	55-65
No. 16	29-50
No. 30	16-36
No. 50	5-20
No. 100	0-7
No. 200	0-3

Sand for abrasive sand finish shall have the following properties:

1) Commercial-quality blast sand.
2) Not less than 95 percent pass the No. 8 sieve and not less than 95 percent retained on the No. 20 sieve when tested under AASHTO Test Method T27.
3) Shall be dry at the time of application.

F. Composite system: The composite PPC system shall have the following properties indicated in Table 4, below:

Table 4
COMPOSITE PROPERTIES
(Tested every 2 years)

Property	Test Method	Requirement
PCC Saturated Surface Dry Bond Strength	CT 551	500 psi minimum at 24 hrs. and 70° F (without primer, at 12% resin content by weight of the dry aggregate, on Saturated Surface Dry Specimen)
Abrasion Resistance	CT 550	<2g weight loss (at 12% resin content by weight of the dry aggregate)
Modulus of Elasticity	ASTM C 469	1,000,000 psi to 2,000,000 psi (at 12% resin content by weight of the dry aggregate)

Construction Requirements

A. PPC Overlay Pre-placement Conference: A Pre-placement Conference shall be held before any overlay operations begin. Attendees shall include representatives from all parties involved in the work. If necessary, teleconferencing of attendees may be approved by the Engineer.

B. Trial Application: Prior to constructing the overlay, one or more trial applications shall be placed on a previously constructed concrete base to demonstrate proper initial set time and the effectiveness of the mixing, placing, and finishing equipment proposed. The set time can be determined as the time elapsed from resin catalyzation until the in-place PPC cannot be deformed by pressing with a finger, indicating the resin binder is no longer in a liquid state. Each trial application shall be the planned paving width, at least 10 feet long, and the same thickness as the specified overlay. Conditions during the construction

of the trial application(s) and equipment used shall be similar to those to be used for construction of the overlay. The location of the trial application(s) shall be approved by the Engineer. Trial applications shall be properly disposed of off-site by the Contractor, if removal is necessary.

The number of trial applications required shall be as many as necessary for the Contractor to demonstrate the ability to construct an acceptable trial overlay section and competency to perform the work. However, the installer or proposed equipment/techniques may be rejected if not shown to be acceptable after three (3) trials.

Overlay tensile bond testing shall be performed in accordance with the acceptance testing herein. Vertical axis pull bond tests shall be performed after 24 hours by the Contractor in accordance to ACI 503R-30. At a minimum, 2 pull bond tests shall be performed on each Trial Application. Acceptable test results shall be achieved on a Trial Application before the installation may proceed. Tensile bond testing shall be performed by an independent testing firm and shall be arranged by the Contractor, cost to be included in bid price for *Placing and Finishing PPC Overlay* item.

C. Equipment: All equipment for cleaning the existing concrete surface and mixing and applying the overlay system shall be in accordance with the System Provider's recommendations, as approved by the Engineer prior to commencement of any work.

1) Surface Preparation Equipment: Provide appropriate scarifying, shotblasting, sandblasting and other equipment to adequately prepare the bridge deck substrate, as required in the Overlay Surface Preparation for Polyester Polymer Concrete special provision.

2) Mixing Equipment: A continuous automated mixer shall be used for all PPC overlay applications. The continuous mixer shall:
   a. Employ an auger screw/chute device capable of sufficiently mixing catalyzed resin with dry aggregate.
   b. Employ a plural component pumping system capable of handling polyester binder resin and catalyst while maintaining proper ratios to achieve set/cure times within the specified limits. Catalyzed resin shall flow through a static mix tube for sufficient duration to completely mix the liquid system.
   c. Be equipped with an automatic metering device that measures and records aggregate and resin volumes. Record volumes at least every five minutes, including time and date. Submit recorded volumes at the end of the work shift.
   d. Have a visible readout gage that displays volumes of aggregate and resin being recorded.
   e. Produce a satisfactory mix consistently during the entire placement.

   A portable mechanical mixer of appropriate size for proposed batches, as recommended by the System Provider and approved by the Engineer, may be used for all PPC patching applications and for smaller area overlay applications if approved by the Engineer.

3) Finishing Equipment: Finishing may be accomplished with a Self-Propelled Slip-Form Paving Machine.

Self-Propelled Slip-Form Paving Machine

A self-propelled slip-form paving machine, which is modified or specifically built to effectively place the PPC overlay in a manner that meets the objectives and requirements of the project, shall be used for major PPC overlay applications. The paving machine shall:

a. Employ a vibrating pan to consolidate and finish the PPC.
b. Be fitted with hydraulically controlled grade automation to establish the finished profile. The automation shall be fitted with substrate grade averaging devices on both sides of the new placement; the device shall average 15 feet in front and behind the automation sensors; or the sensor shall be constructed to work with string-line control. It is acceptable to match grade when placing lanes adjacent to previously placed PPC.
c. Have sufficient engine power and weight to provide adequate vibration of the finishing pan while maintaining consistent forward placement speed.
d. Be capable of both forward and reverse motion under its own power.

Vibratory Screed

A vibratory screed may be used for finishing PPC on smaller projects (generally less than 6000 ft^2 of bridge deck area), but must be approved by the Engineer at least two weeks prior to PPC placement.

D. Concrete Deck Repairs and Surface Preparation: Prepare and repair all concrete deck surfaces in accordance with the requirements of the Overlay Surface Preparation for Polyester Polymer Concrete special provision.

E. Application of Overlay: Methods indicated in this specification are typical of general installations and may be modified per the System Provider's recommendations as approved by the Engineer. The application of the overlay shall not begin until the concrete deck is completely surface dry in accordance with ASTM D4263, with a wait time revised from 16 hours to 2 hours, or as directed by the System Provider's Technical Representative. The concrete surface temperature shall be between 40° and 100° F. Night work may be required when temperatures cannot be met during the day.

During overlay application, precaution shall be taken to assure that traffic is protected from rebound, dust, and construction activities. Appropriate shielding shall be provided as required and directed by the Engineer.

During overlay application, the Contractor shall provide suitable coverings (e.g. heavy duty drop cloths) as needed to protect all exposed areas not to receive overlay, such as curbs, sidewalks, parapets, etc. All damage or defacement resulting from this application shall be cleaned and/or repaired to the Engineer's satisfaction at no additional cost.

1) HMWM Primer Application: Immediately before placing primer, all exposed surfaces shall be completely dry and blown clean with oil-free compressed air. Exposed surfaces shall be protected from precipitation and heavy dew during and after the application of the primer.

After the exposed surfaces have been prepared and are dry, primer shall be applied in accordance with the System Provider's recommendations. Primer shall be placed

within 5 minutes of mixing at approximately 90 ft^2/ gal or the rate acceptable to the Engineer.

Primer shall be applied by flooding and uniformly spread to completely cover surfaces to receive overlay. Care shall be taken to avoid heavy application that results in excess puddling. Excess material shall be removed or distributed to meet the required application rate. Primer shall be reapplied to any areas that appear dry prior to overlay placement.

Primer shall not be allowed to leak onto areas that have not received surface preparation.

2) PPC Application: The PPC shall be applied during the interval between 15 minutes and 2 hours after the primer has been applied. The PPC shall be placed prior to gelling and within 15 minutes following addition of initiator, unless otherwise recommended by the System Provider's Technical Representative.

The polyester resin binder shall be initiated and blended completely. Aggregate shall be added and mixed sufficiently when a portable mechanical mixer is used.

PPC shall have an initial set time of at least 30 minutes and at most 90 minutes. The set time can be determined in the field when the in-place PPC cannot be deformed by pressing with a finger, indicating that the resin binder is no longer in a liquid state. If the initial set is not within 30 to 90 minutes, the material shall be removed and replaced.

The overlay shall be consolidated and finished to the required grade and cross-section using PPC placement equipment as defined herein.

If a vibratory screed is used, prior to placing the PPC, 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 overlay area 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.

Place the PPC in one operation. Provide a minimum overlay thickness as shown in the plans.

Although the paver or screed may yield a finished or nearly finished surface, additional finishing may be necessary. PPC shall be finished, as necessary, through traditional concrete finishing methods, producing a slight resin bleed indicating complete consolidation of aggregates.

Finishing of PPC used as patching of an existing deck surface or overlay shall be completed and finished using traditional concrete hand finishing methods and hand concrete finishing tools. Such patches shall be placed flush with the top of the existing deck surface.

Resin content shall be as specified in the Materials section of this special provision and to yield a PPC consistency that requires surface applied consolidation and finishing to consolidate aggregates and yield a slight sheen of bleed resin on top surface, yet does not yield excess bleed resin.

A surface friction sand finish of at least 2.2 lbs/ yd^2 shall be broadcast onto the glossy surface immediately after sufficient finishing and before resin gelling occurs. To ensure adequate pavement friction, the completed PPC overlay surface shall be free of any smooth or "glassy" areas such as those resulting from insufficient quantities of surface aggregate. Any such surface defects shall be repaired by the Contractor in the manner recommended by the System Provider and approved by the Engineer at no additional cost.

After application of surface friction sand, unless otherwise indicated on the plans, groove the bridge floor in accordance with Article 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 PPC overlay achieves design strength and no later than seven days after completion of the overlay unless otherwise approved by the Engineer.

All working deck joints shall be extended through the overlay and be sealed according to the details in the plans.

If traffic is to be returned to the site, but the overlay is not completed within the allowable lane closure time and is more than ¾ inch higher in elevation than the adjacent pavement, the PPC overlay edges shall be tapered. Tapered edges transverse to the direction of traffic and on the leading edge of the overlay shall be at a 4:1 (horizontal: vertical) slope. Tapered edges transverse to the direction of traffic and on the trailing edge of the overlay and tapered edges longitudinal to the direction of traffic shall be at a 45 degree slope. Tapers of 45 degrees may remain, and PPC overlay may be placed adjacent. Tapers with a slope gentler than 45 degrees shall be sawcut square to the overlay surface, prior to placing adjacent PPC overlay.

The Contractor shall collect a ticket for each pass or portion of a pass that is provided by each mixer, and ensure that the following information is shown on each ticket:

a. Project Number
b. Bridge Number
c. Date and Time
d. Location of Placement (Lane and Station Limits or location and length of placement along the length of the bridge)
e. Aggregate Weight
f. Polyester Resin Binder Weight

The tickets shall be available on site for Inspection personnel to use in tabulating quantities.

Curing: The Contractor shall allow the overlay to cure sufficiently before subjecting it to loads or traffic of any nature that may damage the overlay. Cure time depends upon the ambient and deck temperatures as well as initiator/accelerator levels.

The overlay shall be considered cured to a traffic ready state when a minimum reading of 25 on a properly calibrated Swiss hammer is achieved. Other rebound hammers may be use as approved by the Engineer.

F. Acceptance Testing: Acceptance of the deck repairs, surface preparation, and PPC overlay will be determined by the Engineer based on vertical axis bond tests, and smoothness quality testing performed by the Engineer, assisted by the Contractor.

1) Overlay Direct Tension Bond Testing: Vertical axis pull bond tests shall be performed after 24 hours by the Contractor in accordance to ACI 503R-30. At a minimum, 2 pull bond tests shall be performed on each bridge overlay. For bridges with deck areas greater than 25,000 square feet, additional tests shall be performed at a frequency of one test per 25,000 square feet of additional deck area, rounded up. Additional testing may be required as directed by the Engineer.

   The test result shall be the average of the tests for each structure. Test cores shall be drilled a minimum of 0.25" but no greater than 0.50" below the bond line.

   The minimum bond strength of the PPC overlay system on normal weight concrete shall be 250 psi. An acceptable test will demonstrate that the overlay bond strength is sufficient by producing a concrete subsurface failure area greater than 50% of the test surface area. The Contractor shall repair all bond test locations with PPC overlay in accordance with this specification.

2) Smoothness Quality Testing: As soon as practical after the PPC 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 PPC deck surface shall not deviate from the line and elevation indicated on the plans by more than 0.3” over any 50’ length. If approved by the Engineer, correct low areas in an acceptable manner.

G. Corrective Work

1) Repair of Surface Defects: The repair materials and finishing methods for surface defects in the overlay shall be in accordance to those used for the application of the overlay. All surface defects shall be repaired to the satisfaction of the Engineer before acceptance of the work is made.

2) Correction for Smoothness: Areas showing high spots of more than 1/8 inch in 10 feet shall be marked and diamond ground until the high spot does not exceed 1/8 inch in 10 feet. Ground surface may be sawcut grooved to restore the texture if ordered by the Engineer. Areas showing low spots of more than 1/8 inch in 10 feet shall be marked and prepared with shot blasting or sandblasting, primed, and filled with either catalyzed resin and broadcast sand or mixed PPC slurry material. The use of resin or mixed slurry material shall be as recommended by the System Provider and approved by the Engineer.

3) Replacement of Defective Overlay: A defective overlay, or portion thereof, resulting in failing overlay pull bond test results shall be removed and replaced at the Contractor’s expense. The Contractor shall submit a written corrective work proposal to the Engineer, which shall include the methods and procedures that will be used. The Contractor shall not commence corrective work until the methods and procedures have been approved in writing by the Engineer. The Engineers approval

shall not relieve the Contractor of the responsibility of producing work in conformity with the Contract.

4) Repair of Cracking: After a one-week cure period, if cracks are in the overlay, the Contractor shall fill the cracks with properly catalyzed and mixed HMWM primer material at his own expense. Care shall be taken to fill the cracks only, and ensure minimal HMWM primer is left on the finished surface of the overlay.

Measurement and Payment

PPC Materials will be measured as the actual volume of PPC material complete-in-place. The volume shall include material used for overlay, patching of existing unsound concrete deck surface or overlays, and bridge deck concrete repairs as directed by the Engineer. Tickets provided to the project inspector, showing quantities of PPC produced, shall be sufficient to calculate volume of material placed. Materials placed for Trial Overlay shall be included in Pay Quantity if placed and remaining on the bridge deck as part of the permanent overlay. *PPC Materials* will be paid for at the contract unit price per cubic yard and will be full compensation to furnish the PPC material, including HMWM primer, freight to the project site, receiving, storage, and disposal of any unused PPC overlay material. Payment by cubic foot will be based on a 135 lbs/ ft^3 unit weight and quantities recorded by calibrated mixer unit readouts.

Placing and Finishing PPC Overlay will be measured and paid for as the quantity of final surface finishing. Payment will be full compensation for all labor, equipment, and all incidentals necessary to complete the PPC overlay placement. Construction and removal (if required) of Trial Overlay, including concrete base surfaces, will not be measured and paid for separately, but shall be included in the work.

Payment will be made under:

Pay Item	**Pay Unit**
PPC Materials	Cubic Yard
Placing and Finishing PPC Overlay	Square Yard

BRIDGE JOINT REMOVAL (SPECIAL)

DESCRIPTION

This provision addresses the removal of existing joint material to facilitate the installation of new joints at the locations noted in the contract plans.

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.

MEASUREMENT AND PAYMENT

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

Pay Item	Pay Unit
Bridge Joint Removal	Linear Feet

SILICONE JOINT SEALANT (SPECIAL)

SEALS

Provide and install a low modulus silicone sealant (non-sag or self-leveling) and backer rod which conforms to the Standard Specifications (Subsections 1023-3 and 1023-4, respectively) and this Special Provision. Use silicone approved for use on joint openings as indicated on project plans and provide a seal with a working range of minimum 50% compression and extension. Silicone joint seal product shall be designated as approved for use on the NCDOT Approved Products List. If non-sag and self-leveling sealants are to be in contact with each other, they shall be from the same manufacturer and shall be compatible for such use.

PREPARATION OF FORMED OR SAWED JOINT FOR SEAL INSTALLATION

Polyester polymer concrete shall cure a minimum of 24 hours prior to seal installation.

After forming or sawing the joint, the Engineer will thoroughly inspect the joint opening for spalls, popouts, cracks, etc. All necessary repairs will be made by the Contractor prior to blast cleaning and installing the seal.

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

After blasting, either brush the surface with clean brushes made of hair, bristle, or fiber, blow the surface with compressed air, or vacuum the surface until all traces of blast products and abrasives are removed from the surface, pockets, and corners. If nozzle blasting is used to clean the joint opening, use compressed air that does not contain detrimental amounts of water or oil.

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

Install the backer rod and silicone sealant in the blast cleaned opening on the same day the surface is blast cleaned.

SEAL INSTALLATION

Install the silicone joint sealant(s) as indicated on the plans, in accordance with the manufacturer's procedures and recommendations, and as recommended below. Do not

install the joint seal if the ambient air or surface temperature is below 45°F. Have a manufacturer's certified trained factory representative present during the installation of the first seal of the project, to provide guidance for the proper installation of the silicone joint sealant(s).

After a joint has been sealed, remove excess joint sealer on the pavement or bridge deck concrete as soon as possible.

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

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

BASIS OF PAYMENT

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

Pay Item	Pay Unit
Silicone Joint Sealant	Linear Feet

PRESTRESSED CONCRETE GIRDERS WITH THERMAL SPRAY ANODE (SPECIAL)

GENERAL

The work covered by this Special Provision 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; doweling/ adhesively anchoring new reinforcing steel or studs; repair and retensioning of damaged prestressing strand; 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 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.

Additionally, the work includes the application of Thermal Spray Anode (TSA) coating to select girders as specified in the contract plans. This application shall be performed by thermal spraying (metalizing) the concrete with the required surface preparation necessary to produce a good bond between the TSA coating and the concrete. A good bond is essential to provide an efficient galvanic cathodic protection (CP) system.

There are two different types of installation specified in the Contract Plans: monitoring and non-monitoring. In the non-monitoring type, the anode coating is electrically shorted to the reinforcing steel in the concrete, a small direct current will flow from the galvanic anode to the steel, and thus protect the steel from any further corrosion. The monitoring type system (a non-shorted system) will be installed at select locations to document CP system performance. The CP system shall consist of TSA coating, anode connection plates, embedded reference electrodes, conduit, junction boxes, and all necessary wiring.

Furnish labor, materials, testing and installation equipment, and apply TSA coating on all surfaces within the CP zones defined in the Contract Documents or as directed by the Engineer.

The Contractor shall be mindful of the coordination required between the CP Specialist schedule to accomplish the required testing, and obtaining Engineer's approval to adhere to the overall project schedule. No additional time will be granted. The Engineer will stop work at any time without consequence to the Department due to poor workmanship, use of unapproved materials, or unapproved work procedure. The Contractor is ultimately responsible for the integrity and performance of all repairs and CP systems.

MATERIAL AND EQUIPMENT REQUIREMENTS

WORK VESSELS

Refer to the Securing of Vessels project special provision if utilizing barges or other vessels.

Provide an emergency boat with communication equipment (phone or radio) at the job site at all times when work is being performed. Assure that at any time any worker is present at the job site, there is immediate transportation to shore in the event of an emergency. The emergency boat shall be in addition to the boat provided for CP Specialist or NCDOT inspectors. Do not use the emergency boat as a work platform.

Materials

A. TSA Wire

The TSA wire shall meet the following specifications:

Nominal Chemical Composition:	Al-20Zn-0.2ln
Max. Cu Content:	100 PPM
Wire Diameter:	1/8 in. (3.2 mm)
Density:	0.12 lb/in^3 (3.24g/cm^3)
Open circuit potential in simulated concrete pore solution (pH = 12-13):	> -1.6 V (CSE)

B. Grout Material

Grout shall only be used for backfilling of holes for continuity checking or electrode installation. Grout shall be on the NCDOT Approved Product List (APL) and shall have 15,000 ohm-cm resistivity or less. Use of admixtures such as flash, silica fume, or slag is not allowed.

C. Concrete Repair Material

Repair material shall be a polymer modified concrete repair material for vertical or overhead applications and shall be suitable for applications in marine environments with a maximum electrical resistivity of 15,000 ohm-cm. The selected material shall achieve a minimum compressive strength of 5,000 psi in seven days. Admixtures such as silica fume, fly ash, slag, and others that increase electrical resistivity are not allowed in repair concrete. Material shall be approved for use by NCDOT. Color of repair material shall be concrete gray.

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

D. Wires

Positive (anode) and negative lead (Rebar/Strand) wires shall be No. 12 AWG copper strand wire, with HMWPE, color coded red for positive DC voltage supplied and black for the negative DC return.

All wires shall be pre-tinned and uniquely color coded.

E. Reference Electrode (for Monitoring Sites)

Two reference electrodes shall be installed in each girder designated as a monitoring girder. Reference electrodes shall be silver/silver chloride reference electrodes suitable for permanent embedment in concrete. The electrodes shall be supplied with a #14 AWG stranded copper lead wire with HMWPE blue insulation to reach and enter the junction box without splicing. The lead wire to reference electrode connection shall be completely sealed to prevent moisture penetration into the connection. All silver/silver chloride reference electrodes shall be individually packaged in a sealed plastic container and delivered to the job site.

A #14 AWG stranded copper lead wire with HMWPE black insulation shall be connected to the rebar/strand as the ground wire for each reference electrode.

All silver/silver chloride reference electrodes shall be calibrated against a calibrated calomel electrode or silver/silver chloride reference electrode in a saturated calcium hydroxide solution. A digital multimeter with high internal resistance ($\geq$10 MΩ) and with a resolution of at least 1mV shall be used. The negative (black) lead shall be connected to the reference cell, and the positive (red) lead shall be connected to the calomel reference electrode. Acceptable reference electrodes shall have stable reading of $\pm$5 mV compared to the theoretical value at the typical room temperature of 73˚F. The data shall be tabulated along with the date and temperature of the calcium hydroxide solution and submitted to the Engineer. All reference cells shall be tested and approved by the CP Specialist for use on this project prior to installation. The CP Specialist shall submit the reference electrode test data to the Engineer within 2 days of the test date. Any reference electrode that fail the test shall be rejected by the CP Specialist and shall not be used in this project. All rejected reference electrodes shall be promptly removed from the project site.

F. Conduits, Junction Boxes, and Hardware

All conduit shall be schedule 80 PVC (unless noted otherwise in the Contract Plans) and sunlight resistant. All junction boxes, conduit outlet bodies and fittings shall be sunlight resistant PVC, rated NEMA 4X, rated for use with schedule 80 conduits, have a cover with gasket and Type 316 Stainless Steel screws. Conduit fasteners, hangers, access fittings, junction boxes and any other conduit accessories shall be mounted to concrete surfaces using bolts and lock washers, which shall be threaded into structural drop-in anchors of at least 1/2" diameter inserted into holes drilled into the concrete. All conduit clamps shall have two support holes.

One link bar or shunt shall be furnished inside the junction box. Shunts (for monitoring sites) shall have a calibrated resistor with resistance of 0.1 ohm, rated to 2 amperes.

All hardware, including junction box lock rings, for the installation of the PVC conduit, junction box, and electrical connections shall be Type 316 Stainless Steel, unless otherwise specified.

METALIZING EQUIPMENT

The TSA coating shall be applied using electric-arc spray equipment. The arc spray equipment shall consist of a spray gun, wire feed unit, power supply and air compressor. To readily spray the coiled anode wire, a straightening device may be necessary. The Contractor shall be responsible for making any necessary modifications and adjustments to the thermal spray equipment so that the alloy wire can be sprayed to achieve the desired properties and adhesion.

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

QUALITY CONTROL

Personal Qualification - Metalizing Technicians

The metalizing technicians must have a minimum of two years of experience in the operation of metalizing equipment and shall have completed at least two projects of size similar to this project within the last five years. The metallizing technician shall hold a current (dated within the last 12 months) certificate of satisfactory completion of training from the metalizing equipment manufacturer.

Personnel Qualifications - CP Specialist Qualifications

Secure the services of a CP Specialist with the following qualifications:

1. A National Association of Corrosion Engineers (NACE) certification in CP of level CP-4 or a P.E. License.
2. A minimum of 5 years of experience in the installation and testing of CP systems to protect reinforced concrete structures.
3. Performed QC and performance testing of CP systems for concrete structures in a minimum of 3 projects in the past 5 years.
4. The CP Specialist shall be an independent subcontractor, not otherwise associated with the Contractor, the CP systems manufacturer, distributor, or any other entities providing materials or services for this project. The CP Specialist may be

one firm for multiple CP systems or one firm for each of the single CP systems. No CP work will be allowed if at any time an approved CP Specialist is not active or otherwise involved in the project.

CP Technician(s), who work under the CP Specialist's direction, shall have the following qualification:

1. A minimum of 2 years of experience in the installation and testing of CP systems to protect reinforced concrete structures.

CP Specialist Responsibilities

CP Specialist shall provide the following services:

1. Review all Contractor Documents related to the CP work prior to submittal to NCDOT for approval.
2. Conduct a minimum of one QC visit to the job site per month.
3. Directly update the Engineer in writing monthly on the quality of the work along with a list of rejections or recommended corrections.
4. Certify QC Plan in accordance with this special provision and submit to the Engineer for approval.
5. Test and certify strand/stirrup continuity and continuity corrections.
6. Verify and certify wire connections to strand and supplemental steel.
7. Verify and certify wire connections to the anode.
8. Verify and certify the reference electrode is operational prior to installation and after installation.
9. Verify wire labels and inspect wires and splices after wiring is completed.
10. Certify overall installation of CP on each girder.
11. Energize CP on each girder (Question#1).
12. Submit a final report along with all the test data in an electronic format.

CP Specialist Quality Control Plan

Provide a Quality Control (QC) Plan certified by the CP Specialist. The Plan shall include all tasks to be performed by the CP Specialist, or the technician under his direction. The Plan shall include but not be limited to: verification of material compositions, verification of shop drawings prior to submittal, method and frequency of the Contractor's QC testing, methods of measuring electrical continuity, method of anode application, anode connection plate installation, voltages/currents/potentials measurements, time dedicated by the Contractor for proper training of thermal spray applicators, method of updating the Engineer, and method(s) for energizing of the CP systems.

CP Report

The CP Specialist shall also provide a final report to the Engineer describing the general characteristics of the metalizing work, installation sequence, results of the continuity testing, locations of continuity corrections (where applicable), electrical resistance measurements, reference electrode function, the thickness and bond strength results for each metalized component/zone, the required monthly updates sent to the Engineer describing the quality of work, and CP energizing results.

In the final report, the CP Specialist shall document (written/photo documentation) any unapproved deviations from the Contract Documents that pertain to the CP system along

with the Department approved Request(s) For Information, Request(s) For Modification, Submittals, etc. for the approved deviations. Include in the final report, as an addendum. The report and all data shall be in typed form and a digital version of the report shall be provided along with 4 bound hard copies. Submit copies of the final report to the Engineer.

SUBMITTALS

The Contractor shall prepare and submit all required certifications, data sheets, shop drawings, materials and methods and submittals within 90 days after NTP. Work on girders shall not begin until the submittals are approved by the Engineer.

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.

Submit shop drawings of all the CP zones with dimensions, installations of anode connection plates; conduits; junction boxes; reference electrodes; and other relevant CP details.

Submit Aluminum-Zinc-Indium (Al-Zn-In) anode wire in accordance with the metallizing equipment manufacturer's recommendations. Submit a certified analysis (NCDOT Type 2 Certification) for each lot of anode wire material.

Submit a catalog cut sheet and the Material Safety Data Sheet (MSDS) for the breathable sealer (refer to Section 8).

Submit technical sheet and MSDS for the blasting media.

Submit technical specifications or manufacturers' certifications for marine grade epoxy, connection plates, wires, junction boxes, fasteners, and strand repair materials in accordance with NCDOT Standard Specifications Section 106.

Submit catalog cut and installation diagram of the proposed reference electrode with recommendation by CP Specialist. Demonstrate the reference electrodes submitted meet the requirements of this Technical Special Provision. Include operations and maintenance data sheets for reference electrodes.

Submit a concrete mix design of the repair material. Provide method of application including manufacturer's technical specifications, formulation if applicable, and pot and curing times.

Submit manufacturer's technical specifications, method of application, formulation (if applicable), and pot and curing times for proposed cement grout material to backfill holes or excavations during continuity checking/correction and reference electrode installation.

Submit calibration certificate for all test equipment to be used in testing all CP related systems.

Submit qualifications of the CP specialist(s) and CP Technician(s) with experience records.

Submit a CP Specialist QC Plan.

Submit metalizing technician qualifications.

SURFACE PREPARATION

Concrete Removal

Refer to the contract plans for concrete repair locations. Mark all areas of concrete damage. Areas of concrete damage identified beyond what is shown in the contract plans shall be brought to the attention of the Engineer for confirmation. The Contractor shall not proceed further without the Engineer's confirmation and approval of additional repair locations.

Prior to removal, introduce a shallow saw cut a minimum ½" in depth around the repair area, at right angles to the concrete surface. Within 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 of the excavation 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.

Abrasive blast all exposed concrete surfaces and existing reinforcing steel and strand in the repair area to remove all debris, loose concrete, loose mortar, rust, scale, etc.

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, lapping 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.

If four or more prestressing strands have 50% or greater section loss from their original diameter, one half of the compromised strands shall be repaired by splicing of new strand section at the location of the section loss. Device for splicing shall be

a turnbuckle type device and shall be submitted for approval before beginning work. New splice section shall match size of existing strand, and splice device shall be sized for that size strand. Do not splice two adjacent strands unless approved by the Engineer. For strands that are to be spliced, remove concrete such that full section of the prestressing strand is exposed for a minimum of six inches on each side of the section loss area. Following device manufacturer's recommendations, prepare the strand, removing concrete as necessary, and install splice device and new splice strand. Tensioning of the splice shall be turn-of-the-nut method.

At locations where strand splicing is required, replacement of concrete with repair material shall provide a minimum cover of one inch.

Thoroughly clean surfaces to be repaired and remove all loose materials. Remove grease, wax, salt, oil and other contaminants, as necessary for proper bond of repair material. Remove weak or deteriorated concrete to sound concrete by bush hammering, gritblasting, scarifying, waterblasting, or other approved methods. Remove dirt, dust, laitance and curing compounds by blasting. Remove all dust and loose material with air blast or vacuum cleaning.

Electrical Continuity

Any strand that is broken but is not required to be spliced shall receive electrical continuity correction as shown in the contract plans.

Prior to applying the TSA coating, perform electrical continuity test among all outer layer of strands, stirrups, and any other steel components within the metalizing limits. Strands and other metals that are found to be discontinuous shall be made continuous with each other. Electrical continuity of the reinforcing steel shall be established during the concrete restoration operation, and shall be tested and approved by the CP Specialist.

Strands/rebar for continuity test shall be exposed by drilling a 0.5" diameter hole to each strand/rebar in the concrete and measuring inter-strand voltage using a high impedance voltmeter ($\geq$ 10MΩ). Where continuity corrections are required, additional concrete excavation may be necessary. All excavations required for continuity corrections shall be minimal. Continuity shall be provided by mechanical connection (U-bolt and similar approved) and a continuity wire to each strand/rebar requiring continuity correction inside the excavation. Trench, as needed, by means of saw-cutting a 0.5" wide trench (between continuity connection points) to place the continuity wire. Establish continuity by tying discontinuous reinforcement together with 16 gauge 316 stainless steel wire. No more than 5 strands shall be exposed at a time unless otherwise directed by the Engineer. The Contractor shall exercise great care to prevent damage to the existing reinforcing steel. The Contractor shall retest continuity between the connections. All electrical continuity work found to be discontinuous shall be repaired by the Contractor at no additional cost to the Department. Continuity shall be verified by the CP Specialist after the continuity corrections are completed. Fill trench to original profile with approved grout material after continuity is established.

The Contractor shall provide details of the procedure for continuity testing and corrections for approval by the CP Specialist. After approval by the CP Specialist, such procedure shall be included in the CP Specialist QC/QA Plan for approval by the Engineer.

Concrete Repairs

Prior to the application of concrete repair material, prepare concrete substrate as indicated in section 5.1 "Concrete Removal". 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 and electrical continuity has been approved by the CP specialist, mix and apply concrete repair material in accordance with manufacturer's recommendations. Use aggregate that is washed, kiln-dried, and bagged. As recommended by the repair material manufacturer, apply bonding agent to all repair areas immediately prior to placing concrete repair material. 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. After placing the concrete repair material and form removal, remove excessive material and provide a smooth, flush surface.

CP INSTALLATION

Blasting

All concrete surfaces to be metalized shall be thoroughly blasted with silica sand or other suitable material to remove all existing coatings, cement splatter or foreign materials prior to Al-Zn-In coating application. Sandblasting of the concrete should leave a clean, rough surface, which leaves the appearance of medium grit sandpaper (grit numbers from 60 to 100) without exposing the coarse aggregate.

The exposed steel shall receive an abrasive blast to remove any epoxy coating, mill scale, rust, oil, and/or other foreign matter present, to the extent that a near white appearance is obtained as per the Society for Protective Coatings (SSPC) SP-10 Standard. The abrasive stream should be directed normally perpendicular to the concrete surface or at an angle of approximately 15 degrees but no more than 30 degrees from the normal plane. Level of sandblasting of the concrete surface to achieve the highest possible bond of the TSA coating shall be determined in the field for every type of concrete present to receive metalizing. Blast material must be plant packaged and maintained in a clean and dry condition at all times. Material stored in the sand-blaster pot overnight shall not be used.

Connection for Connection Plates

After the concrete restoration areas are cured, the Contractor shall connect the zinc plate as shown on the Contract Document. The Contractor shall install the connections for the connection plates during the concrete removal/restoration operation. The surface of the concrete to be in contact with the connection plates shall be sufficiently smooth and uniform as to provide 100% contact between the plates and the concrete. The number of connection plates and method of installation are shown in the Contract Plans.

i. Installation of Anode Connection Plates for Non-Monitoring Sites

The anode connection plates facilitate a direct electrical connection between the sacrificial anode and the reinforcing steel. For each anode connection plate, a threaded stainless steel rod (stud) shall be attached to the rebar to facilitate attachment of the anode connection plate, as shown on the Contract Document.

ii. Installation of Anode Connection Plates for Monitoring Sites

For monitoring sites, one lead wire from strand and one lead wire from the anode plate shall extend to a junction box. Install the anode plate and wires in accordance with the Contract Document.

Installation of Reference Electrodes for Monitoring Sites

The CP specialist shall mark the exact location of the reference electrodes in the field based on the half-cell potential data obtained before spraying Al-Zn-In anode.

1. Installation procedures: Reference electrodes shall be installed in areas of sound concrete having high active half cell potential readings or as approved by the CP specialist. Prior to excavating, locate the stirrups and strands in the area of the excavation. Cut a slot for placement of the reference electrode. The Contractor shall not expose any reinforcement (rebars or strands) in the reference electrode excavation. The depth of the slot shall be such that the reference electrode is situated at the same depth as the rebar/strand. Reference electrode excavations shall be visibly free of dirt, grease and other foreign material prior to placing the reference electrode and the backfill material.
2. The reference electrode shall be placed in the excavation and the lead wire routed through the conduit into the junction box. An identification tag shall be affixed to the end of the wire indicating the reference electrode location and number.
3. The reference electrode excavation shall be patched with approved cement grout. Just prior to backfilling, the plastic cap on the reference electrode plug shall be removed and discarded. The reference electrode shall be fully encapsulated with cementitious backfill material. The backfill material shall completely fill the excavation, and no voids shall be permitted.

Installation of Junction Boxes for Monitoring Sites

There are two types of junction boxes, as shown in the Contract Plans. The Contactor shall install junction boxes as shown on the Plans. For monitoring girders, junction boxes (type 2) shall be extended down to a convenient location, when necessary (5 feet above MHW), for future testing.

1. Anode wire connection: Securely attach an anode (red) wire between the anode connection plate and the stainless steel washer and nut – making sure that the nut is firmly tightened. Route the anode wire through the conduit to the junction box type 1.
2. Strand wire connection: Securely attach a strand/rebar (black) wire to the strand as shown on the Contract Document and route this wire to the junction box type 1 through the PVC conduit. Provide a connection between the anode and the strand wires through a precision 0.1 ohm shunt, rated to 2 amperes, inside the junction box type 2.
3. Fastening: The junction boxes and the conduit shall be secured to the concrete surface using durable 316 stainless steel fasteners. The conduit fastener spacing shall be in accordance with Table 352.30(B) National Electrical Code (NEC). The Contractor shall monitor the electrical isolation between the anode and the reinforcement during the installation of conduits and junction boxes for all monitoring areas. Any short between the anode

and reinforcement shall be immediately corrected by the Contractor at no additional cost to the Department.

4. Sealing: All wire terminations shall be housed in junction boxes which shall be encapsulated in a liquid insulation spray to prevent any moisture intrusion and to provide electrical insulation from other nearby connections or wires. A weep hole shall be provided in the base of each junction box.
5. Caulking: The perimeter of the junction boxes shall be caulked with outdoor all weather caulk material manufactured by GE, or approved equal. The caulking shall achieve water tightness to shelter the anode connection plates, wires, shunts, and other metals housed inside.
6. Identification: All CP wires shall be identified in the junction boxes using durable identification tags. Each wire shall be clearly marked as to its function and shall be identified correctly.

Wiring and Conduit (for Monitoring Sites)

1. Wiring: Route all lead wires and reference electrode wires (without splices), through PVC conduits to the junction boxes.
2. Conduit: All wiring shall be installed in PVC conduits.
3. Connections: All conduit joints, fittings, couplings and adapters shall be jointed by means of solvent cement or as recommended by the conduit manufacturer.
4. Bending: Any conduit sections to be bent must be heated evenly over the entire length of the curve. Only electrical heaters designed specifically for the size and purpose of bending non-metallic conduit shall be used. Conduit bending shall be performed per the conduit manufacturer's recommendations. For "blind" bends or for compound turns in a conduit run, the heated conduit may be solvent cemented in place while still flexible. The use of torches or other flame-type devices shall not be permitted. PVC conduit sections that were exposed to excessive heating, as evident by brown discoloration, shall be discarded.

TSA COATING APPLICATION

Test Sections-Target Bond

Prior to commencing the arc-spraying operation, the Contractor shall metalize a minimum of four on-site test sections with minimum dimensions of four square feet each. These test sections shall be performed for both low level and high level girders. The work on test section shall not proceed without the presence of Engineer. The Contractor shall coordinate his work on test sections with the Engineer's schedule and availability. These test sections shall be used to determine the field application rate for the specified thickness and the grain size, texture acceptability and target adhesion strength. The test sections shall cover representative sections of all the concrete conditions present on the bridge to receive metalizing. Bond strength on the test sections shall be measured at no less than 24 hours after metalizing and shall be conducted as described by ASTM D4541 (latest version). All bond tests shall be made in triplicate and the results averaged.

Preliminary test areas and adhesion tests shall be performed on the bridge prior to commencing production metalizing. Adhesion strength shall be measured on all test sections to determine the target bond for production and acceptance. Target bond shall be established based on the higher strengths obtained from the test areas. It is expected that a minimum of 150 psi of bond strength will be achieved and strengths lower than the expected will not be accepted. Various levels of sandblasting of concrete at the test sections may be necessary to determine the proper surface condition to achieve the target bond. The Contractor shall provide a minimum of 14 days advanced notice for the preparation and metalizing of the test sections such that the CP Specialist and appropriate Department personnel be present for the application and testing.

Prior to TSA coating application, the concrete surface shall be air blasted to remove any residue from the sandblasting operation. Air stream shall be 100% moisture free and discharge a minimum pressure of 50 psi. Moisture and pressure of the air stream shall be tested on a daily basis.

TSA coating Application

Metalizing shall be performed on completely dry concrete. Thermal spraying operation shall not be performed during periods where rainfall, high seas, rough waters or any other wet conditions are present. TSA coating shall not be performed when excessive wind is blowing which could interfere with the operation as determined by the Engineer. The Contractor shall be responsible for compliance with any Federal, State or local codes regulating the quality of the surface waters.

Metalizing shall cover the concrete restored area and to the limits as shown on the Contract Documents. The coating should be applied in multiple passes and should overlap on each pass in a crosshatch pattern before the first layer of material cools down. Uniform gun movement should be used to ensure a consistent thickness. Metalized areas shall have uniform appearance, free of visible coating defects such as: cracking, burning, blistering, uncoated areas, and other similar defects that will affect the functioning of the coating. Sufficient anode material shall be sprayed to achieve an average thickness of 16 mils. This should correspond to a deposition rate of 0.2 pounds per square foot of sprayed area. Typically, each pass results in 4 mil thick anode coating. A total of 4 passes should correspond to a thickness of 16 mils. The thickness of the anode coating shall not exceed 20 mils. Material usage logs shall be used to document installation of the proper anode quantity. Metalizing shall only be applied to surface areas that have been properly prepared as per this Project Special Provision and approved satisfactory by the Engineer. Metalizing shall be continuous and un-interrupted within each repair area. Cold overlaps of the TSA coating will only be allowed for deficiencies correction.

Metalizing Time Window

Coordinate the metalizing and concrete restoration operations such that metalizing is completed and connected to the reinforcement on each component at no less than 10 days and no more than 90 days after concrete repair/restoration operation. Metalizing shall be completed within two hours following sandblasting and before any contamination on the concrete occurs.

Thickness Measurements

A minimum of one thickness measurement shall be obtained at 100 square foot intervals of production, Measurements shall be obtained and recorded by the Contractor as part of the Contractor's QC, and verified by the Engineer. Thickness measurements shall be obtained using a spherical anvil and spindle micrometer with digital display capable of performing measurements ranging from zero to one inch. Electronic thickness measuring devices may be allowed as approved by the Engineer. The Contractor shall use his measuring equipment in the test areas and coordinate the results with the equipment used by the Engineer/CP specialist prior to using his test equipment during installation of CP anode.

Where deficient coat thickness values are found, the deficient section and the immediate surface around (one square foot minimum), shall receive additional coating so that the coat thickness of the repaired area will reach a minimum of 16 mils. This shall be performed immediately (not to exceed 2 hours) following the first application or the metalizing shall be removed and the element shall then be re-metalized to cover the entire limits identified in the Contract Plans.

Bond Strength Test

The Contractor shall use his measuring equipment in the test areas and coordinate the results with the equipment used by the Engineer/CP specialist prior to using his test equipment during installation of CP anode.

The Contractor shall conduct a minimum of one coating adhesion strength test (pull-off test) at every 100 square feet. Each spot measurement shall be made in triplicate and the values averaged to comprise a test. Results shall be recorded by the Contractor, reviewed by the CP Specialist, and shall be subject to verification by the Engineer.

Pull-off tests shall be conducted using a mechanical 0 to 500 psi, fixed alignment adhesion tester as per ASTM -D 4541 (latest version) using 20 mm dollies. Pull-off strength shall be a minimum of 90% of the target values determined from the preliminary on-site test areas on the bridge. Measurements shall be obtained at no less than 3 hours after metalizing but at no more than 72 hours. Limits of areas not meeting the required bond strength shall be identified and marked, and then blasted clean of all sprayed metal prior to re-spraying as directed by the Engineer. Description of such areas shall be included in the CP report.

TSA Coating Uniformity

Surfaces not intended to be metalized that are adjacent or in close proximity to the surface to be metalized, shall be protected with suitable masking during the TSA coating application. The masked surfaces shall form neat horizontal and vertical lines. Surfaces of the TSA coated sections shall be uniform in appearance, free of visible coating defects such as; cracking, burning, blistering and un-coated areas and/or other defects that will affect the function and/or durability of the coating. The Contractor shall visually inspect the surface of the metalizing to ensure the above using a lens with a minimum magnification of 10. The coating uniformity is subject to verification by the Engineer and the Engineer’s decision is final.

TSA COATING DEFECTS

If a defective coating area is found, the correction shall be performed in the same manner as for deficient thickness correction. Sandblasting of the defective areas may be required as directed by the Engineer. Cold overlaps during reapplication may be necessary. However, re-application on the sprayed Al-Zn-In anode over previously metalized areas shall not blister, burn, or otherwise damage the bottom anode layer. Should this occur, the entire element should be sandblasted and re-metalized.

BREATHABLE SEALER

After TSA coating is approved satisfactory by the Engineer, the Contractor shall apply a coat of breathable sealer over the metalized areas. The Contractor shall apply this sealer only after the Engineer approves and accepts the sprayed anode. The sealer shall be Prmakote, or approved equal. The breathable coating shall have a minimum dry film thickness of 5 mils. A minimum of three thickness measurements shall be obtained per metalized zone or as directed by the Engineer. Concrete surfaces adjacent to the areas receiving breathable coating shall be masked during sealer application to protect from overspraying or over-run. The masked surface shall form clean horizontal/vertical lines.

Prmakote is a non-sacrificial sealer. It is water based and breathable. It is manufactured by Visual Pollution Technologies, Inc. (480) 657-9183.

The following alternate breathable sealers are allowed to be used upon approval by the Engineer:

1. Sure Klean® Weather Seal Blok-Guard® & Graffiti Control II
   ProSoCo, Inc.
   3741 Greenway Circle
   Lawrence, KS 66046
   Phone: (800) 255-4255

2. Si-COAT® 531™
   CSL Silicones Inc.
   144 Woodlawn Rd. W.
   Guelph, ON N1H 1B5
   Canada
   Phone: 1 (519) 836-9044

SYSTEM ENERGIZING (FOR MONITORING SITES)

At each monitoring site, the CP Specialist shall measure and record the AC resistance and DC voltage between the anode and steel, the DC millivolt drop across each shunt, the AC resistance between each reference electrode and the steel and the native potential of the steel and anode using the embedded reference electrodes. Conduct depolarization tests per NACE International Standard Practice SP 0290-2007 using the embedded reference electrodes. Submit test results and energizing data to the Engineer for approval. The CP specialist shall conduct these tests, and the results of the testing shall be a part of the CP report.

MEASUREMENT AND PAYMENT

Unless otherwise approved by the Engineer, take all measurements horizontally and vertically. The method or combination of methods of measurements shall be those that will reflect, with reasonable accuracy, the actual surface area of finished metalized work as determined by the Engineer.

Prestressed Concrete Girder Repair 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, cost of temporary work platform, testing of the soundness of the exposed concrete surface, furnishing and installation of concrete repair material/grout material, curing and sampling of concrete repair material, 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.

Splicing of Prestressing Strand will be measured and paid for at the contract unit price bid per each and will be full compensation for removal, containment and disposal off-site of unsound concrete and compromised prestressing strand, including the cost of materials, prestressing strand, turnbuckle strand splice device, labor, tools, equipment and incidentals necessary to complete the repair work. The Contractor and Engineer will determine quantities after removal of unsound concrete and blast cleaning of prestressing strand and before prestressing strand repair. Payment will also include the cost of blast cleaning, removal of concrete necessary for installation of splice devices, installation of splice devices, and tensioning of the strand and splice section.

TSA Full length (Non-Monitoring), TSA Full Length (Monitoring), TSA Partial Length (Non-Monitoring),TSA Partial Length (Monitoring) shall be at the unit price and shall be made based on actual area (square feet) of metalized concrete surface approved satisfactory by the Engineer. Payment shall provide full compensation for related items including but not limited to surface preparation, TSA coating application, breathable sealer application, CP Specialist services, testing, continuity corrections, manufacturer's representative, anode connection plates, threaded rods, wiring, conduit, junction boxes, reference electrodes, and any other incidental items associated with this work.

Pay Item	**Pay Unit**
Prestressed Concrete Girder Repair	Cubic Feet
Splicing of Prestressing Strand	Each
TSA Full Length (Non-Monitoring)	Square Feet
TSA Full Length (Monitoring)	Square Feet

TSA Partial Length (Non-Monitoring)	Square Feet
TSA Partial Length (Monitoring)	Square Feet

SHOTCRETE REPAIRS (12-5-12)

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 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 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.)
Water/Cementitious Materials Ratio	-	-	0.40 (Max.)
Air Content - As Shot (%)	ASTM C231	-	4 ± 1
Slump - As Shot (Range in inches)	ASTM C143	-	2 - 3
Minimum Compressive Strength (psi)	ASTM C39	7 28	3,000 5,000
Minimum Bond Pull-off Strength (psi)	ASTM C1583	28	145
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

i. 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 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.

ii. 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 ½" in depth around the repair area at right angles to the concrete surface. Remove all deteriorated concrete 1 inch below the reinforcing steel with a 17 lb (maximum) pneumatic hammer with points that do not exceed the width of the shank or with hand picks or chisels as directed by the Engineer. Do not cut or remove the existing reinforcing steel. Unless specifically directed by the Engineer, do not remove concrete deeper than 1 inch below the reinforcing steel.

Abrasive blast all exposed concrete surfaces and existing reinforcing steel in repair areas to remove all debris, loose concrete, loose mortar, rust, scale, etc. Use a wire brush to clean all exposed reinforcing steel. 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 welded stainless wire fabric at each repair area larger than one square foot if the depth of the repair exceeds 2 inches from the "As Built" outside face. 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.

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 5 days. If the time allowance exceeds 5 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 3 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 3 to 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 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 "As Built" dimensions and configuration. Provide a minimum 2" of cover for reinforcing steel exposed during repair. 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.

Prevent finished shotcrete from drying out by maintaining 95% relative humidity at the repair and surrounding areas by fogging, moist curing or other approved means for seven days.

MATERIAL TESTING & ACCEPTANCE

Each day shotcreting takes place, the nozzleman shall shoot one 18" x 18" x 3" 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.

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.

After 7 days, core three 3" diameter samples from each test panel and from the repaired structure as directed by the Engineer. Any cores taken from the structure shall penetrate into the existing structure concrete at least 2 inches. Cores shall be inspected for delamination, sand pockets, tested for bond strength and compressive strength. If a core taken from a repaired structure unit indicates unsatisfactory application or performance of the shotcrete, take additional cores from the applicable structure unit(s) for additional evaluation and testing as directed by the Engineer. 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 repaired structure units to the satisfaction of the

Engineer. All material testing, core testing and sampling will be done by the Materials and Tests Unit of North Carolina Department of Transportation.

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. 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, curing of shotcrete and taking core samples from the test panels and substructure units.

Payment will be made under:

Pay Item	Pay Unit
Shotcrete Repairs	Cubic Feet

EPOXY COATING AND DEBRIS REMOVAL (SPECIAL)

1.0 GENERAL

This work applies to bents and end bents of all bridges throughout the project as noted in the plans. Pressure wash, clean and epoxy coat top of the bent and end bent caps, top and sides of struts and top of footings, as noted in the plans.

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. Provide a Type 3 material certification in accordance with Article 106-3 showing the proposed epoxy meets Type 4A requirements.

2.0 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.

3.0 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.

4.0 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.

PILE ENCAPSULATION (SPECIAL)

Description

The work specified in this section consists of surface preparation of the pile, placement of a translucent, fiberglass reinforced plastic (FRP) jacket around the pile and injecting a water insensitive epoxy grout into the space between the jacket and the pile. The epoxy grout is batched, mixed and pumped by equipment, expressly designed for that purpose.

Materials

FRP Outer Jacket

The FRP Outer Jacket shall be Translucent FRP Jacket, as described in this section. For a submission to be approved it must meet ALL requirements of this section and approved by the engineer prior to the bid.

The translucent outer jacket shall be a marine grade laminate of fiberglass reinforced plastic (FRP), constructed of layers of woven roving and mat. Construction by the spray-up process, using a chopper gun, is not acceptable. The glass content shall be sufficient to meet the strength requirements specified herein, but shall not be less than 30% of the laminate. An Ultra-Violet (UV) screening ingredient shall be integrally bound within the polyester matrix.

The strength and thickness of the outer jacket shall be as required to provide adequate strength and rigidity to withstand the forces and stresses it may be subjected to during handling, installation and the injection of epoxy grout, but shall not be less than 1/8 inch (3 mm) thick.

The outer jacket shall be translucent to the extent that the progression of epoxy grout inside the jacket during injection can be visually monitored from outside the jacket.

The outer jacket shall be equipped with 1" NPT injection ports, spaced at intervals not to exceed five (5) feet, along its entire length. The injection ports shall be positioned on alternately opposite sides of the jacket to allow for more even distribution of grout. The injection ports shall be of all-polymer construction and be fitted into the jacket wall prior to jacket installation, except in special situations, approved by the engineer, where a port may be added to accommodate an unanticipated jobsite condition.

The outer jacket shall have a sufficient number of polymer stand-offs, adhered to its inside surface, to maintain a minimum space between the pile and the jacket of 1/2 inch (9.5 mm). When loss of pile section exists, it may be necessary to use adjustable stand-offs to keep the outer jacket in proper alignment with the pile. At an adjustable stand-off location, a polymer boss shall be adhered to the inside surface of the jacket to provide adequate thread length to accommodate the adjustable polymer screw.

The outer jacket material, exclusive of polymer stand-offs and injection ports, shall possess the following minimum physical properties.

1. Ultimate Tensile Strength per ASTM D-638: 10,000 PSI

2. IZOD Impact Strength per ASTM D-256: 15 ft-lbf/inch. (Notched Sample)

3. Barcol Hardness per ASTM D-2583: 30

4. Water Absorption per ASTM D-570: 1% Maximum

5. Ultra Violet (UV) Stability as demonstrated by Accelerated Weathering Tests per ASTM G-23: Samples of outer jacket subjected to 500 hour exposure in Twin Carbon Arc Weather-ometer (ASTM G-23, Type D) operated at 145 degrees F., shall not exhibit any chipping, flaking or peeling. Said test to be conducted in twenty (20) minute cycles, consisting of seventeen (17) minutes of arc light and three (3) minutes of water spray, throughout the 500 hour test duration.

The outer jacket shall be fabricated in sections. Each section shall not contain more than two (2) longitudinal joints. Sections of jacket may be placed one above the other and joined together with transverse joints. All joints in the outer jacket shall meet the following minimum requirements:

1. All joints shall have sufficient strength to assure that they will not open or separate when subjected to installation stresses, sea forces and epoxy grout injection pressures.

2. The longitudinal joint design shall be of overlapping configuration and shall allow for minor field adjustment to pile size. The design of all joints shall ensure that a minimum 1/2 inch annulus between jacket and pile is maintained.

3. Transverse joints (if any) shall be of overlapping configuration.

The lower end of each outer jacket shall be provided with a molded upset cavity to properly receive and contain a bottom seal gasket.

Epoxy Grout

The Epoxy Grout must meet ALL requirements of this section and approved by the engineer prior to the bid.

The epoxy grout shall be a manufactured, prepackaged, solvent-free, underwater curing, three component product, consisting of epoxy resin (component A), epoxy hardener (component B) and graded dry silica aggregate (component C). The ratio of the epoxy components A and B (collectively called the binder) shall be 1:1 by volume. The A and B components shall be of sharply contrasting colors, as supplied to the project, to minimize error in field proportioning and to assist in evaluating thoroughness of mixing. The grout shall be proportioned to meet the handling and placement requirements of this specification and the ratio of the filler to binder shall not exceed 3.5:1, by weight.

The mixed epoxy grout shall exhibit the following characteristics in the plastic state:

1. Viscosity of filled resin and filled curing agent shall be such that it may be pumped without segregation and be inject able into the space between the jacket and the pile without causing distortion or rupture of the jacket. The viscosity shall also be such that the blended grout completely fills the space between jacket and pile without voids and be reasonably self-leveling, once placed within the jacket.

2. The gel time or "Pot Life" of the blended grout shall be suitable for proper placement without voids, and allow sufficient time for reasonable self leveling within the jacket, yet in no case shall exceed 65 minutes after blending at a control temperature of 77 degrees F. (This requirement minimizes the possibility of the filler settling out of the liquid components.)

3. The blended grout shall be uniform in color and not contain any pockets or streaks of the original component colors.

The catalyzed Epoxy Grout, after curing under water, shall possess the following minimum physical properties in the hardened state.

1. 7 Day Compressive Strength per ASTM C-579: 7,000 PSI

2. 7 day Tensile Strength per ASTM C-307: 2,000 PSI

3. 7 day Bond/Shear Strength per ASTM C-882: 150 PSI

4. Shrinkage after 7 day's cure per ASTM C-531: 0.07% (Maximum)

5. Water Absorption after 7 day's cure per ASTM C-413: 0.45% (Maximum)

Marine Epoxy Pastes

The epoxy paste used to adhere the outer jacket seams and bottom seal gaskets, shall be a two component epoxy compound, capable of being applied underwater. The ratio of resin component to hardener component shall be 1:1 by volume and each component shall be of sharply contrasting color (e.g. black and white) to the other, to assist in evaluating the thoroughness of jobsite mixing.

The epoxy paste used to finish the tops of the encapsulations and to seal any in-situ bond test locations, shall be be a non-sag, two component epoxy compound, capable of being applied underwater. The ratio of resin component to hardener component shall be 1:1 by

volume and each component shall be of sharply contrasting color (e.g. black and white) to the other, to assist in evaluating the thoroughness of jobsite mixing.

Epoxy Grout Hose Lubricant shall be approved by the manufacturer of the epoxy grout manufacturer. The lubricant must be an epoxy diluent, compatible with the chemistry of the epoxy grout used.

Equipment

The epoxy grout to be injected into the outer jackets shall be proportioned, mixed and pumped with equipment expressly designed for that purpose. The equipment shall be capable of delivering mixed grout into the jackets at the rate of 2 GPM or greater.

Temperature Control Equipment

When ambient and/or water temperatures are expected to fall below 70 degrees F., a source of heated water, such as a diver's water heater, shall be provided. The heated water shall be directed into water jackets surrounding the epoxy grout hoppers and injection hose(s). This equipment shall be capable of delivering a sufficient amount of heated water to maintain grout viscosity suitable for proper grout placement.

Materials Handling and Storage

Handling and storage of pile encapsulation materials shall strictly conform to the manufacturer's recommendations. A list of minimum handling and storage requirements follows:

Outer Jackets

Outer jackets shall be shipped in closed containers or covered with tarpaulins to prevent contamination by dirt or road films. Outer jackets shall be properly stored at the jobsite to minimize distortion and to prevent contamination by foot traffic and blown debris. If storage at project is to exceed 30 days, shaded storage shall be provided.

Epoxy Grout Components

The silica aggregate component of the epoxy grout shall be properly packaged and labeled to indicate point of origin and manufacturer's lot number. The aggregate shall be stored to assure that it is thoroughly dry when mixed in the epoxy grout. All liquid epoxy components to be used in the work shall be delivered to the jobsite in tightly sealed unopened containers, clearly labeled to indicate:

Name of manufacturer.

Manufacturer's product name and component designation.

Manufacturer's lot number and "Use before" date.

ANSI (American National Standards institute) hazardous material rating and handling precautions.

Epoxy liquid epoxy components shall be stored in a covered, well ventilated space. The storage temperature of the liquid components shall not exceed 120 degrees F nor be less than 40 degrees F at any time after receipt by the contractor. (See Epoxy Grout Preparation)

Containers containing liquid epoxy components shall always be sealed and air tight from time of receipt by contractor until entering the proportioning and blending process. When containers are opened for sampling or other purposes and containers remain partially filled, their lids will be tightly closed to prevent contamination by moisture or other substances. After the seal has been broken on a container, its contents must be used within seven (7) days or removed from the project.

All project personnel handling the epoxy grout or its liquid components shall be properly alerted to the Epoxy Safety Requirements supplied by the manufacturer. A Material Safety Data Sheet (MSDS) shall be supplied with each shipment of liquid epoxy materials.

Submittals

Submit shop drawings and calculations to the Engineer for approval prior to start of fabrication. Submittal shall include:

1. Top and bottom elevations relative to project datum of each outer jacket to be installed.

2. Details and locations of typical longitudinal and transverse joints in the outer jackets, including a description of the joint sealing method(s).

3. Details of fixed and/or adjustable stand-offs and their location on the outer jackets.

4. Detail of typical outer jacket bottom seal.

5. Location and details of temporary bracing and outer jacket support required during placement and curing of epoxy grout.

6. Details of injection ports or other access points into outer jacket to facilitate placement of epoxy grout.

7. Details of installation sequence to be used to place the epoxy grout in the space between jacket and pile.

8. Detail of final finishing of epoxy grout at the top of the encapsulation.

9. Details of permanent closure of all injection ports and test locations in the outer jacket to be accomplished after epoxy grout placement is complete.

Material Certification

For materials to be used, the Supplier shall furnish a certificate to the Engineer attesting that the materials meet all the requirements contained herein and that they conform in all respects to the materials subjected to the tests required. Copies of current test reports

shall be attached to the certificate. No test report for tests made more than one year prior to shipment will be accepted for the form material.

Construction Methods

Pile Cleaning

Prior to application of the encapsulation process, all pile surfaces shall be thoroughly cleaned of marine growth, oil, grease, mud, rust, broken concrete, micro-organisms and any other deleterious material which might prevent proper bonding between the epoxy grout and the pile. Pile cleaning may be accomplished by grit blasting, water blasting, or by powered rotary abraders, and shall meet the satisfaction of the Engineer.

In environments where active marine growth occurs, it may be necessary to perform the pile cleaning in two (2) phases. In such environments, the first phase shall consist of removing marine growth, oil, grease, rust, broken concrete, etc., and shall occur not more than seven (7) days prior to the encapsulation. The second phase shall be a final surface preparation, removing all remaining deleterious substances including micro-organisms and shall occur not more than 48 hours prior to the placement of the epoxy grout in the outer pile jacket.

Outer Jacket Assembly

Only jackets with pre-fitted injection ports (by the contractor) are to be used.

The entire inside surface of the jacket shall be lightly grit blasted by the contractor to remove any bond breaking residue that may be present.

All fixed stand-offs or adjustable stand-off bosses shall be affixed to the jacket by the contractor in accordance with approved shop drawings. Maximum spacing between fixed stand-offs shall be 18” in the longitudinal direction and 12” in the transverse direction.

Jacket assembly and positioning around the pile shall be performed by the contractor in such a manner as to assure that no damage to stand-offs and/or set screws occurs and that there will be no detrimental movement of the joints while joint adhesive is curing.

Both the longitudinal and transverse seams, if any, shall be sealed by the contractor with marine epoxy paste as described above and fastened with 3/16" diameter stainless steel rivets. The spacing between individual fasteners shall not exceed 5".

The jacket shall be supported by temporary bracing or other means supplied by the contractor to assure that it will not move or distort during the epoxy grout placement and curing period and that the minimum annular space of 1/2 inch between pile and jacket is maintained throughout the entire encapsulation.

The contractor shall install a gasket to prevent the epoxy grout from leaving the bottom of the jacket during the injection process. The gasket shall be fitted into the molded cavity at the lower end of the jacket and adhered in place with marine epoxy paste. Any gasket material used in the bottom seal shall be contained within the molded cavity and shall not extend up into the jacket above the cavity.

Epoxy Grout Preparation

Proportioning and mixing of the epoxy grout shall be accomplished with equipment expressly designed for that purpose and shall be performed in a suitable work area within hose distance of the piles to be encapsulated.

Proportioning of the silica aggregate and the liquid epoxy components shall be performed in strict accordance with the manufacturer's recommendations, with particular regard to temperature control. When ambient and/or water temperatures are expected to fall below 70 degrees F., the day's supply of grout filler and liquid components shall he pre-heated to above 80 degrees F., but never greater than 120 degrees F., prior to being introduced into the grout handling equipment. In no case shall open flame be used in direct contact with the equipment or the epoxy components.

Epoxy Grout Placement (Injection)

Before the injection process begins, at least 2 gallons of an approved grout hose lubricant shall be placed in each grout hopper. This lubricant shall be pumped through the entire system to coat all wetted surfaces of the hopper(s), pump(s) and hoses. When the lubricant level has reached the bottom of the hopper(s), it may be immediately followed by the epoxy grout and the remaining lubricant "chased" out of the hoses. All lubricant, that is not intermixed with the epoxy grout, may be collected at the downstream end of the hoses for re-use.

The premixed, aggregate filled epoxy grout shall be pumped through hoses to the jacket injection ports. If the plural component method of grout handling is used, the separate aggregate filled components shall be pumped through separate hoses to the mixer/blender assembly, where the components are then thoroughly blended and catalyzed, just prior to entering the pile jacket.

Grout injection shall begin at the bottom injection port. As the grout appears at the next higher port, and it has been determined that the space between the pile and the jacket is filled to that port, the lower port shall be capped off and the injection begun at the next higher port where the grout appeared. This process is repeated from port to port until the grout reaches the top of the jacket. NOTE: If project experience indicates that the grout can be injected from a lower port, past the next higher port or ports, without difficulty or undo stress on the jacket, the higher port or ports may be plugged and bypassed. The plugs shall be 1" NPT, Schedule 40, PVC, CPVC or Polypropylene.

At the contractor's option, he may inject a short lift of grout (six inches to 1 foot in height) into the bottom-most port and allow it to cure before proceeding with subsequent lifts. If this practice is used, the jackets shall be fitted with an additional injection port to coincide with the top of the first lift. Subsequent lifts of grout will follow the above procedures.

The injection process shall be continuous, except for brief interruptions when the injector is moved from port to port, and the speed of the injection process shall be controlled to prevent entrapment of water or air in the grout cavity being filled.

The maximum permissible voids in the epoxy grout within the jackets shall not exceed 0.01 square foot per one (1) square foot of encapsulation area. Any voids larger than two (2) inches in diameter shall be repaired by the contractor, using an approved method, at no expense to the owner.

Final Finishing and Inspection of the Completed Encapsulation

After the grouting process is completed and the grout has sufficiently cured, all temporary support for the jacket shall he removed.

The exposed epoxy grout at the top of each encapsulation shall he finished with the marine epoxy paste using the method shown in the approved shop drawings.

Measurement and Payment

Pile Encapsulation will be measured and paid for at the contract unit price bid per linear foot of encased pile 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 accomplish removal; shop drawings, cleaning the pile, jacket installation, falsework; furnishing and placement of epoxy grout including pumping equipment, pollution control, turbidity curtains, and all else required to repair deteriorated piles using pile encapsulation.

Payment will be made under:

Pay Item	Pay Unit
Pile Encapsulation	Linear Feet

GALVANIC CATHODIC PROTECTION INTEGRAL PILE JACKET (SPECIAL)

GENERAL

The work under this Special Provision consists of supplying, installing, testing, and energizing Cathodic Protection (CP) system for selected piles, as shown on the Contract Documents. The CP system requires continuity between all embedded steel components on designated prestressed piles, wire connection to the steel reinforcement, installation of integral zinc mesh anode factory installed in fiberglass CP jackets, and installation of bulk zinc anodes at an elevation below the CP jacket in accordance with the Contract Documents.

Piles identified in contract plans as anticipated structural pile jackets are based on previous Bridge Inspection Reports. A structural jacket will be required if, after surface preparation, either of the two following is present.

1) 1 or more strands/vertical reinforcing steel on one side of a pile exhibit more than 30% cross-sectional area loss.
2) The total cross-sectional area of strands/vertical reinforcing steel on one side of the bent pile exhibit more than 10% section loss.

If greater than 50% section loss is found on 3 or more vertical reinforcing steel bars consult Engineer.

The Contractor shall coordinate the installation of anode jackets with other construction operations. Special caution on scheduling may be required to prevent damage to any installed components by subsequent operations. Any damage to already installed CP systems shall be promptly repaired by the Contractor at no additional cost to the Department.

At some shallow water locations minor hand excavation (up to 2ft) may be required to place the bulk zinc anode below the jacket as detailed on plans. No jetting is permitted, only hand excavation will be allowed. The mudline must be returned to original condition. Cost of these operations shall be considered incidental to the CP system installation.

The Contractor shall be mindful of the coordination required between the CP Specialist schedule to accomplish the required testing, and obtaining Engineer's approval to adhere to the overall project schedule. No additional time will be granted. The Engineer will stop work at any time without consequence to the Department due to poor workmanship, use of unapproved materials, or unapproved work procedure. The Contractor is ultimately responsible for the integrity and performance of all repairs and CP systems.

MATERIALS AND EQUIPMENT REQUIREMENTS

Work Vessels

Refer to the Securing of Vessels project special provision if utilizing barges or other vessels.

Provide an emergency boat with communication equipment (phone or radio) at the job site at all times when work is being performed. Assure that at any time any worker is present at the job site, there is immediate transportation to shore in the event of an emergency. The emergency boat shall be in addition to the boat provided for CP Specialist or NCDOT inspectors. Do not use the emergency boat as a work platform.

Materials

Fiberglass Jacket

Use fiberglass jacket forms composed of a durable, inert, corrosion resistant material with an interlocking joint along two sides that permits the form to be assembled and sealed in place around the pile. Fabricate the forms from fiberglass and polyester resins. The jacket forms shall have a minimum thickness of 1/8 inch. 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 jacket concrete material. Provide the forms with bonded or bolted-on, non-metallic 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 to ensure bond with the jacket concrete. Equip the forms with a compressible sealing strip at the bottom which will effectively seal the annular space between the pile

and the form. Use non-metallic hardware for pumping ports. Fabricate the pile jacket form and have it inspected and approved by the Engineer prior to placement on piles. Promptly remove any pile jacket form that is rejected by the Engineer from the project.

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.	

Zinc Mesh Anode

Place the zinc mesh anodes in direct contact with the inside face of the fiberglass jacket form. The zinc mesh anode shall be suitable for encapsulation in jacket concrete. The zinc mesh shall conform to ASTM B-69 with the following composition:

Lead (Pb) 0.003% weight max
Iron (Fe) 0.001% weight max
Cadmium (Cd) 0.001% weight max
Copper (Cu) 0.7-0.9% weight max
Aluminum (Al) 0.001% weight max
Titanium (Ti) 0.001% weight max
Magnesium (Mg) 0.0005% weight max
Manganese (Mn) 0.001% weight max
Nickel (Ni) 0.001% weight max
Tin (Sn) 0.001% weight max
Zinc (Zn) Balance

The zinc mesh shall have the following physical properties:

Electrical conductivity 28% min
Solid zinc density 0.26 PCI
Weight of expanded mesh 1.6 PSF
Open area of expanded mesh 53% (density)
Solid zinc sheet thickness 3/32"

The zinc mesh shall have the following geometrics:

0.500" hex pattern
0.125" strand width in short direction
0.500" strand width in long direction
0.320" short opening
0.750" long opening

Bulk Zinc Anode

Two 26 lb bulk zinc anodes are required for the CP system to complement the CP jacket. The bulk zinc anode shall conform to ASTM B-418 for a Type I anode and shall be 99% pure zinc with a steel strap core. The steel strap shall be hot dip galvanized with a minimum zinc thickness of 0.005 inch. A 3/4-inch diameter hole shall be predrilled at each end of the steel strap prior to galvanizing.

Grout Material

Grout shall only be used for backfilling of holes for continuity checking or electrode installation. Grout shall be on the NCDOT Approved Product List (APL) and shall have 15,000 ohm-cm resistivity or less. Use of any admixtures that increase electrical resistivity such as flash, silica fume, or slag is not allowed.

Jacket Concrete

Use concrete material for both non-structural and structural jackets unless otherwise specified in the Contract Documents.

For jacket concrete, use “Drilled Pier Concrete” in accordance with the requirements of NCDOT Standard Specifications Sections 1000 and 1024 with an adjusted slump of 7 to 9 inches. Reduced size coarse aggregate may be used as approved by the Engineer. Fly ash, slag, or silica fume is not allowed for cathodic protection jackets. Perform sampling and testing in accordance with NCDOT Standard Specifications Section 1000. Hardened concrete will be accepted on the basis of strength test results.

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

Water

Use water that is in accordance with the requirements of NCDOT Specifications Section 1024-4 & 1026-4 for all jacket concrete mixing. Use potable water for cleaning, rinsing, or any other application that requires direct contact with the piles.

Reinforcing Steel

Use bare deformed reinforcing steel in accordance with the requirements of NCDOT Standard Specifications Section 1070 for all structural and non-structural jackets

Conduit, Junction Box, and Hardware

All conduit shall be schedule 80 PVC (unless noted otherwise in the Contract Plans) and sunlight resistant. All junction boxes, conduit outlet bodies, and fittings shall be sunlight resistant PVC, rated NEMA 4X, rated for use with schedule 80 conduits, have a cover with gasket and Type 316 Stainless Steel screws. Conduit fasteners, hangers, access fittings, junction boxes and any other conduit accessories shall be mounted to concrete surfaces using bolts and lock washers, which shall be threaded into structural drop-in anchors of at least 1/2" diameter inserted into holes drilled into the concrete. All conduit clamps shall have two support holes.

All wire terminations shall be housed in junction boxes which shall be encapsulated in a liquid insulation spray to prevent any moisture intrusion and to provide electrical insulation from other nearby connections or wires. A weep hole shall be provided in the base of each junction box.

One link bar or shunt shall be furnished inside the junction box. Shunts (for monitoring sites) shall have a calibrated resistor with resistance of 0.1 ohm, rated to 2 amperes.

All hardware, including junction box lock rings for the installation of the PVC conduits, junction boxes, and electrical connections shall be Type 316 Stainless Steel, unless otherwise specified.

Wires

Positive (zinc mesh) and negative (rebar) lead wires shall be No. 10 AWG copper strand wire, with HMWPE, color coded red for positive DC voltage supplied and black for the negative DC return.

All wires shall be pre-tinned and uniquely color coded.

Reference Electrodes (for Monitoring Piles)

One reference electrode shall be installed in each pile designated as a monitoring pile. Reference electrodes shall be silver/silver chloride reference electrodes suitable for permanent embedment in concrete. The electrodes shall be supplied with a #14 AWG stranded copper lead wire with HMWPE blue insulation to reach and enter the junction box without splicing. The lead wire to reference electrode connection shall be completely sealed to prevent moisture penetration into the connection. All silver/silver chloride reference electrodes shall be individually packaged in a sealed plastic container and delivered to the job site.

A #14 AWG stranded copper lead wire with HMWPE black insulation shall be connected to the rebar/strand as the ground wire for each reference electrode.

All silver/silver chloride reference electrodes shall be calibrated against a calomel electrode in a saturated calcium hydroxide solution. A digital multimeter with a high internal resistance ($\geq$10 MΩ) and with a resolution of at least 1mV shall be used. The negative (black) lead shall be connected to the reference cell, and the positive (red) lead shall be connected to the

calomel reference electrode. Acceptable reference electrodes shall have stable reading of ±5 mV compared to the theoretical value at the typical room temperature of 73˚F. The data shall be tabulated along with the date and temperature of the calcium hydroxide solution and submitted to the Engineer. All reference cells shall be tested and approved by CP Specialist for use on this project prior to installation. The CP Specialist shall submit the reference electrode test data to the Engineer within 2 days of the test date. Any reference electrode that fail the test shall be rejected by the CP Specialist and shall not be used in this project. All rejected reference electrodes shall be promptly removed from the project site.

QUALITY CONTROL

Personnel Qualifications - CP Specialist Qualifications

Secure the services of a CP Specialist with the following qualifications:

1. A National Association of Corrosion Engineers (NACE) certification in cathodic protection of level CP-4 or a P.E. License.
2. A minimum of 5 years of experience in the installation and testing of CP systems to protect reinforced concrete structures.
3. Performed QC and performance testing of CP systems for concrete structures in a minimum of 3 projects in the past 5 years.
4. The CP Specialist shall be an independent subcontractor, not otherwise associated with the Contractor, the CP systems manufacturer, distributor, or any other entities providing materials or services for this project. The CP Specialist may be one firm for multiple CP systems or one firm for each of the single CP systems. No CP work will be allowed if at any time an approved CP Specialist is not active or otherwise involved in the project.

CP Technician(s), who work under the CP Specialist's direction, shall have the following qualifications:

1. A minimum of 2 years of experience in the installation and testing of CP systems to protect reinforced concrete structures.

CP Specialist Responsibilities

CP Specialist shall provide the following services:

13. Review all Contractor documents related to the CP work prior to submittal to NCDOT for approval.
14. Conduct a minimum of one QC visit to the job site per month.
15. Directly update the Engineer in writing monthly on the quality of the work along with a list of rejections or recommended corrections.
16. Certify QC Plan in accordance with this special provision and submit to the Engineer for approval.
17. Test and certify strand/spiral continuity and continuity corrections.
18. Verify and certify wire connections to strand and supplemental steel.
19. Verify and certify wire connection to the anode.
20. Verify and certify the reference electrode is operational prior to installation and after installation.

21. Verify wire labels and inspect wires and splices after wiring is completed.
22. Certify overall installation of each CP pile jacket.
23. Energize each CP pile jacket.
24. Submit a final CP report along with all the test data in an electronic format.

CP Specialist Quality Control Plan

Provide a QC Plan certified by a CP Specialist for Engineer's approval. The Plan shall include all tasks to be performed by CP Specialist, or the technician under his direction. The Plan shall include but not be limited to: verification of material compositions, verification of shop drawings prior to submittal, method and frequency of the Contractor's QC testing, methods of measuring electrical continuity, anode installation, voltages/currents/potentials measurements, energizing procedure, and method of updating the Engineer.

CP Report

Provide a final report produced by the CP Specialist for the CP systems. The report shall describe the general characteristics of the systems, installation sequence, results of the continuity testing, location of continuity corrections (where applicable), electrical resistance measurements, reference electrode function, the required monthly updates sent to the Engineer describing the quality of work and CP energizing results.

In the final report, the CP Specialist shall document (written/photo documentation) any unapproved deviations from the Contract Documents that pertain to the CP system along with the Department approved Request(s) For Information, Request(s) For Modification, Submittals, etc. for the approved deviations. Include in the final report, as an addendum, the required monthly updates from the CP Specialist to the Engineer regarding the status of CP work. The report and all data shall be in typed form and a digital version of the report shall be provided along with 4 bound hard copies. Submit copies of the final report to the Engineer.

SUBMITTALS

The Contractor shall prepare and submit all required certifications, data sheets, shop drawings, materials and methods and submittals within 90 days after NTP. Work on piles shall not begin until submittals are approved by the Engineer.

Submit shop drawings of jacket and bulk anode installations detailing the location of standoff spacers, method of performing the surface preparation, method of fastening jacket form to pile, method of sealing the forms after installation, method of bracing during jacket concrete placement, method of and staging for jacket concrete placement, details of access holes for reference electrodes, and method of cutting and sealing pumping ports.

Submit shop drawings of electrical work for the CP system, including negative connections to the steel, continuity check and correction procedures, installation of reference electrodes, and installation of wires, conduit, and junction box.

Submit a Concrete Pumping Plan for review and approval by the Engineer. Include in the Plan as a minimum: 1) equipment and positioning (along with any required road/lane/bridge closures), 2) estimated time of placement per jacket, 3) port pumping sequence, 4) method of sealing ports, 5) concrete test protocol at discharge point and, 6) method of collecting flushed material.

Submit certified laboratory test results for the fiberglass jacket form.

Submit certified test results (dated within six months for the particular heat) of the chemical composition of the anodes (both mesh anode and bulk zinc anode). Submit manufacturer certification stating that the dimensions and physical characteristics of the anode meet the requirements of the Contract Documents.

Submit reference electrodes' catalog cut and installation diagram with recommendation by CP Specialist. Demonstrate the reference electrodes submitted meet the requirements of this Special Provision. Include operations and maintenance data sheets for reference electrodes.

Submit technical sheet and MSDS for the blasting media.

Submit technical specifications or manufacturers' certifications for wires, conduits, dowel bars, junction boxes, marine grade epoxy, and epoxy mastic in accordance with NCDOT Standard Specifications Section 106.

Submit a concrete mix design of the jacket concrete.

Submit manufacturer's technical specifications, method of application, formulation (if applicable), and pot and curing times for proposed cement grout material to backfill holes or excavations during continuity checking/correction and reference electrode installation.

Submit calibration certificate for all test equipment to be used in testing all CP related systems.

Submit qualifications of the CP specialist(s) and CP Technician(s) with experience records.

Submit a CP Specialist QC Plan.

CONSTRUCTION

Initial Water Level Survey

The Contractor shall survey mean low water (MLW) level and mean high water (MHW) level and Submit to the Engineer prior to starting any concrete repair work or ordering CP jackets. The Contractor shall review the contract plans provided by NCDOT and submit a list which shall include the length of jacket and positioning of the bottom of the jacket (in relation to the MLW) for each pile and obtain approval from the engineer before starting any concrete removal work or placing orders for the jacket.

Concrete Removal & Surface Preparation

Remove all cracked or delaminated concrete and excavate to a depth of 3/4 to 1 inch behind the exposed reinforcement. Limit the size of chipping hammers to 20 pounds unless otherwise approved by the Engineer. The Contractor shall exercise extreme caution not to damage the existing prestressed strand and spiral ties during removal/repair operations.

Thoroughly clean all pile surfaces that the jacket will cover. Remove all oil, grease, dirt, delaminated/damaged concrete, marine growth and any other deleterious material that would prevent proper bonding of the jacket concrete material. Sandblast all exposed reinforcing steel to the Society of Protective Coatings (SSPC)-SP10, near white, 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 provide a clean surface for proper bonding of the jacket concrete. Do not place the jacket until the surface preparation is approved by the Engineer.

Positive (Anode) and Negative (Rebar) Connections

Braze or resistance weld one end of each of the two negative lead wires to the spiral tie (that was exposed during the continuity test) and route them to the junction box. The brazed/welded connections shall be coated with two coats of 100% solids non-conductive epoxy such that no copper wire or weld will be in contact with concrete or patching material.

Braze a No. 8 AWG copper strand wire with HMWPE insulation to the steel bar at the bulk zinc anode. Brazing of the connection wire to the bulk anode should be performed prior to anode installation. Route the copper wire in conduit, terminate the wire inside the junction box, as described in Section 5.8.

The free ends of the copper wires shall be connected in the junction box as shown in the Plans. Soldered marine grade, tin coated electrical ring connectors or other approved weatherproof permanent connections shall be used as wire terminations. Connect the negative leads to the anode wires from the CP jacket mesh anode and the bulk anodes only inside the junction box, as shown in the Plans.

The following wires shall be present:

1. Two spiral tie (negative) (cathode)
2. Two additional steel reinforcement (negative) (cathode)
3. Two bulk anode (positive) (anode)
4. Two zinc mesh (positive) (anode)

For monitoring piles, one additional reference electrode wire and one additional reference electrode ground wire shall be present, as shown in the Contract Plans.

Establishing Continuity

Prior to installing the jackets, perform electrical continuity testing between all existing strands, spiral ties & vertical reinforcing steel and the new steel, and any

other steel components to receive cathodic protection. Strands and other metals in the piles that are found to be discontinuous shall be made continuous with each other. Strands for continuity test shall be exposed by drilling a 0.75" diameter hole to each strand in the concrete and measuring inter-strand voltage using a high impedance voltmeter. Holes to access the strands shall be staggered at 1' intervals within the top 1' of the CP jacket.

Continuity shall be provided by resistance welding two continuous solid steel wires to each strand requiring continuity correction inside the excavation.

Continuity shall be performed by the CP specialist prior to coating with epoxy. Any discontinuity found shall be repaired by the Contractor. Where continuity corrections are required, additional concrete excavation may be necessary. All excavations required for continuity corrections shall be kept minimal. Continuity corrections shall be verified by CP specialist on all strands after continuity corrections are completed by the Contractor. Continuity welds shall receive a coat of 100% solids, non-conductive epoxy such that no weld comes in contact with the concrete.

Special care shall be observed to avoid cutting any of the strands or spiral ties during drilling, saw cutting, and/or grooving operation. The strand and the weld in excavations shall not be left exposed for more than 7 days. Any hole or excavation for continuity testing/correction performed inside and outside the jacket limits shall be filled with an approved grout/patch material prior to installing the jacket.

Reference Electrode Installation (for Monitoring Piles)

One Silver-Silver Chloride reference electrode shall be installed in each monitoring pile. Reference electrodes shall be installed as per manufacturer recommendations at depth of steel and shall be installed at an elevation of 6 inches above MHW. The exact location of the reference electrode shall be determined by the CP Specialist and submitted to the Engineer for approval.

The reference electrodes shall be located and installed in accordance with the Plans. Once the reference electrode is installed, AC resistance between reference electrode lead wire and ground wire shall be measured and documented. The AC resistance shall be no greater than 15,000 ohms. The half-cell potential of the rebar shall be measured to check the stability of reference cells. The potentials obtained using a high-impedance multimeter shall not be unstable. Any reference electrode that is not stable shall be replaced by the Contractor with a new reference electrode. The potential readings of stable reference electrodes shall not vary by more than 20mV in 10 minutes.

Jacket Placement

The zinc mesh/fiberglass jacket halves shall be placed around the pile within 24 hours after the concrete surface preparation is approved by the Engineer. Place the jacket in position around the pile; secure and seal the interlocking joint(s), and seal the bottom of the form against the pile surface with the compressible seal and an epoxy mastic suitable for underwater application. Adjust stand-offs as necessary to prevent misalignment and install temporary hard backing to prevent deformation. Place a temporary plastic wrap around the form prior to placement of the hard

backing to protect the gel coat. After jacket halves have been placed, route the two anode mesh wires coming out of the jacket in conduit so that the free end of the wire terminates inside the junction box for fastening later. At no time shall any system wires be allowed to touch/enter the water.

Bulk Zinc Anode Installation

Attach the bulk zinc anodes to the pile in accordance with the Contract Plans. Route the bulk zinc anode wires to the junction box through the CP jacket form as shown in the Contract Plans.

Jacket Concrete Placement

Wet to saturation the surface of the pile immediately prior to placing the jacket concrete. Place the jacket concrete in one continuous pour at no more than 72 hours after surface preparation. Fill the annulus between the pile and pile jacket form following the jacket manufacturer's instructions and the Contract Documents. Do not drop jacket concrete material into forms higher than five feet or into forms containing water. Prevent contamination of the jacket concrete during placement and provide internal or external vibration to ensure proper consolidation. Cure jacket concrete for a minimum of 96 hours before removing any external bracing. Remove any jacket concrete or other extraneous material from the exterior surface of the form (on the same day) 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 marine grade epoxy.

Installation of Monitoring Port

After the jacket concrete has cured, a 1-1/2-inch diameter access hole shall be cored (no hammer drilling) through the fiberglass jacket and the mesh anode to the original concrete surface at an elevation of 6" above MHW. Care shall be exercised to not core through the reinforcement or the strand. For the monitoring piles, the access hole shall be located on the opposite face of the pile where the reference electrode is located.

The sides of the monitoring port (except for the pile surface) shall be shielded using a PVC stub that fits into the hole or coated with Type 2 marine grade epoxy after the coring is completed. Unreasonable spread of epoxy on the concrete surface is not permitted. The bottom of the access hole shall be clear of any epoxy. Seal the monitoring port (when not in use) with a rubber seal.

ENERGIZING

The CP Specialist, or the technician under his direction, shall measure and document the following: anode to steel resistance, static reinforcement/anode potentials, energizing current, energized "on" and "off" potentials, and depolarization of the old and new reinforcement for each pile per NACE International Standard Practice SP 0290-2007. Potentials shall be measured with a portable copper-copper sulfate reference electrode and the embedded permanent reference electrode (where applicable). Static potential shall be measured both in the water and in the monitoring access port. Submit test results and energizing data

to the Engineer for approval. Once a jacket is filled with concrete, it shall be energized within 14 days.

MEASUREMENT AND PAYMENT

Basis of Payment

Payment shall provide full compensation for all required surveys, submittals, materials, equipment, and labor for: concrete removal, negative connections, continuity testing and corrections, reinforcing steel, jacket concrete, conduits, wiring, junction boxes, and any incidental items necessary to complete this work. Cost of QC/quality assurance and the CP Specialist services as described herein are considered incidental items, and are thereby included in the cost of the cathodic protection pile jacket.

Partial monthly payments for cathodic protection jackets installed will require certification from the CP Specialist indicating that the jackets are installed and functioning in complete accordance with the Contract Documents. Any galvanic CP jacket that exhibits electrical shortage or has misalignments exceeding ½" will be rejected and the Contractor shall replace at no additional cost. Time extension will not be granted for correcting rejected materials, parts, CP jackets, or CP systems. Payment for all fully installed and functioning CP jacket and bulk anode system will be made under:

Pay Item	Pay Unit
CP Jacket (Non-Monitoring)	Linear Feet
CP Jacket (Monitoring)	Linear Feet
Bulk Anode	Each

REMOVAL OF EXISTING FENDER SYSTEM (SPECIAL)

The existing fender system shall be removed in accordance with Section 402 of the *Standard Specifications* and this special provision.

Navigational lighting and fender signage shall be maintained at all times in accordance with the requirements set forth by the Coast Guard. The Contractor shall notify the Engineer and the Division 2 Electrical Representative no less than 10 business days before beginning any work in order to establish a process for the placement of temporary lighting and signage and the removal and replacement of the existing lighting and signage. The contractor will be required to provide navigational lighting and signage in accordance with Coast Guard specifications during those times in which the existing lighting and signage are removed to allow for fender replacement work. For this project the Division 2 Electrical Representative to be contacted is Ken Miller who can be reached at (252) 670-2143.

In order to protect the bridge at all times during the replacement of the fender system, both removal and the construction shall be limited to replacing a length not to exceed 48'-0" of the fender system at any one time. Therefore, removal and replacement of the existing fender system shall be done in stages consisting of removing the existing fender length necessary to install and construct the new section of fender system prior to beginning the next stage.

Piles from the existing fender system and any remnant piles from previous fender system shall be removed in their entirety. If piles break off during removal or otherwise cannot be entirely removed and they do not interfere with the placement of new piles, they may be cut off flush with the bed of the body water. The North Carolina Division of Coastal Management (NCDCM) shall be notified of each occurrence within one working day. All existing fender members within 5' of either face of the fender shall be removed.

The lump sum price bid for *Removal of Existing Fender System* at each site will be full compensation for the above work covered by Section 402 of the *Standard Specifications*, the applicable permits, and this Special Provision including all materials, equipment, tools, labor, disposal, and incidentals necessary to complete this work.

AS-BUILT PLANS (SPECIAL)

The Contractor shall provide As-Built plans to both the Resident Engineer and the Navigational Branch of the U.S. Army Corps of Engineers showing the location of the new fender system. A survey must be performed and referenced to the North Carolina State Plain Coordinate System NAD 1983 US survey feet horizontal datum and NGVD 1929 US survey feet vertical datum. The As-Built plans shall be submitted within thirty (30) days of completion of construction activities to the Resident Engineer and to the US Army Corps of Engineers, Wilmington District, 69 Darlington Ave., Wilmington, North Carolina 28403.

No separate payment will be made for the above work. All costs associated with providing the As-Built plans shall be considered incidental to the lump sum price bid for *Removal of Existing Fender System.*

COMPOSITE FENDER SYSTEM (SPECIAL)

1.0 Description

The work for providing the composite fender system including the pile clusters consists of furnishing and installing structural plastic (SP) components including fiberglass reinforced plastic lumber (FRPL) and composite piles and all miscellaneous hardware to complete the work in accordance with the plans and this special provision. The work also includes providing, installing, and later removing temporary navigational lights as mentioned in the

"Coordination with the US Coast Guard" special provision. All fender system members shall be black in color unless otherwise specified in the Contract Documents.

2.0 Global Fender System Requirements

The fender system presented and detailed in the plans and provisions may be exchanged for a Contractor submitted option pending approval of the Engineer and Structures Management. If the Contractor elects to submit an alternate design, corresponding calculations, drawings, and material specifications shall be supplied to the Engineer for review. Any variation to the design and details presented in this contract shall be sealed by a Professional Engineer registered in the state of North Carolina. Alternate designs shall be capable of providing a bending capacity, shear capacity, and stiffness that exceeds the capacity and stiffness of the existing fender in its original, new state.

Alternate designs shall contain horizontal plastic lumber wales with a minimum strength specified in this provision and shall have a minimum cross-sectional area of 100 in^2. The minimum allowable outside composite pile diameter is 13". Composite piles with a square cross-section are allowed; the minimum size must be 14" x 14". All hardware must be stainless steel and shall conform to the requirements in the plans and contract.

3.0 Fiberglass Reinforced Plastic Lumber (FRPL)

Use plastic consisting of a mixture of one or more of the following recycled post consumer or post industrial thermoplastics: high-density polyethylene, medium-density polyethylene, low-density polyethylene. Mix the plastic with appropriate colorants, UV inhibitors, hindered amine light stabilizers and antioxidants so that the resulting product meets the material property requirements specified in Table 1 in the Materials Section. SP products must not absorb moisture, corrode, rot, warp, splinter or crack. The outer surface of the FRPL shall be generally smooth, uniform and consolidated but may contain occasional small blisters or pockmarks.

Manufacture FRPL as one continuous piece with no joints or splices to the dimensions and tolerances in accordance with Table 2 in the Materials Section and consisting of a dense outer skin surrounding a less dense core. Interior voids shall not exceed 1.0 inch in diameter. The total area of voids shall be less than 5% of the total cross sectional area of the member. FRPL shall be free of twist and curvature. Reinforce 10"x10" FRPL with a minimum of four 1-1/2 inch reinforcing rods placed in the corners of the section. Reinforcing rods must be continuous; steel reinforcement of FRPL is not permitted. See Table 6 in the Materials Section for reinforcing rod properties.

Add a minimum of 15% (by weight) glass filament to the polyethylene used for FRPL.

10"x10" FRPL must meet the minimum structural properties listed in Table 3 in the Materials Section. The FRPL reinforced with glass filament shall meet the minimum properties listed in Table 4 in the Materials Section.

4.0 Composite Pile

Solid Piles with Fiberglass Reinforcing Rods

Use plastic consisting of a mixture of one or more of the following recycled post consumer or post industrial thermoplastics: high-density polyethylene, medium-density polyethylene, low-density polyethylene. Mix the plastic with appropriate colorants, UV inhibitors, hindered amine light stabilizers and antioxidants so that the resulting product meets the material property requirements specified in Table 1 in the Materials section. SP products must not absorb moisture, corrode, rot, warp, splinter or crack. The outer surface of the piles shall be generally smooth, uniform and consolidated but may contain occasional small blisters or pockmarks.

Manufacture piles as one continuous piece with no joints or splices. Interior voids shall not exceed 1.0 inch in diameter. The total area of voids shall be less than 5% of the total cross sectional area of the member. FRPP shall be free of twist and curvature. Reinforce 13" OD piles with a minimum of eight 1-3/8 inch fiberglass reinforcing rods. Reinforce 16" OD piles with a minimum of sixteen 1-1/4 inch fiberglass reinforcing rods. Space the fiberglass reinforcing rods evenly around the inside perimeter of the pile. Reinforcing rods must be continuous; steel reinforcement of piles is not permitted. See Table 6 in the Materials Section for reinforcing rod properties.

Add a minimum of 5% (by weight) glass filament to the polyethylene used for solid piles.

13" O.D. and 16" OD piles must meet the minimum structural properties listed in Table 5 in the Materials section.

Solid piles reinforced with fiberglass rods shall exhibit recoverable deflection with not more than a 5% reduction in bending stiffness (EI) when cyclically tested. Cyclic load testing shall be for a minimum of 200 load cycles. The applied load shall produce a minimum of 40% of the pile's bending moment at yield.

Hollow Piles

Use composite materials consisting of Fiber Reinforced Polymer (FRP), High Density Polyethylene (HDPE), fiberglass composite with hybridized resin, or other approved and accepted materials. The exterior of piles shall be resistant to abrasion and comprised of a material that meets the properties of Table 1 in the Materials section. Manufacture hollow piles as one continuous piece with no joints or splices. A HDPE outer sleeve is required the full length of the pile to increase abrasion resistance and provide additional impact resistance.

After installation of hollow piles, fill piles with sand from the groundline to the mean waterline. The remaining upper portion of the pile shall be filled with Class A concrete and finished so water does not pond on the top of the pile. Concrete shall be placed following installation of all hardware used to connect wales to the piles. The Contractor is allowed to

exchange Class A concrete for the sand used to fill the hollow piles at no cost to The Department. The cost for filling the pipe piles with sand and concrete to the specified elevations shall be considered incidental to the cost of the *Composite Piles.*

14" O.D. and 16" OD Hollow Composite Piles must meet the minimum structural properties listed in Table 7 in the Materials section.

Hollow composite piles shall exhibit recoverable deflection with not more than a 5% reduction in bending stiffness (EI) when cyclically tested. Cyclic load testing shall be for a minimum of 200 load cycles. The applied load shall produce a minimum of 40% of the pile's bending moment at yield.

The minimum bolt pull-through resistance of hollow piles in the unfilled condition shall be 10 kips when tested at a distance of 2 ft. from the end of the member.

5.0 Materials

Table 1
Plastic Material Properties

Density ASTM D 792-00	Skin	55-65 pcf
Density ASTM D792-00	Core	35-55 pcf
Water Absorption ASTM D 570-98	Skin	2 hrs: 0.01% weight. increase 24 hrs: 0.03% weight. increase
Brittleness ASTM D 746-07	Skin	No break at < –40ºF
Impact Resistance ASTM D256-06 Method A	Skin	Greater than 0.62 ft-lbs/in
Hardness ASTM D 2240-05	Skin/Core	55-70 (Shore D)
Abrasion ASTM D 4060-07	Skin	Weight Loss: < 0.3g Wear Index: 25-30 Cycles = 10,000 Wheel = CS17 Load: 1kg
Chemical Resistance ASTM D756-03	Skin/Core Sea Water Gasoline No. 2 Diesel	 < 1.0% weight increase < 9.0% weight increase < 5.0% weight increase
Tensile Properties ASTM D 638-03	Skin/Core	Minimum 1500 psi at break
Compressive Modulus ASTM D 695-02	Skin/Core	Minimum 40 ksi
Static Coefficient of Friction ASTM D1894-06	Skin Sea Water Dry	 0.2 max. 0.25 max.
Nail Pull-Out ASTM D6117	Skin/Core	Minimum 97 lbs

Table 2 Dimensions and Tolerances for FRPL		
	Dimension	Tolerance
Length	Per order (80 ft maximum)	+6 –0 in
Width	See Contract Plans	± ¼ in
Height	See Contract Plans	± ¼ in
Corner Radius – FRPL (w/ rebar) - FRPL (w/o rebar)	1 3/4 in ¼ in	± ¼ in ± 1/16 in
Outer Skin Thickness –	3/16 in	± 1/8 in
Distance from outer surface to rebar elements (FRPL)	1 1/2 in	± 5/8 in
Straightness (gap, bend or inside while lying on a flat surface)		<1 ½ in per 10 feet

Table 3 Structural Properties for 10”x10” FRPL reinforced w/ (4) - 1.50” rebar	
Member Size	10 in x 10 in
Modulus of Elasticity as derived below	521 ksi
Stiffness, E.I.	4.05E+08 lb-in^2
Yield Stress in Bending	5.8 ksi
Weight	30-37 lb/ft

Determine the modulus of elasticity for FRPL by conducting a three point or four point bend test as per ASTM D790 or D6109. The modulus for FRPL with rebar is to be taken at a strain of 0.01 inches per inch. The modulus for FRPL reinforced with glass filament may be taken by one of the methods suggested in ASTM D6109.

Table 4 Structural Properties for FRPL reinforced w/ glass filament	
Modulus of Elasticity (ASTM D6109)	300,000 psi
Flexural Strength (ASTM D6109)	No fracture at 3000 psi
Compressive Strength (ASTM D6108)	2900 psi parallel to grain 2400 psi perpendicular to grain
Screw / Nail Withdrawal (ASTM D6117)	370 lbs screw 97 lbs nail

Table 5 Structural Properties for 13” OD solid piles reinforced w/ (8) – 1.375” rebar Structural Properties for 16” OD solid piles reinforced w/ (16) – 1.25” rebar		
Member Size	13” O.D.	16” O.D.
Modulus of Elasticity (ASTM D790 or ASTM D6109)	735,000 psi	856,000 psi
Stiffness, EI	1.03E+09 lb-in^2	2.76E+09 lb-in^2

Table 5 Structural Properties for 13" OD solid piles reinforced w/ (8) – 1.375" rebar Structural Properties for 16" OD solid piles reinforced w/ (16) – 1.25" rebar		
Yield Stress in Bending	6,000 psi	6,780 psi
Weight	42-51 lbs/ft	64-78 lb/ft

Table 6 Reinforcing Rod Properties	
Flexural Strength ASTM D 4476	70 ksi
Compressive Strength ASTM D 695	40 ksi

Table 7 Structural Properties for 14" OD hollow composite pile Structural Properties for 16" OD hollow composite pile		
Member Size	14" O.D.	16" O.D.
Average Modulus of Elasticity (ASTM D6109)	5.50E+06 lb- in^2	5.50E+06 lb- in^2
Stiffness, EI (ASTM D6109)	1.50E+09 lb-in^2	4.00(2.5)E+09 lb-in^2
Average Flexural Strength (ASTM D6109)	45,000 psi	45,000 psi
Average Compressive Strength (ASTM D6109)	55,000 psi	55,000 psi
Minimum Wall Thickness	0.5 in	0.5 in
Weight	≥13 lbs/ft	≥20 lb/ft
Fiber Volume	≥50%	≥50%

6.0 Acceptance

The contractor shall submit the following information to the resident engineer at least 60 days prior to installing any SP products:

- Copies of the SP manufacturer's standards and most recent brochure for the FRPL & composite pile products covered by these Specifications.
- Independent test lab report confirming the SP products meet the Plastic Material properties found in Table 1.
- Independent test lab report confirming the submitted FRPL & composite pile products meet the minimum structural property requirements found in the Materials Section of this Special Provision.
- Independent test lab report (cyclical load test) confirming composite piles meet the recoverable deflection requirements found in this specification.
- Written certification from the SP manufacturer that the submitted FRPL and composite pile products satisfy the requirements of this specification and have been in service for a minimum of five (5) years on at least three (3) other bridge pier protection applications in the U.S. This written certification shall include project owner information, project names, locations, contacts and phone numbers.

The Department reserves the right to place a duly authorized inspector in the plant prior to shipment of any SP product for the purpose of determining preapproval. Notify the

Engineer at least 7 days in advance of any shipment. Preapproval of SP products shall be on the basis of tests of materials, inspection of SP products, conformance with specified dimensions, appearance, and freedom from defect. Each individual SP piece shall be available for inspection by the inspector. The inspector shall have the authority to reject any or all SP products not manufactured in accordance with these specifications. Any SP products found to be defective in any manner at any time shall be rejected and replaced by an acceptable SP product or repaired in a manner approved by the engineer. All SP products preapproved by the inspector shall be stamped as approved. Preapproval does not guarantee final acceptance.

Final acceptance of all SP products shall be determined by the Engineer prior to installation.

7.0 Construction Details

Protect materials at all times against exposure to extreme heat or impact. Transport SP in a manner that will minimize scratching or damage to the outer surfaces, stack on dunnage above ground so that it may be easily inspected and store in a manner that will avoid damage. Handle and lift SP with nylon slings. Do not use sharp instruments in handling the product. SP damaged in shipping or handling will be rejected.

Cut, bevel, drill, countersink, and otherwise fabricate SP in accordance with the manufacturer's recommendations Set all material accurately to required levels and lines, with members plumb and true and accurately cut and fitted. Securely attach all composite lumber to substrate by anchoring and fastening as shown on plans. Perform all cutting and drilling in a manner that allows for the collection of all debris and dispose of properly.

Install piles using an approved method that meets pile manufacturer guidelines and does not violate the environmental permits. Hollow composite piles may be driven when SPT blow counts ($N1_{60}$) do not exceed 15 bpf. After pile installation, cut off piles at the elevation shown on the plans using sawing or other means as approved by the Engineer to provide a smooth level cut.

8.0 Basis of Payment

The cost to replace fender system members is included in the unit price per linear foot bid for *__"x__" Plastic Lumber*. This price is full compensation for furnishing all material, labor, tools and equipment as needed to install fender system members.

The cost to replace fender system wales is included in the unit price per linear foot bid for *__"x__" Composite Lumber*. This price is full compensation for furnishing all material, labor, tools and equipment as needed to install fender system wales.

The cost to replace fender system piles is included in the unit price per linear foot bid for *Composite Piles*. Composite piles will be measured as the pile length before installation minus any pile cut-offs. No payment will be made for pile cut-offs or cutting off piles. No payment will be made for damaged, defective or rejected piles. This price is full

compensation for furnishing all material, labor, tools and equipment as needed to install piles. No payment will be made for filling of piles with sand and concrete following installation as this is considered incidental to pile installation.

All permanent connection hardware including bolts, washers, nuts, drift pins, etc. will be paid for by the contract unit price bid per pound for *Hardware*.

For wire rope, see the Wire Rope for Fender System special provision.

Payment will be made under:

Pay Item	**Pay Unit**
__"x__" Plastic Lumber	Linear Feet
__"x__" Composite Lumber	Linear Feet
"__" Composite Piles	Linear Feet
Hardware	Pound

WIRE ROPE FOR FENDER SYSTEM **(SPECIAL)**

Unless otherwise shown on the plans, galvanized aircraft quality wire rope with ultraviolet ray resistant polypropylene impregnation shall be used. The polypropylene plastic shall form a wall of protection by using spacer wires in the outer gallery of each strand and shall be effectively bonded to the outer plastic jacket. The rope diameter shall be 5/8 inch and the outside diameter of the covering shall be 3/4 inch. The rope construction shall be 6 by 19 independent wire rope core with nominal strength of 22,800 pounds. All ends shall be protected with heat shrinkable end caps, compatible with the rope's polypropylene. The caps shall provide an effective water-tight seal and shall be installed in accordance with the manufacturer's instructions. The rope shall conform to Federal Specifications W83420 for aircraft quality and the protective coating shall conform to ASTM A 475 (Type 1 coating).

The cost to install wire rope for fender system is included in unit price per linear foot bid for *Wire Rope for Fender System*. The price is full compensation for furnishing all material, labor, tools and equipment as needed to install wire rope for fender system..

LOCATION OF NEW FENDER SYSTEM **(SPECIAL)**

The new fender system is shown at the same location of the existing fender system and shall not encroach into the existing navigational channel. The existing navigational channel width shall be maintained as specified in the dimensions on the plans and shall be verified by the Contractor prior to construction. The Contractor may request building both sides of the fender system up to two foot up or down stream from the existing location. The Contractor may also request building one side or both sides of the fender system up to two feet away from/outside of the existing navigational channel width;

thereby, increasing the navigational channel width. Any requests to move the location of the new fender system is subject to the Engineer's approval.

2 BAR METAL RAIL RETROFIT (SPECIAL)

Furnish and place metal bridge railing and concrete end posts in accordance with the plans and the Standard Specifications.

Measurement and payment will be for the actual number of linear feet of bridge railing. These prices and payments will be full compensation for all materials, labor, equipment, tools, and incidentals necessary to construct the bridge railing and concrete end posts.

Payment will be made under:

2 Bar Metal Rail ……..……...…….……..... ……...Linear Feet

RESET BEARINGS (SPECIAL)

1.0 DESCRIPTION

Reset steel bearings at locations shown on the plans and as determined by the Engineer. Resetting of bearings shall be done in conjunction with concrete repairs to the top of the bent caps as required. This work shall consist of jacking the beam, removing the bearing if required, removing the damaged concrete around the bearing if required, making the concrete repairs, drilling for new anchor bolts, resetting the bearing, installation of new anchor bolts, and removing the jacking support system.

2.0 BASIS OF PAYMENT

Reset Bearings will be measured and paid in units of each bearing. The price per each will be full compensation for new anchor bolts, repairing existing anchor bolts if needed, all materials, equipment, tools, labor, and incidentals necessary to complete the work. Bridge jacking will be paid for according to the "Bridge Jacking" special provision.

BRIDGE JACKING (SPECIAL)

1.0 DESCRIPTION

Bridge jacking at end bents and interior bents is to facilitate beam repairs, substructure repairs, and/or to replace 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 structures as specified on the plans and as noted herein.

2.0 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.

3.0 SCOPE OF WORK

Work for bridge jacking includes calculation of existing bridge loads and designing proper strength jacking scheme, setting blocking and jacks, jacking bridge girders, mechanically locking jacks, and lowering bridge spans onto new bearing assemblies.

Prior to bridge jacking, complete all diaphragm modifications necessary at the bent being jacked. 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. Lower the bridge onto the bearing assemblies. Complete diaphragm work as needed. All bridge jacking operations shall be complete before new deck overlay is placed on the existing structure.

Submit calculation, working drawings and jacking procedure to the Engineer for review and approval prior to the start of work. Working drawings and all calculations pertaining to determination of all applied loads for the required jacking scheme shall be sealed by an engineer licensed in the State of North Carolina.

4.0 BASIS OF PAYMENT

Payment will be made at the price bid for each set-up to complete *Bridge Jacking* as shown in the contract plans. The price per each jacking set-up will be full compensation for 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.

EPOXY RESIN INJECTION (12-5-12)

1.0 GENERAL

For repairing cracks, an approved applicator is required to perform the epoxy resin injection. Make certain the supervisor and the workmen have completed an instruction program in the methods of restoring concrete structures utilizing the epoxy injection process and have a record of satisfactory performance on similar projects.

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

2.0 SCOPE OF WORK

Using Epoxy Resin Injection, repair all cracks 25 mils wide or greater in the end bent caps, interior bent columns and caps, and in 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.

3.0 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.

4.0 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 3000 psi is required of these cores.

5.0 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	6000 - 8000
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 7 days at 77 ± 3°F unless otherwise specified, has the following properties:

	Test Method	Specification Requirements
Ultimate Tensile Strength	ASTM D638	7000 psi (min.)
Tensile Elongation at Break	ASTM D638	4% max.
Flexural Strength	ASTM D790	10,000 psi (min.)
Flexural Modulus	ASTM D790	3.5×10^5 psi
Compressive Yield Strength	ASTM D695	11,000 psi (min.)
Compressive Modulus	ASTM D695	$2.0 - 3.5 \times 10^5$ psi
Heat Deflection Temperature Cured 28 days @ 77 ± 3°F	ASTM D648*	125°F min. 135°F min.
Slant Shear Strength, 5000 psi (34.5 MPa) compressive strength concrete	AASHTO T237	
Cured 3 days @ 40°F wet concrete		3500 psi (min.)
Cured 7 days @ 40°F wet concrete		4000 psi (min.)
Cured 1 day @ 77°F dry concrete		5000 psi (min.)

* Cure test specimens so that the peak exothermic temperature of the adhesive 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).

6.0 EQUIPMENT FOR INJECTION

Use portable positive displacement type pumps with interlock to provide positive ratio control of exact proportions of the two components at the nozzle to meter and mix the two 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.

7.0 PREPARATION

Follow these steps prior to injecting the epoxy resin:

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.

Provide entry ports along the crack at intervals not less than the thickness of the concrete at that location.

Apply surface seal material to the face of the crack between the entry ports. For through cracks, apply surface seal to both faces.

Allow enough time for the surface seal material to gain adequate strength before proceeding with the injection.

8.0 EPOXY INJECTION

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.

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

9.0 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.

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.

10.0 BASIS OF PAYMENT

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

CLEANING AND PAINTING EXISTING BEARINGS WITH HRCSA (SPECIAL)

DESCRIPTION

These items of work shall consist of cleaning, preparation, and field application of the specified paint system to existing steel bridge bearings and for all labor, materials, tools and equipment necessary, to complete the work to the limits shown on the plans, described in these special provisions, or as directed by the Engineer.

The bridge bearings shall be cleaned using hand tools, power tools, and high pressure water equipment. Using dry compressed air, connections and crevices will be dried completely. Rust penetrant will be applied to all open connections, crevices, pack rust and scale rust areas. A paint system with a co-polymerized high ratio of 'active' calcium sulfonate (HRCSA) will be used as a stripe coat at all connections/crevices and as a topcoat over the bearings.

CERTIFICATION

Only contractors who are currently SSPC QP 1 certified, and have successfully completed field painting on similar structures within 18 months prior to this bid, may perform this work.

Successfully completed projects shall have all lead abatement work completed in accordance with the contract and be free of citation from safety or environmental agencies. Lead abatement work shall include, but not be limited to: abrasive blasting; waste handling, storage and disposal; worker safety during lead abatement activities (fall protection, PPE, etc.); and containment. This requirement is in addition to the Contractor pre-qualification requirements covered by Article 102-2 of the *2012 Standard Specifications*.

TWELVE-MONTH OBSERVATION PERIOD

The Contractor maintains responsibility for the coating system for a 12 month observation period beginning upon the satisfactory completion of all the work required in the plans or as directed by the Engineer. The Contractor shall guarantee the coating system under the payment and performance bond (refer to Article 109-10 of the *2012 Standard Specifications*). To successfully complete the observation period, the coating system shall meet the following requirements after 12 months service:

(A) No visible rust, contamination or application defect is observed in any coated area.
(B) Painted surfaces have a uniform color and gloss.
(C) Painted surfaces have an adhesion that meets an ASTM D3359, 3A rating.

Final acceptance is made only after the paint system meets the above requirements.

SUBMITTALS

Submit all of the following to the Engineer for review and approval before scheduling the pre-construction meeting. Allow 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) Work schedule which shall be kept up to date, with a copy of the revised schedule being provided to the Engineer in a timely manner,
(B) Containment Drawings in accordance with SSPC Guide 6, Class 3W sealed by a Professional Engineer licensed by the State of North Carolina,
(C) Bridge wash water sampling and disposal plan,
(D) Subcontractor identification,
(E) Lighting plan for night work in accordance with Section 1413 of the *2012 Standard Specifications*. Lighting shall be equipped with explosion-proof fixtures,

(F) Traffic control plan with NCDOT certified supervisors, flaggers and traffic control devices,

(G) Health and safety plan addressing at least the required topics as specified by the SSPC QP 1 and QP 2 program and including hazard communication, respiratory health, emergency procedures, and local hospital and treatment facilities with directions and phone numbers, disciplinary criteria for workers who violate the plan and accident investigation. The plan shall address the following: hazardous materials, personal protective equipment, general health and safety, occupational health and environmental controls, fire protection and prevention, signs signals, and barricades, materials handling, storage, use, and disposal, hand and power tools, welding and cutting, electrical, scaffolds, fall protection, cranes, derricks, hoists, elevators, and conveyors, ladders, toxic and hazardous substances, airless injection and HPWJ.

(H) Provide the Engineer a letter of certification that all employees performing work on the project have blood lead levels that are below the OSHA action level.

(I) Provide the Engineer with Competent Person qualifications and summary of work experience.

(J) Environmental Compliance Plan

(K) Quality Control Plan (Project Specific) with quality control qualifications and summary of work experience.

(L) Bridge and Public Protection Plan (Overspray, Utilities, etc. - Project/Task Specific)

(M) Soluble salt removing chemical for use during high pressure water cleaning
- (1) Product Data Sheet

(N) Coating Material
- (1) NCDOT HICAMS Test Reports (testing performed by NCDOT Materials and Tests Unit),
- (2) Product Data Sheets,
- (3) Safety Data Sheets,
- (4) Product Specific Repair Procedures, and
- (5) Acceptance letters from paint manufacturers for work practices that conflict with Project Special Provisions and/or paint manufactures product data sheets.

PRE-CONSTRUCTION MEETING

Submittals shall be reviewed and approved by the Engineer prior to scheduling the pre-construction meeting. Allow no less than 2 weeks for a review process. When requesting a pre-construction meeting, contact the Engineer at least 7 working days in advance of the desired pre-construction date. The contractor's project supervisor, Competent person, quality control personnel, coating manufacturer's representative, and certified traffic control supervisor shall be in attendance at the pre-construction meeting in order for the Contractor and NCDOT team to establish responsibilities for various personnel during project duration and to establish realistic timeframes for problem escalation.

CONTAINMENT PLAN

If a containment plan for Painting of Existing Structure is submitted for a bridge that will have its bearings cleaned and painted with HRCSA, the containment plan for that structural steel painting operation will suffice for cleaning and painting existing bearings with HRCSA. If the structural steel of a bridge is not to be cleaned and painted, and no containment plan has been submitted for that bridge, if that bridge will have its bearings cleaned and painted with HRCSA, a containment plan for cleaning and painting existing bearings with HRCSA shall be submitted for review and approval.

No work shall begin until the Contractor furnishes the Engineer with a containment plan for surface preparation and coating operations and the Engineer reviews and approves, in writing, the acceptability of said plan. Allow a minimum of two weeks for review of the plan. Such plan shall meet or exceed the requirements of Class 3W containment in accordance with SSPC Guide 6. Enclosure drawings and loads supported by the containment structure shall be prepared, signed and sealed by a Professional Engineer licensed by the State of North Carolina.

In the containment plan describe how debris is contained and collected. Describe the type of tarpaulin, bracing materials and the maximum designed wind load. Describe the paint and debris collection system. Describe how the airflow inside the containment structure is designed to meet all applicable OSHA Standards. Describe how wash water will be contained and paint chips separated. Describe how water run-off from rain will be routed by or through the enclosure. Describe what physical containment will be provided during painting application to protect the public and areas not to be painted.

WASH WATER SAMPLING AND DISPOSAL PLAN

No work shall begin until the Contractor furnishes the Engineer with a containment plan for surface preparation and coating operations and the Engineer reviews and approves in writing said plan. All wash water shall be collected and sampled prior to disposal. Representative sampling and testing methodology shall conform to 15A NCAC 02B.0103, “Analytical Procedures”. Wash water shall be tested for pollutants listed in 15A NCAC 02B.0211(3), 15A NCAC 02T.0505(b)(1) and 15A NCAC 2T.0905(h). Depending on the test results, wash water disposal methods shall be described in the disposal plan. Wash water shall be disposed of in accordance with all current Federal and State regulations. See link for NCDOT Guidelines for Managing Bridge Wash Water: **http://www.ncdot.gov/projects/ncbridges/#stats**.

WASTE HANDLING OF PAINT AND DEBRIS

Comply with all Federal, State and local regulations. Failure to comply with the regulations could result in fines and loss of qualified status with NCDOT.

Comply with the Resource Conservation and Recovery Act (RCRA - 40 CFR 261 - 265) and the Occupational Safety and Health Act

(OSHA - 29 CFR 1910 - 1926) regulations for employee training, and for the handling, storage, labeling, recordkeeping, reporting, inspections and disposal of all hazardous waste generated during paint removal.

A summary of Generator Requirements is available at the above NCDOT web link which cites the specific regulations for each Generator category. Quantities of waste by weight and dates of waste generation shall be recorded. Waste stored at the project site shall be properly labeled. All waste, hazardous or non-hazardous, requires numbered shipping manifests.

The North Carolina Department of Environment and Natural Resources (NCDENR) have adopted RCRA as the North Carolina Hazardous Waste Management Rules and are responsible for enforcement. The "Hazardous Waste Compliance Manual for Generators of Hazardous Waste" is published by the Compliance Branch of the Division of Waste Management of NCDENR, and can be found at: **http://portal.ncdenr.org/web/wm/hw/rules**.

Use a company from the below list of approved waste management companies. Immediately after award of the contract, arrange for waste containers, sampling, testing, transportation and disposal of all waste. No work shall begin until the Contractor furnishes the Engineer with a written waste disposal plan. Any alternative method for handling waste shall be pre-approved by the Engineer.

Southern Logistics, Inc.
312 Orville Wright Dr., Greensboro, NC 27409
(Phone 336-662-0292)
A&D Environmental
PO Box 484, High Point, NC 27261
(Phone 336-434-7750)
Poseidon Environmental Services, Inc.
837 Boardman-Canfield Rd #209, Youngstown, OH
(Phone 330-726-1560)
Clean Harbors Reidsville, LLC
208 Watlington Industrial Drive, Reidsville, NC 27320
(Phone 336-342-6106)

All removed paint and debris shall be tested for lead following the SW-846 TCLP Method 1311 Extraction, as required in 40 CFR 261, Appendix 11, to determine whether it shall be disposed of as hazardous waste. Furnish the Engineer certified test reports showing TCLP results and Iron analysis of the paint chips stored on site, with disposal in accordance with "Flowchart on Lead Waste Identification and Disposal" at:

http://portal.ncdenr.org/c/document_library/get_file?p_l_id=38491&folderId=328599&_name=DLFE-9855.pdf.

All sampling shall be done in presence of the Engineer's representative.

The Competent Person shall obtain composite samples from each barrel of the wash water and waste generated by collecting two or more portions taken at regularly spaced intervals during accumulation. Composite the portions into one sample for testing purposes. Acquire samples after 10% or before 90% of the barrel has accumulated. The intent is to provide samples that are representative of widely separated portions, but not the beginning and end of wash water or waste accumulation.

Perform sampling by passing a receptacle completely through the discharge stream or by completely diverting the discharge into a sample container. If discharge of the wash water or waste is too rapid to divert the complete discharge stream, discharge into a container or transportation unit sufficiently large to accommodate the flow and then accomplish the sampling in the same manner as described above.

Comply with the NCDENR Hazardous Waste Compliance Manual for Generators of Hazardous Waste. Record quantities of waste by weight and dates of waste generation. Until test results are received, store all waste, and label as "NCDOT Bridge Paint Removal Waste - Pending Analysis" and include the date generated and contact information for the Division HazMat Manager or Project Engineer. Store waste containers in an enclosed, sealed and secured storage container protected from traffic from all directions. Obtain approval for the protection plan for these containers from the Engineer. If adequate protection cannot be obtained by use of existing guardrail, provide the necessary supplies and equipment to maintain adequate protection. Once test results are received and characterized, label waste as either "Hazardous Waste - Pending Disposal" or "Paint Waste - Pending Disposal".

Once the waste has been collected, and the quantities determined, prepare the appropriate shipping documents and manifests and present them to the Engineer. The Engineer will verify the type and quantity of waste and obtain a Provisional EPA ID number from the:

NC Hazardous Waste Section
North Carolina Department of Environment & Natural Resources
1646 Mail Service Center
Raleigh, NC 27699
Phone (919) 508-8400, Fax (919) 715-4061

At the time of shipping, the Engineer will sign, date and add the ID number in the appropriate section on the manifest. The maximum on-site storage time for collected waste shall be 90 days. All waste whether hazardous or non-hazardous will require numbered shipping manifests. The cost for waste disposal (including lab and Provisional EPA ID number) is included in the bid price for this contract. Note NC Hazardous Waste Management Rules (15A NCAC 13A) for more information. Provisional EPA ID numbers may be obtained at this link:

http://portal.ncdenr.org/web/wm/provisional-hw-notification-page.

Testing labs shall be certified in accordance with North Carolina State Laboratory Public Health Environmental Sciences. List of certified laboratories may be obtained at this link:

http://slphreporting.ncpublichealth.com/EnvironmentalSciences/Certification/CertifiedLaboratory.asp.

All test results shall be documented on the lab analysis as follows:

1. For leachable lead:
   a. Soils/Solid/Liquid- EPA 1311/200.7/6010

Area sampling will be performed for the first 2 days at each bridge location. The area sample will be located within five feet of the containment and where the highest probability of leakage will occur (access door, etc.). Results from the area sampling will be given to the Engineer within 72 hours of sampling (excluding weekends). If the results of the samples exceed 20 $\mu g/m^3$ corrective measures shall be taken and monitoring shall be continued until 2 consecutive sample results are less than 20 $\mu g/m^3$.

TWA may suspend the work if there are visible emissions outside the containment enclosure or pump monitoring results exceeding the level of 30 $\mu g/m^3$.

Where schools, housing and/or buildings are within 500 feet of the containment, the Contractor shall perform initial TSP-Lead monitoring for the first 10 days of the project during water cleaning and containment removal. Additional monitoring will be required during water cleaning 2 days per month thereafter. Results of the TSP monitoring at any location shall not exceed 1.5 $\mu g/m^3$.

EQUIPMENT MOBILIZATION

The equipment used in any travel lanes and paved shoulder shall be mobile equipment on wheels that has the ability to move on/off the roadway in less than 30 minutes. All work conducted in travel lanes shall be from truck or trailer supported platforms and all equipment shall be self-propelled or attached to a tow vehicle at all times.

SUBLETTING OF CONTRACT

Only contractors certified to meet SSPC QP 2, Category A, and have successfully completed lead paint removal and field painting on all similar structures within 18 months prior to this bid are qualified for this work. Work is only sublet by approval of the Engineer.

MATERIAL

PENETRANT AND PAINT SYSTEM

The paint system to be used shall be a High Ratio Co-Polymerized Calcium Sulfonate

(HRCSA) coating system. Characteristics of submitted products shall meet or exceed those of the requirements listed within this specification.

The structure is to be coated with a High Ratio, Co-Polymerized Calcium Sulfonate (HRCSA) corrosion mitigation system. Any Contractor-proposed coating system shall meet the following requirements:

a. The proposed coating system shall be an HRCSA coating as defined by these specifications and shall be submitted for approval.
    1. Primer/Topcoat (Minimum 9.5% active sulfonate) must maintain a 9-11 to 1 ratio Total Base Number to Active Sulfonate, i.e., total base number of 85 to 104 to 9.5% Active Sulfonate, as determined by Percent Active Sulfonate Content by Cationic Titration (Hyamine) testing, Procedure No. 817/4.9/T1409A.
    2. Formulations with greater than 27% Alkyd or co-polymer are not valid HRCSA.
    3. Zero VOC, 100% Solids Penetrant/Sealer approved by HRCSA manufacturer (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.
b. The proposed coating system shall be certified in writing by the coating manufacturer that the HRCSA Primer/Topcoat and the HRCSA Penetrant Sealer meets the HRCSA generic specification and has been verified by the testing titration protocols indicated above. The Engineer may choose to perform verification testing using the same protocols on materials delivered to the job site.
c. The proposed coating formulation shall have independent laboratory tests showing that the HRCSA coating, as supplied, has been tested to ASTM D5894 with a 24 hour freeze thaw cycle and has passed a minimum 5000 hours with no rust creepage at the scribe. The manufacturer shall certify that the currently manufactured formulation used is the same as the formulation that was tested, and can supply supporting documentation.

Lighting shall be equipped with explosion-proof fixtures.

The accumulation of empty paint cans, combustibles, and other debris will not be permitted.

MSDS sheets for all materials shall be maintained on file and provided to the Engineer prior to receipt of the material from the manufacturers.

If required, paint shall be mixed with mechanical mixers in accordance with the paint manufacturer's recommendations.

The primer, stripe, and other coats may be thinned only if recommended by the manufacturer, done in compliance with the manufacturer's instructions, approved by the Engineer, and mixed in the presence of the Engineer. If recommended by the

manufacturer and approved by the Engineer, a measuring cup, have graduation in ounces, shall be used in the addition of thinner to any paint. No "eye balling" during addition of thinner to paint will be allowed. Paint mixed with thinner by "eye balling" will be subject to rejection by the Engineer as ruined material.

PENETRANT AND PAINT STORAGE

Do not expose penetrant and paint materials to rain, excessive condensation, long periods of direct sunlight, or temperatures above 100°F or below 40°F. In addition, the Contractor shall place a device which records the high, low, and current temperatures inside the storage location. Follow the manufacturer's storage requirements if more restrictive than the above requirements. Any material found to be damaged or beyond its expiration date shown on the container shall be immediately removed from the project site and will be considered as ruined material.

TESTING OF PAINT SAMPLES:

Engineer reserves the right to conduct tests of the materials at any time, and any number of times during the period of field painting.

The Engineer will sample the paint(s) being used. A representative size sample of each component of paint(s) at the construction site will be transferred to metal containers, identified, sealed, and certified in the presence of the Contractor.

Tests on paint samples may be performed by the Owner in order to confirm the manufacturer's test results submitted with each batch of material.

If the laboratory test results show that the material being used does not comply with the requirements specified in this Special Provision, the Contractor will be directed to stop painting work and remove non-complying paint; pay for testing; re-paint surfaces coated with rejected paint; or remove rejected paint from previously painted surfaces if, upon re-painting with specified paint, the two coatings are not compatible.

CONSTRUCTION METHODS

CLEANING AND REMOVAL OF PACK RUST

Removal of pack rust shall be done by hand tool cleaning to meet requirements of SSPC-SP 2, or by power tool cleaning to meet requirements of SSPC-SP 3, or a combination of these methods. Any black oxide scale shall be removed, unless otherwise directed by the Engineer. Pay particular attention to crevice areas when removing pack rust and rust scale. Exercise care to avoid nicking or gouging the steel during removal. Remove all rust scale and loose pack rust, followed by high pressure water cleaning.

HIGH PRESSURE WATER CLEANING (HPWC)

The structure (or portions of it to be coated) shall be cleaned with water at a minimum

pressure of 5,000 psi, at 5 gallons per minute, with a rotating tip, at a maximum 4 inch standoff distance from the steel surface, held as perpendicular to the steel surface as possible.

All water to be used in the surface preparation shall be potable water.

Ambient wash water temperature is allowed; hot water is not necessary.

The wash water shall include a soluble salt removing chemical at a minimum ratio of 100:1 and in compliance with manufacturer recommendations.

Care should be taken to ensure that the potable wash water does not have a level of chloride exceeding 15 ppm when tested. If higher, the level of soluble salt removing chemical should be proportionally increased as per manufactures recommendation.

It should be expected that the surfaces of the steel (and connections) are contaminated with soluble salts (e.g. Chlorides, Sulfates, or Nitrates). Using an acceptable sample method in accordance with SSPC Guide 15, ensure that soluble slat levels on the surfaces do not exceed allowable soluble salt limits listed below:

Chloride - NVC3 3 $\mu g/cm^2$
Sulfate - NVS10 10 $\mu g/cm^2$
Nitrate - NVN10 10 $\mu g/cm^2$

The frequency of testing shall be 2 tests per span after all surface preparation has been completed and immediately prior to painting. Select test areas representing the greatest amount of corrosion in the span as determined by the Engineers' representative. Additional testing may be required if significant amounts of chloride are detected.

The surface cleaning shall meet the requirements of SSPC-WJ4, to remove loose paint and loose rust. SSPC SP2 or SP3 (hand or power tool cleaning) may be used in inaccessible areas or when water cleaning is not possible.

In some cases, after HPWC, there may be areas of tightly adhered black oxide that were not removed. All black oxide scale shall be removed, unless otherwise directed by the Engineer.

If there is a question of whether all loose paint has been removed, adhesion testing of the remaining "tightly adhered" paint shall be done in accordance with ASTM D 4541-02 Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers, with a minimum value of 300 psi.

Care should be taken to ensure all crevice corroded and pack rusted joints connections and corrosion frozen bearings are flushed with water containing a soluble salt removing chemical, at a minimum pressure of 5,000 psi, at 5 gallons per minute, to ensure removal of all loose materials and to flush out any contaminant.

COMPRESSED AIR DRYING

All joints, connections, and bearings shall be blown dry with clean, dry, oil free, high pressure (100 psi) compressed air, regardless if the areas appear to be dry. Use the white blotter test in accordance with ASTM D4285 to verify the cleanliness of the compressed air used for blowout of "Limited Access" areas and drying. Conduct the test at least once per shift for each compressor system. Sufficient freedom from oil and moisture is confirmed if soiling and/or discoloration are not visible on the paper. If air contamination is evidenced, change filters, clean traps, add moisture separators or filters, or make adjustments as necessary to achieve clean, dry air.

All surfaces shall be inspected at this point. Surface preparation found to be deficient will be repeated at the Contractor's expense as directed by the Engineer. Once areas are agreed to be satisfactory, the Contractor may proceed with penetrating sealer application.

PENETRATING SEALER

Penetrating sealer may be applied by brush, roller, or airless spray method as recommended by the manufacturer. The mixing amount and method of mixing for the sealer components must be in accordance with the manufacturer's instruction. Wet coat sufficiently to completely cover and penetrate the steel surface, but do not apply heavy coat. Use coat thickness as recommended by the manufacturer. Apply liberally to crevices and joints and/or spaces where a gap has been created between plates and around bolts, nuts and washers. Allow material to soak into spaces. Brush out any excess material, so as to not retard curing of the topcoat or result in an unaesthetically pleasing surface.

The penetrating sealer shall be applied within 24-hours after completion of the cleaning operations and before flash-rusting occurs. No bare steel surface prepared for penetrating sealer application shall be left uncoated long enough to allow the formation of rust. Cleaned areas upon which rust has formed shall be re-cleaned in accordance with the cleaning requirement at no additional cost. The presence of rust shall be determined by the Engineer.

The receiving steel surface shall be clean and absolutely dry. The permissible steel surface temperature and the ambient temperature shall be as recommended by the sealer manufacturer. However, in no case, shall the penetrating sealer be applied when the steel surface or the ambient temperatures is below 36°F or above 104°F, or the relative humidity exceeds 99% or a 3.6°F (2°C) temperature-Dew Point temperature spread.

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 other coatings. If the manufacturer's recommendations allow, the use of forced air pressure to dry the surface will be permitted.

HRCSA – STRIPING AND TOPCOAT

No application of any stripe/primer shall be allowed until cleaning and preparation of the substrate has been approved by the Engineer. See drawings to determine exact location of structure components to be painted.

The permissible steel surface temperature and the ambient temperature shall be as recommended by the coating manufacturer. However, in no case, shall the coating be applied when the steel surface or the ambient temperatures is below 36°F or above 104°F, or the relative humidity exceeds 99% or a 3.6°F (2°C) temperature-Dew Point temperature spread

The Contractor shall provide paintbrushes, rollers, and spray equipment to conduct the work as specified in this Section.

The Contractor shall also provide specialized equipment as required for the painting of limited access areas and for other difficult-to-clean areas. Specialized equipment may include, but is not limited to:

- Pole guns for spray painting
- Mitts, daubers, or other methods to supplement brush application

Stripe painting will be required on the following surfaces that have been cleaned: edges of plates, angles, lattice, connections (rivets and bolt heads) or other shapes, corners, crevices, back-to-back angles, and built-up edges. The surfaces of existing steel members to which new steel may be connected (faying surfaces) shall also be cleaned and painted as herein described. The stripe coat shall have a band width of at least 4 in. (101.6 mm) to each side of the adjoining edges and is to completely coat the interior of all crevices. All stripe painting should be applied by spray, but immediately afterwards it may be 'brushed in' using a brush. No other method of paint application will be allowed for stripe painting.

Paint for intermediate coat or topcoat may be applied using spray, brush, or roll methods.

Spray painting will be permitted only within a containment that will contain all of the sprayed material, as approved by the Engineer. Complete protection from paint spatter, spillage, overspray, wind-blown paint, or similar releases of paint shall be provided. Covers, tarps, mesh, and similar materials shall be placed around the work area to protect public and private property, pedestrian, vehicular, marine, or other traffic, all portions of the bridge, highway appurtenances, waterways, and similar surrounding areas and property, upon, beneath, or adjacent to the structure.

Apply HRCSA as directed by the manufacturer. Wait time between the stripe coats, intermediate coats, and the topcoat shall be as per the manufacturer's recommendations. The following paint schedule shall be used unless special exceptions are submitted and approved according to manufacturer recommendations prior to the start of this work.

Application Location	Description	Film Thickness
SPOT	Liberally apply a stripe coat to crevice corroded and pack rusted bearings and	15-18 mils (wet) 10-12 mils (dry)

	connections, provide extra material to bolts, nuts and any gaps around rivets.	
SPOT	Over exposed metal areas and areas of tightly adhered contaminant free rust or flash rust apply a spot prime with 5 to 7 mils DFT of Topcoat, including areas mentioned in previous SPOT application	7-10 mils (wet) 5-7 mils (dry)

Prior to placing the subsequent coats, the Contractor will ensure that the prior coat is clean of all foreign matter, such as grease, dirt, bird waste, etc., before application of the subsequent coat.

Sealer, stripe, spots, and finish coats shall be applied in sufficient quantity so as to produce the minimum specified Dry Film Thicknesses (DFT). Care should be taken to not over apply the primer/topcoat, especially on flat surfaces. Maximum 25 mils DFT.

Active calcium sulfonate coatings cure slowly, so wet film measurements may be used as criteria for **preliminary** acceptance of the coating. Wet film thickness (WFT) measurements shall be determined as the job progresses and corrections shall be made during paint application.

Dry film thicknesses shall be determined using SSPC-PA2 – using a digital film thickness gage and a shim – after the coating has cured sufficiently to allow accurate measurements. (Note: Depending upon ambient air conditions, it may take more than one week before DFT measurements can be taken.)

Areas failing to meet the specified WFT range shall be over-coated with the same paint to produce at least the total WFT required.

Paint applied containing unauthorized thinners, paint applied to contaminated surfaces, and paint applied contrary to this Specification shall result in the re-cleaning and re-painting of the surface. The work of re-cleaning, re-painting, or over-coating, if required, shall be performed within 10 days following notification by the Engineer and shall be done by the Contractor to the satisfaction of the Engineer, at no additional cost to the Owner.

INSPECTION

Each layer of application shall be verified by both Quality Control (QC) and Quality Assurance (QA).

QUALITY CONTROL INSPECTOR

The Contractor shall provide a quality control inspector in accordance with the SSPC QP guidelines to ensure that all processes, pack rust removal, and each coating application are in accordance with the requirements of the contract. The inspector shall have written authority to perform QC duties to include continuous improvement of all QC internal procedures. The presence of the Engineer or inspector at the work site shall in no way lessen the contractor's responsibility for conformity with the contract.

QUALITY ASSURANCE INSPECTOR

The quality assurance inspector, which may be a Department employee or a designated representative of the Department, shall observe, document, assess, and report that the Contractor is complying with all of the requirements of the contract. Inspectors employed by the Department are authorized to inspect and/ or test all work performed and materials furnished. Such inspection may extend to all or any part of the work and to the preparation, fabrication, or manufacture of the materials to be used. The inspector is not authorized to alter or waive the requirements of the contract. Each stage in preparing the structure to be coated, which includes, but not limited to washing, pack rust removal, sealing, and application paint system, shall be inspected and approved by the Engineer or his authorized representative.

INSPECTION ACCESS

The Contractor shall furnish all necessary OSHA-approved apparatus such as ladders, scaffolds, and platforms as required for the Engineer or his inspector to have reasonable and safe access to all parts of the work. The contractor shall illuminate the surfaces to be inspected to a minimum of 50-foot candles of light. All access points shall be illuminated to a minimum of 20-foot candles of light.

INSPECTION INSTRUMENTS

At a minimum, furnish the following calibrated instruments and conduct the following quality control tests:

- Sling Psychrometer - ASTM E337 - bulb type and tables
- Inspection Mirror
- Surface Temperature Thermometer 30°F to 150°F
- Air Thermometer, pocket type, 30°F to 100°F
- Illuminated Magnifier
- Hypodermic Needle Pressure Gauge
- Surface Condition Standards - SSPC VIS 1-3 and 4
- Wet Film Thickness Gage - ASTM D4414
- Dry Film Thickness Gage - SSPC-PA2 Modified
- Calibration Standards (NIST Traceable)
- Surface Contamination Analysis Kit or (Chloride, Nitrate, and Sulfate Level Test Kit) SSPC Technology Guide 15

QUALITY CONTROL

Maintain a daily quality control record in accordance with Article 442-13 of the *2012 Standard Specifications* and make such records available at the job site for review by the inspector and submit to the Engineer as directed. In addition to the information required on M&T-610, submit all Dry Film Thickness (DFT) or Wet Film Thickness (WFT) readings on a form equivalent to M&T-611.

Film thickness shall be measured at no less than six random spots per bearing (each of four bearing plate edges and two readings on top of the sole plate). Also, film thickness shall be measured at no less than six random spots per span on diaphragms/"K" frames.

Each spot is an average of three to five individual gage readings as defined in SSPC PA-2. No spot average shall be less than 80% of minimum film thickness for each layer applied; this does not apply to stripe coat application. These non-conforming areas shall be corrected by the Contractor prior to applying successive coats.

Areas failing to meet the specified film thickness range shall be over-coated with the same paint to produce at least the total film thickness required.

REPAIR OF DAMAGED COATINGS

All damaged coatings, new or existing, shall be repaired prior to project completion and acceptance in accordance with the above specifications for Re-Coating and Over-coating and as directed by the Engineer, at no additional cost to the Owner.

COATING MANUFACTURER'S REPRESENTATIVE

Unless waived by the Engineer, the Contractor shall make arrangements for a representative of the coating manufacturer to be present on-site as work begins, at a minimum, and as necessary as work progresses, to work together with the Contractor and representatives of the owner and to provide comments and guidance, so that the cleaning, application, and inspection procedures are done properly.

MEASUREMENT AND PAYMENT

Painting Containment will be paid for at the contract lump sum price which price will be full compensation for all collection, handling, storage, air monitoring, and disposal of debris and wash water, all personal protective equipment, and all personal hygiene requirements, and all equipment, material and labor necessary to fully contain the paint and water; daily collection of debris into specified containers; and any measures necessary to ensure conformance to all safety and environments regulations as directed by the Engineer.

Pollution Control will be paid at the contract lump sum price which will be full compensation for all collection, handling, storage, air monitoring, and disposal of

debris and wash water, all personal protective equipment, and all personal hygiene requirements, and all equipment, material and labor necessary for the daily collection of the blast debris into specified containers; and any measures necessary to ensure conformance to all safety and environmental regulations as directed by the Engineer.

Cleaning and Painting Existing Bearings with HRCSA will be paid for at the contract lump sum price which will be full compensation for all labor, materials and equipment necessary to complete the work. All work shall be done in a manner satisfactory to the Engineer.

Payment will be made under:

Pay Item	**Pay Unit**
Painting Containment	Lump Sum
Pollution Control	Lump Sum
Cleaning and Painting Existing Bearings with HRCSA	Each

PROJECT SPECIAL PROVISION

STRUCTURE

2/15/2017

FIBER REINFORCED POLYMER (FRP) STRENGTHENING (SPECIAL)

1.0 DESCRIPTION

This work shall consist of furnishing of all labor, equipment, and materials necessary to the strengthening of the hinge regions of the existing Carteret 6 bridge girders with fiber-reinforced polymer (FRP).

All concrete girder repairs consisting of, but not limited to, spall repair and epoxy-injection of cracks shall be completed before beginning this work (refer to " Epoxy Resin Injection" and "Shotcrete Repairs" of *Project Special Provisions* on NCDOT website).

2.0 CERTIFICATION

FRP material must be provided by a Manufacturer/Supplier whose products are in accordance with the International Code Council Evaluation Service (ICC-ES) acceptance criteria. Installation must be performed by a representative of the Manufacturer/Supplier or contractor trained in accordance with the installation procedures specified by the Manufacturer.

A. Manufacturer/Supplier shall meet the following criteria:
   1. Provide system data sheets and Material Safety Data Sheets (SDS) for all components of the FRP system;
   2. Minimum of 3 years of documented experience or 5 documented similar field applications with acceptable reference letters from respective owners;
   3. Record of material testing of mechanical properties, aging and environmental durability of the system approved by ICC-ES AC125 or another third-party agency approved by the Owner; and
   4. Comprehensive hands on training program for each FRP system to qualify Contractor/Installer.

B. Contractor/Installer shall meet the following criteria:
   1. Minimum of 3 years of documented experience or 5 documented similar field applications with acceptable reference letters from respective Owners; and
   2. Provide at least one onsite field representative who possesses a certificate of completed training from the Manufacturer/Supplier and who shall be present on site throughout the project.

3.0 MATERIAL REQUIREMENTS

A Carbon Fiber Reinforced Polymer (CFRP) is recommended for this application. The composite properties of the selected material shall meet or exceed the values found in the chart below:

Composite Properties	Minimum Value
Ultimate Tensile Strength (f_{fu})	121 ksi
Modulus of Elasticity (E_f)	11,875 ksi
Maximum Strain (ε_{fu})	0.01 in/in
Thickness of Fabric (t_f)	0.02 in

The contractor shall submit for approval, evidence of acceptable quality control procedures to the Manufacturer of the FRP system. The quality control procedures shall include, but not be limited to, specifications for raw material procurement, the quality standards for the final product, in-process inspection and control procedures, test methods, sampling plans, criteria for acceptance or rejection, and record keeping standards.

The contractor shall furnish sufficient information describing the fiber, epoxy resin, and adhesive systems intended for use which defines their engineering properties. Descriptions of the fiber system shall include the fiber type, percent of fiber orientation in each direction (i.e. unidirectional fibers), and fiber surface treatments. The epoxy resin and other adhesive(s) and their components shall be identified by their commercial names and the commercial names of each shall be provided to the Engineer.

4.0 STORAGE, HANDLING AND DISPOSAL

A. STORAGE

All components of the FRP system must be delivered and stored in the original factory-sealed, unopened packaging or containers with proper labels identifying the Manufacturer, brand name, system identification number and date. Store catalysts and initiators separately. All components must be protected from dust, moisture, chemicals, direct sunlight, physical damage, fire, and temperatures outside the range specified in the system data sheets. Any component that has been stored in a condition different from that stated above must be disposed of, as specified in the section labeled *Clean-up and Disposal*.

All components of the FRP system, especially epoxy resins and adhesives, that have been stored longer than the shelf life specified on the system data sheet, shall not be used, and must be disposed of, as specified in the section labeled *Clean-up and Disposal*.

B. HANDLING

All components of the FRP system, especially fiber sheets, must be handled with care according to the Manufacturer’s recommendations to protect them from damage and to avoid misalignment or breakage of the fibers by pulling, separating or wrinkling them or by folding the sheets. After cutting, sheets shall be either stacked dry with separators, or rolled gently as recommended by the Manufacturer.

All components of the FRP system, especially epoxy resins and adhesives, must be handled with care to avoid safety hazards, including but not limited to skin irritation and sensitization, and breathing vapors and dusts. Mixing epoxy resins shall be monitored to avoid fuming and inflammable vapors, fire hazards, or violent boiling. The Contractor is responsible to ensure that all components of the FRP system at all stages of work conform to the local, state, and federal environmental and worker’s safety laws and regulations. The SDS for all components of the FRP system shall be accessible to all at project site. Specific handling hazards and disposal instructions shall be specified in the SDS.

C. PERSONNEL AND WORK-PLACE PROTECTION

The Contractor is responsible for providing proper means of protection for safety of the personnel and the work place. The Contractor shall inform the personnel of the dangers of inhaling fumes of epoxy resin or other adhesives, and shall take all necessary precautions against injury to personnel. The epoxy resin mixing area shall be well vented to the outside.

D. CLEAN-UP AND DISPOSAL

The Contractor is responsible for the clean-up of the equipment and the project site from hazardous and aesthetically undesirable FRP components using appropriate solvents, as recommended in the system data sheet. Any component of the FRP system that has exceeded its shelf life or pot life, or has not been properly

stored, as specified in the section labeled *Storage*, and any unused or excess material that is deemed waste, shall be disposed of in a manner amiable to the protection of the environment and consistent with the SDS.

5.0 SURFACE PREPARATION

Prior to installation of the FRP system, the Contractor is responsible for making sure the concrete girders to be strengthened have been prepared using methods approved by the Manufacturer/Supplier. These activities shall include, but are not limited to:

1. All spall and areas of delamination must be repaired using acceptable form of cementitious material. Fill all cracks 1/16 inch or greater with epoxy resin. The repair material shall have a compressive strength equal to or greater than that of the original concrete. The repair material shall be cured a minimum of 7 days before installing the FRP system, unless its curing and strength are verified by tests.
2. Once repaired, the beam's surface should be roughed using a stone grinder, pneumatic needle gun or sand-blasting to a surface profile specified by the Manufacturer. Localized out-of-plane variations, including form lines, should not exceed 1/32 inch (or tolerances recommended by the Manufacturer).
3. Surface shall be cleaned of dust and/or other contaminants that may affect the bond of the FRP system.
4. When fibers are wrapped around corners, the corners shall be rounded to a minimum ½ inch radius to avoid stress concentrations in the FRP system.
5. At installation, the surface moisture shall be less than 4.3% (when measured by a moisture-meter); relative humidity between 65% and 82%; and temperature between 50° and 90°F (10° and 32°C).

6.0 INSTALLATION OF FRP SYSTEM

A. MIXING OF EPOXY RESIN COMPONENTS

All epoxy resin components, including main agent and hardener shall be mixed at proper temperature, using appropriate ratios and for a duration specified by the Manufacturer to achieve thorough mixing with uniform color and consistency. Epoxy resins shall not be diluted with any organic solvents such as thinner. Manual stirring and small electrically powered mixing blades are allowed. Epoxy resin shall be mixed in small quantities to ensure that it can be used within its pot life. Any mixed epoxy resin that exceeds its pot life, or begins to generate heat or show signs of increased viscosity, shall not be used, and must be disposed of according to *Section 4.0* or according to Manufacturer's specifications.

B. APPLYING FIBER SHEETS AND EPOXY

The epoxy shall have sufficiently low viscosity to ensure full impregnation of the fiber sheets prior to curing. To maintain proper viscosity of the epoxy, the ambient and concrete surface temperatures must be within the range specified in *Section 5.0*. Any mixed epoxy that exceeds its pot life shall be disposed of, according to *Section 4.0*. A first coat of epoxy resin shall be uniformly applied as an undercoat to all locations on the concrete surface where the FRP system is to be installed.

After uniformly applying the first layer of epoxy as an undercoat, the fiber sheet previously cut with principal fibers running lengthwise in the fabric, at the length specified in the Contract Documents, shall be installed in place and gently pressed onto the wet epoxy. Any entrapped air between fiber sheet and concrete surface shall be released or rolled in the direction parallel to the fibers, allowing the epoxy resin

to impregnate the fibers and achieve intimate contact with the substrate. Any deviation in the fiber alignment more than 5° (approximately 1 in. /ft) is not acceptable. Rolling perpendicular to the fiber alignment direction is not allowed. Sufficient epoxy shall be applied on top of each fiber sheet, as an overcoat, to ensure full saturation of the fibers. Undercoat, fiber sheets and overcoat shall be applied with no interruption.

C. MULTIPLE FRP LAYERS

In multi-ply (i.e. multi-layer) installations, the sequence specified in the section labeled *Applying Fiber Sheet and Epoxy* shall be repeated for each additional fiber sheet. The amount of epoxy resin overcoat for intermediate plies is approximately 15%–20% greater than a single-ply installation, because the epoxy serves as overcoat for the applied ply and undercoat for the next ply. Follow the Contract Documents for the fiber orientation and ply stacking sequence. Each ply shall be applied before the onset of complete gelation of the previous layer. The number of locations to be strengthened in a single day shall be determined based on the Manufacturer's recommendation and the approval of the Engineer. If curing of previous layers occurs prior to installation of all layers, interlayer surface preparation, such as light sanding and filling with putty may be required, per Manufacturer's specifications.

D. OVERLAPPING

When a lap splice is required, as per the Contract Documents, the overlap length shall be a minimum 6 in.

E. ANCHORING OF FRP SHEETS

Anchoring of FRP sheets to the concrete substrate shall follow the method specified in the Contract Documents or as specified by the Manufacturer/Supplier. If temporary mechanical clamps or fasteners are used, care shall be taken to avoid damage to the FRP system or to the concrete substrate. FRP anchors shall be sufficiently embedded into concrete at the depth specified on the contract drawings (+/- 0.5" tolerance) or as specified by the Manufacturer/Supplier. All other issues governing installation of anchors shall be in accordance with Manufacturer's recommendations.

F. PROTECTIVE COATING

A protective coating shall be applied on the surface of the FRP system after installation. The coating is for protection against ultraviolet (UV) exposure and shall be compatible with the FRP system. Surface preparation shall be as recommended by the manufacturer. Solvent-wipes shall not be used to clean the FRP surface, unless approved by the FRP manufacturer, as they may cause damaging effects on polymer resins. The Engineer may request the Contractor to provide a sample mock-up of the coating system for about 1 ft^2 area to ensure the final appearance matches the color and texture of the adjacent concrete. If abrasive cleaning is necessary, air pressure shall be limited to avoid any damage to fibers. Ambient temperatures and surface moisture shall be within the range specified in Section 5.0, prior to applying the protective coating. There shall be a waiting period for a minimum of 1–2 hours, or per manufacturer's recommendation, to allow the FRP to cure prior to applying the protective coating.

7.0 INSPECTION AND QUALITY ASSURANCE

The Contractor shall be responsible for the quality control of all materials and processes in the project. The quality control and quality assurance (QC/QA) plan must be approved by the Owner or his representative. The QC/QA plan shall include specific procedures for personnel safety; tracking and inspection of all FRP

components prior to installation; inspection of all prepared surfaces prior to FRP application; inspection of the work in progress to assure conformity with specifications; quality assurance samples; inspection of all completed work including necessary tests for approval; repair of any defective work; and clean-up.

Application of FRP systems shall be inspected by a licensed engineer or qualified inspector knowledgeable in FRP systems as approved by the Owner. The following shall be recorded at the time of each installation:

1. Date and time of installation
2. Ambient temperature, relative humidity, and general weather observations and surface temperature of concrete
3. Surface dryness, surface preparation methods and resulting profile (e.g. International Concrete Repair Institute (ICRI)-surface-profile- chips)
4. Qualitative description of surface cleanliness
5. Type of auxiliary heat source, if applicable
6. Widths of cracks not injected with epoxy
7. Fiber batch number(s) and approximate locations in structure
8. Batch numbers, mixture ratios, mixing times, and qualitative descriptions of the appearance of all mixed epoxy resins, adhesives, and coatings mixed for the day
9. Observations of progress of cure of epoxy resins
10. Conformance with installation procedures
11. Location and size of any delamination or air voids
12. General progress of work
13. Level of curing of epoxy resin in accordance with ASTM D3418 (see *Section 8.0*)
14. Adhesion strength after curing (see *Section 8.0*)

8.0 MATERIAL TESTING AND ACCEPTANCE

Procedures required for inspection and accommodation for future assessment (Witness Panels and Test Areas) shall be implemented at the time of FRP system installation.

A. WITNESS PANELS

From each individual fiber batch and mixed portion of epoxy, a small FRP witness panel, shall be fabricated on site under conditions similar to the actual installation. Selected panels shall be later tested to determine mechanical and physical properties to confirm the expected properties for the full FRP structure. Tensile test following ASTM D3039 shall be conducted on a minimum of 5 witness panels to measure tensile strength, elastic modulus, and ultimate strain. The measured thickness of the FRP witness panel shall also be recorded. If the average tensile strength, elastic modulus, and ultimate strain of the tested panels are 5% or more below the specified minimum values in *Section 2.0*, then remedial action, up to and including complete removal of the FRP system and reinstallation an FRP system, is required.

B. TEST AREAS

Test areas shall be installed at non-critical locations to allow for pull-off tests to be conducted. A minimum an area of 1 ft^2; single-layer (i.e. undercoat epoxy, fabric, overcoat epoxy); and is located on areas representative of the concrete substrate of the FRP system repairs. The test areas are for the assessment of the effectiveness of the bond between the FRP system and the concrete girders. Test areas shall be installed immediately after the completed installation of the FRP system on each girder hinge region. Test areas shall

be located on the intermediate diaphragm adjacent to the strengthened section. A minimum of 24 FRP system test areas shall be installed for the project. Anchors are not required in test areas. The concrete surface shall be prepared a minimum of 1.25 ft^2 area, according to the instructions provided in *Section 5.0*. After a minimum of 24 hours of the initial curing of the epoxy resin, direct pull-off test shall be performed following ASTM D4541 to verify tensile bond between FRP system and concrete. A minimum of three pull-off tests with at least one test per girder shall be performed. The failure surface of the core specimen shall be inspected to ensure that it is by cohesive failure within the concrete substrate. Failure at the bond line at tensile stresses below 200 psi is unacceptable. Remaining test areas allow for future pull-off tests.

C. CRITERIA FOR VOIDS AND DEBONDING

After a minimum of 24 hours of initial curing of the epoxy resin, a visual inspection of the surface shall be performed to identify any swelling, air bubbles, voids or delamination. If a defect is suspected, an acoustic tap test shall be carried out with a hard object to identify delaminated areas by sound. Defects smaller than 2 in^2 shall require no corrective action as long as the delaminated area is less than 5% of total laminated area. Defects larger than 2 in^2 but less than 25 in^2 shall be repaired by resin injection, or by ply replacement if the frequency is more than 5 per any unit surface area of 10 ft^2. If ply replacement is required, an area at least 1 inch larger on all sides surrounding the defect shall be carefully removed. The area shall be wiped cleaned and thoroughly dried. The area shall be patched by adding FRP of the same type as the original laminate and extending at least 1 inch on all sides of the removed area. Defects greater than 25 in^2 can affected the performance of the installed FRP system and shall be replaced by selectively cutting away the affected FRP material. The substrate shall then be prepared according to *Section 5.0*. Application of a new FRP system within the repair area shall follow procedures for the original FRP system installation, except that the new layer extends a minimum of 6 inches on all sides of the repair area.

9.0 MEASUREMENT AND PAYMENT

The FRP Strengthening System shall be measured and paid for at a contract unit price per square foot. Area shall be measured from original outside surface of concrete to be strengthened. This payment shall include all materials, labor, equipment, installation, fabrication of witness panels and test areas, inspection, material testing and all other incidentals. The FRP anchors, and the furnishing and placing Protective Coating (if required by the Manufacturer) is also included in this payment.

Payment shall be made under:

Pay Item	**Pay Unit**
FRP Strengthening System	Square Foot

PROJECT SPECIAL PROVISION

(10-18-95) (Rev. 10-15-13) Z-1

PERMITS

The Contractor's attention is directed to the following permits, which have been issued to the Department of Transportation by the authority granting the permit.

PERMIT	AUTHORITY GRANTING THE PERMIT
Dredge and Fill and/or Work in Navigable Waters (404)	U. S. Army Corps of Engineers
Water Quality (401)	Division of Environmental Management, NCDEQ State of North Carolina

The Contractor shall comply with all applicable permit conditions during construction of this project. Those conditions marked by ***** are the responsibility of the Department and the Contractor has no responsibility in accomplishing those conditions.

Agents of the permitting authority will periodically inspect the project for adherence to the permits.

The Contractor's attention is also directed to Articles 107-10 and 107-13 of the *2012 Standard Specifications* and the following:

Should the Contractor propose to utilize construction methods (such as temporary structures or fill in waters and/or wetlands for haul roads, work platforms, cofferdams, etc.) not specifically identified in the permit (individual, general, or nationwide) authorizing the project it shall be the Contractor's responsibility to coordinate with the Engineer to determine what, if any, additional permit action is required. The Contractor shall also be responsible for initiating the request for the authorization of such construction method by the permitting agency. The request shall be submitted through the Engineer. The Contractor shall not utilize the construction method until it is approved by the permitting agency. The request normally takes approximately 60 days to process; however, no extensions of time or additional compensation will be granted for delays resulting from the Contractor's request for approval of construction methods not specifically identified in the permit.

Where construction moratoriums are contained in a permit condition which restricts the Contractor's activities to certain times of the year, those moratoriums will apply only to the portions of the work taking place in the waters or wetlands provided that activities outside those areas is done in such a manner as to not affect the waters or wetlands.

P-2

U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT

Action Id. **SAW-2016-02295** County: **Carteret** U.S.G.S. Quad: **NC-BEAUFORT**

GENERAL PERMIT (REGIONAL AND NATIONWIDE) VERIFICATION

Permittee: **NCDOT, Division 2**
Jay Johnson
Address: **Post Office Box 1587**

Greenville, NC, 27835
Telephone Number:

Size (acres) **.05**
Nearest Waterway **Bogue Sound**
USGS HUC **03020301**

Nearest Town **Atlantic Beach**
River Basin **Onslow Bay**
Coordinates Latitude: **34.7173361732379**
Longitude: **-76.7351537638066**

Location description: **Atlantic Beach bridge over Bogue Sound near Atlantic beach, Carteret County, NC**

Description of projects area and activity: **Install 7 pile jackets and /or encapsulation; repair or replace existing deteriorating fender system, light poles, repair structural and sub-structural elements to extend facility life span.**

Applicable Law: ☐ Section 404 (Clean Water Act, 33 USC 1344)
☒ Sections 10 (Rivers and Harbors Act, 33 USC 403)

Authorization: Regional General Permit Number or Nationwide Permit Number: **NWP 3 Maintenance.**
SEE ATTACHED RGP or NWP GENERAL, REGIONAL AND SPECIAL CONDITIONS

Your work is authorized by the above referenced permit provided it is accomplished in strict accordance with the attached conditions and your submitted application and attached information dated 10/21/2016. Any violation of the attached conditions or deviation from your submitted plans may subject the permittee to a stop work order, a restoration order, a Class I administrative penalty, and/or appropriate legal action.

This verification will remain valid until the expiration date identified below unless the nationwide authorization is modified, suspended or revoked. If, prior to the expiration date identified below, the nationwide permit authorization is reissued and/or modified, this verification will remain valid until the expiration date identified below, provided it complies with all requirements of the modified nationwide permit. If the nationwide permit authorization expires or is suspended, revoked, or is modified, such that the activity would no longer comply with the terms and conditions of the nationwide permit, activities which have commenced (i.e., are under construction) or are under contract to commence in reliance upon the nationwide permit, will remain authorized provided the activity is completed within twelve months of the date of the nationwide permit's expiration, modification or revocation, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend or revoke the authorization.

Activities subject to Section 404 (as indicated above) may also require an individual Section 401 Water Quality Certification. You should contact the NC Division of Water Resources (telephone 919-807-6300) to determine Section 401 requirements.

For activities occurring within the twenty coastal counties subject to regulation under the Coastal Area Management Act (CAMA), prior to beginning work you must contact the N.C. Division of Coastal Management in Morehead City, NC, at (252) 808-2808.

This Department of the Army verification does not relieve the permittee of the responsibility to obtain any other required Federal, State or local approvals/permits.

If there are any questions regarding this verification, any of the conditions of the Permit, or the Corps of Engineers regulatory program, please contact **Thomas Steffens at 910-251-4615 or Thomas.A.Steffens@usace.army.mil**.

Corps Regulatory Official: STEFFENS.THOMAS.ANCRUM.1284706273 Digitally signed by STEFFENS.THOMAS.ANCRUM.1284706273 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=STEFFENS.THOMAS.ANCRUM.1284706273 Date: 2016.11.21 17:13:14 -05'00' Date: November 17, 2016
Expiration Date of Verification: 03/18/2017

SAW-2016-02295

P-3

Determination of Jurisdiction:

A. ☒ There are waters, including wetlands, on the above described project area that may be subject to Section 404 of the Clean Water Act (CWA) (33 USC § 1344) and/or Section 10 of the Rivers and Harbors Act (RHA) (33 USC § 403). This preliminary determination is not an appealable action under the Regulatory Program Administrative Appeal Process (Reference 33 CFR Part 331). However, you may request an approved JD, which is an appealable action, by contacting the Corps district for further instruction. Please note, if work is authorized by either a general or nationwide permit, and you wish to request an appeal of an approved JD,the appeal m ust be received by the Corps and the appeal process concluded prior to the commencement of any work in waters of the United States and prior to any work that could alter the hydrology of waters of the United States.

B. ☐ There are Navigable Waters of the United States within the above described project area subject to the permit requirements of Section 10 of the Rivers and Harbors Act (RHA) (33 USC § 403) and Section 404 of the Clean Water Act (CWA) (33 USC § 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

C. ☐ There are waters, including wetlands, within the above described project area that are subject to the permit requirements of Section 404 of the Clean Water Act (CWA) (33 USC § 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

D. ☐ The jurisdictional areas within the above described project area have been identified under a previous action. Please reference jurisdictional determination issued . Action ID: **SAW-** .

Basis For Determination: This area exhibits a High Tide Line as indicated by physical markings on structures and is part of the Bogue Sound.

Remarks:

E. Attention USDA Program Participants

This delineation/determination has been conducted to identify the limits of Corps' Clean Water Act jurisdiction for the particular site identified in this request. The delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA Program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

F. Appeals Information (This information applies only to approved jurisdiction determinations as indicated in B and C above).

This correspondence constitutes an approved jurisdiction determination for the above described site. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and request for appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA form to the following address:

US Army Corps of Engineers
South Atlantic Division
Attn: Jason Steele, Review Officer
60 Forsyth Street SW, Room 10M15
Atlanta, Georgia 30303-8801
Phone: (404) 562-5137

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by .
It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this correspondence.

Corps Regulatory Official: STEFFENS.THOMAS.ANCRUM.1284706273
Thomas Steffens

Digitally signed by STEFFENS.THOMAS.ANCRUM.1284706273
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=STEFFENS.THOMAS.ANCRUM.1284706273
Date: 2016.11.21 17:12:45 -05'00'

Date of JD: **11/17/2016**
Expiration Date of JD:

The Wilmington District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete our Customer Satisfaction Survey, located online at http://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0.

Copy furnished:

Agent:

Address:

Telephone Number:

P-5

Action ID Number: SAW-2016-02295 **County:** Carteret

Permittee: NCDOT, Division 2
Jay Johnson

Project Name: NCDOT B-5938 Bridge 68 Atlantic Beach Bridge Bogue Sound

Date Verification Issued: November 17, 2016

Project Manager: Thomas Steffens

STEFFENS.THOMAS.ANCRUM.1284706273

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Date: 2016.11.21 17:12:21 -05'00'

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the following address:

US ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT
Attn: Thomas Steffens
Washington Regulatory Field Office
2407 West 5th Street
Washington, North Carolina
27889

Please note that your permitted activity is subject to a compliance inspection by a U. S. Army Corps of Engineers representative. Failure to comply with any terms or conditions of this authorization may result in the Corps suspending, modifying or revoking the authorization and/or issuing a Class I administrative penalty, or initiating other appropriate legal action.

I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and condition of the said permit, and required mitigation was completed in accordance with the permit conditions.

_____ _____

Signature of Permittee **Date**

SAW-2016-02295

SPECIAL CONDITIONS

NAVIGATION: This permit does not authorize the interference with any existing or proposed Federal project, and the Permittee will not be entitled to compensation for damage or injury to the authorized structure or work which may be caused from existing or future operations undertaken by the United States in the public interest.

1. No attempt will be made by the Permittee to prevent the full and free use by the public of all navigable waters at or adjacent to the authorized work. Use of the permitted activity must not interfere with the public's right to free navigation on all navigable waters of the United States.

2. The Permittee must install and maintain, at its expense, any signal lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, on all authorized facilities constructed within navigable waters of the United States.

3. The permittee shall notify NOAA/NATIONAL OCEAN SERVICE Chief Source Data Unit N CS261, 1315 E West HWY- RM 7316, Silver Spring, MD 20910-3282 at least two weeks prior to beginning work and upon completion of work.

ESSENTIAL FISH HABITAT: An in-water moratorium will be observed from April 1 through September 30 to minimize impacts to essential fish habitat.

MANATEE CONDITION: In order to further protect the endangered West Indian Manatee, Trichechus manatus, the applicant must implement the U.S. Fish and Wildlife Service's Manatee Guidelines, and strictly adhere to all requirements therein. The guidelines can be found at http://www.fws.gov/nc-es/mammal/manatee_guidelines.pdf.

WATER CONTAMINATION: All mechanized equipment will be regularly inspected and maintained to prevent contamination of waters and wetlands from fuels, lubricants, hydraulic fluids, or other toxic materials. In the event of a spill of petroleum products or any other hazardous waste, the permittee shall immediately report it to the N.C. Division of Water Quality at (919) 733-3300 or (800) 858-0368 and provisions of the North Carolina Oil Pollution and Hazardous Substances Control Act will be followed.

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Date: 2016.11.21 17:15:32 -05'00'

P-7

U.S. ARMY CORPS OF ENGINEERS

WILMINGTON DISTRICT

Action Id. SAW-2016-02294 County: Carteret U.S.G.S. Quad: NC-BEAUFORT

GENERAL PERMIT (REGIONAL AND NATIONWIDE) VERIFICATION

Permittee: NCDOT, Division 2
Jay Johnson

Address: Post Office Box 1587

Greenville, NC, 27835

Telephone Number:

Size (acres) .05
Nearest Waterway Bogue Sound
USGS HUC 03020301

Nearest Town Atlantic Beach
River Basin Onslow Bay
Coordinates Latitude: 34.7173361732379
Longitude: -76.7351537638066

Location description: Atlantic Beach bridge over Bogue Sound near Atlantic beach, Carteret County, NC

Description of projects area and activity: Install 7 pile jackets and /or encapsulation; repair or replace existing deteriorating fender system, light poles, repair structural and sub-structural elements to extend facility life span.

Applicable Law: ☐ Section 404 (Clean Water Act, 33 USC 1344)
☒ Sections 10 (Rivers and Harbors Act, 33 USC 403)

Authorization: Regional General Permit Number or Nationwide Permit Number: NWP 25 Structural maintenance.
SEE ATTACHED RGP or NWP GENERAL, REGIONAL AND SPECIAL CONDITIONS

Your work is authorized by the above referenced permit provided it is accomplished in strict accordance with the attached conditions and your submitted application and attached information dated 10/21/2016. Any violation of the attached conditions or deviation from your submitted plans may subject the permittee to a stop work order, a restoration order, a Class I administrative penalty, and/or appropriate legal action.

This verification will remain valid until the expiration date identified below unless the nationwide authorization is modified, suspended or revoked. If, prior to the expiration date identified below, the nationwide permit authorization is reissued and/or modified, this verification will remain valid until the expiration date identified below, provided it complies with all requirements of the modified nationwide permit. If the nationwide permit authorization expires or is suspended, revoked, or is modified, such that the activity would no longer comply with the terms and conditions of the nationwide permit, activities which have commenced (i.e., are under construction) or are under contract to commence in reliance upon the nationwide permit, will remain authorized provided the activity is completed within twelve months of the date of the nationwide permit's expiration, modification or revocation, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend or revoke the authorization.

Activities subject to Section 404 (as indicated above) may also require an individual Section 401 Water Quality Certification. You should contact the NC Division of Water Resources (telephone 919-807-6300) to determine Section 401 requirements.

For activities occurring within the twenty coastal counties subject to regulation under the Coastal Area Management Act (CAMA), prior to beginning work you must contact the N.C. Division of Coastal Management in Morehead City, NC, at (252) 808-2808.

This Department of the Army verification does not relieve the permittee of the responsibility to obtain any other required Federal, State or local approvals/permits.

If there are any questions regarding this verification, any of the conditions of the Permit, or the Corps of Engineers regulatory program, please contact Thomas Steffens at 910-251-4615 or Thomas.A.Steffens@usace.army.mil.

Corps Regulatory Official: STEFFENS.THOMAS.ANCRUM.1284706273 Digitally signed by STEFFENS.THOMAS.ANCRUM.1284706273 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=STEFFENS.THOMAS.ANCRUM.1284706273 Date: 2016.11.21 17:09:55 -05'00' Date: November 17, 2016

Expiration Date of Verification: 03/8/2017

SAW-2016-02295

P-8

Determination of Jurisdiction:

A. ☒ There are waters, including wetlands, on the above described project area that may be subject to Section 404 of the Clean Water Act (CWA) (33 USC § 1344) and/or Section 10 of the Rivers and Harbors Act (RHA) (33 USC § 403). This preliminary determination is not an appealable action under the Regulatory Program Administrative Appeal Process (Reference 33 CFR Part 331). However, you may request an approved JD, which is an appealable action, by contacting the Corps district for further instruction. Please note, if work is authorized by either a general or nationwide permit, and you wish to request an appeal of an approved JD,the appeal m ust be received by the Corps and the appeal process concluded prior to the commencement of any work in waters of the United States and prior to any work that could alter the hydrology of waters of the United States.

B. ☐ There are Navigable Waters of the United States within the above described project area subject to the permit requirements of Section 10 of the Rivers and Harbors Act (RHA) (33 USC § 403) and Section 404 of the Clean Water Act (CWA) (33 USC § 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

C. ☐ There are waters, including wetlands, within the above described project area that are subject to the permit requirements of Section 404 of the Clean Water Act (CWA) (33 USC § 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

D. ☐ The jurisdictional areas within the above described project area have been identified under a previous action. Please reference jurisdictional determination issued . Action ID: **SAW-** .

Basis For Determination: This area exhibits a High Tide Line as indicated by physical markings on structures and is part of the Bogue Sound.

Remarks:

E. Attention USDA Program Participants

This delineation/determination has been conducted to identify the limits of Corps' Clean Water Act jurisdiction for the particular site identified in this request. The delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA Program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

F. Appeals Information (This information applies only to approved jurisdiction determinations as indicated in B and C above).

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South Atlantic Division
Attn: Jason Steele, Review Officer
60 Forsyth Street SW, Room 10M15
Atlanta, Georgia 30303-8801
Phone: (404) 562-5137

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by .
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Corps Regulatory Official: STEFFENS.THOMAS.ANCRUM.1284706273 Digitally signed by STEFFENS.THOMAS.ANCRUM.1284706273 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=STEFFENS.THOMAS.ANCRUM.1284706273 Date: 2016.11.21 17:09:30 -05'00'

Thomas Steffens

Date of JD: **11/17/2016**
Expiration Date of JD:

The Wilmington District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete our Customer Satisfaction Survey, located online at http://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0.

Copy furnished:

Agent:

Address:

Telephone Number:

P-10

Action ID Number: SAW-2016-02295 **County:** Carteret

Permittee: NCDOT, Division 2
Jay Johnson

Project Name: NCDOT B-5938 Bridge 68 Atlantic Beach Bridge Bogue Sound

Date Verification Issued: November 17, 2016

Project Manager: Thomas Steffens STEFFENS.THOMAS.ANCRUM.1284706273 Digitally signed by STEFFENS.THOMAS.ANCRUM.1284706273 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=STEFFENS.THOMAS.ANCRUM.1284706273 Date: 2016.11.21 17:09:00 -05'00'

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the following address:

US ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT
Attn: Thomas Steffens
Washington Regulatory Field Office
2407 West 5th Street
Washington, North Carolina
27889

Please note that your permitted activity is subject to a compliance inspection by a U. S. Army Corps of Engineers representative. Failure to comply with any terms or conditions of this authorization may result in the Corps suspending, modifying or revoking the authorization and/or issuing a Class I administrative penalty, or initiating other appropriate legal action.

I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and condition of the said permit, and required mitigation was completed in accordance with the permit conditions.

_____ _____

Signature of Permittee **Date**

SAW-2016-02294

SPECIAL CONDITIONS

NAVIGATION: This permit does not authorize the interference with any existing or proposed Federal project, and the Permittee will not be entitled to compensation for damage or injury to the authorized structure or work which may be caused from existing or future operations undertaken by the United States in the public interest.

1. No attempt will be made by the Permittee to prevent the full and free use by the public of all navigable waters at or adjacent to the authorized work. Use of the permitted activity must not interfere with the public's right to free navigation on all navigable waters of the United States.

2. The Permittee must install and maintain, at its expense, any signal lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, on all authorized facilities constructed within navigable waters of the United States.

3. The permittee shall notify NOAA/NATIONAL OCEAN SERVICE Chief Source Data Unit N CS261, 1315 E West HWY- RM 7316, Silver Spring, MD 20910-3282 at least two weeks prior to beginning work and upon completion of work.

ESSENTIAL FISH HABITAT: An in-water moratorium will be observed from April 1 through September 30 to minimize impacts to essential fish habitat.

MANATEE CONDITION: In order to further protect the endangered West Indian Manatee, Trichechus manatus, the applicant must implement the U.S. Fish and Wildlife Service's Manatee Guidelines, and strictly adhere to all requirements therein. The guidelines can be found at http://www.fws.gov/nc-es/mammal/manatee_guidelines.pdf.

WATER CONTAMINATION: All mechanized equipment will be regularly inspected and maintained to prevent contamination of waters and wetlands from fuels, lubricants, hydraulic fluids, or other toxic materials. In the event of a spill of petroleum products or any other hazardous waste, the permittee shall immediately report it to the N.C. Division of Water Quality at (919) 733-3300 or (800) 858-0368 and provisions of the North Carolina Oil Pollution and Hazardous Substances Control Act will be followed.

STEFFENS.THOMAS.ANCRUM.1284706273

Digitally signed by STEFFENS.THOMAS.ANCRUM.1284706273
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=STEFFENS.THOMAS.ANCRUM.1284706273
Date: 2016.11.21 17:10:59 -05'00'

P-12

U.S. ARMY CORPS OF ENGINEERS

WILMINGTON DISTRICT

Action Id. **SAW-2016-02328** County: **Carteret** U.S.G.S. Quad: **NC-SWANSBORO**

GENERAL PERMIT (REGIONAL AND NATIONWIDE) VERIFICATION

Permittee: **NCDOT, Division 2**
Jay Johnson
Address: **Post Office Box 1587**

Greenville, NC, 27835
Telephone Number:

Size (acres) **1.0**
Nearest Waterway **Atlantic Ocean**
USGS HUC **03020301**

Nearest Town **Cape Carteret**
River Basin **Onslow Bay**
Coordinates Latitude: **34.673159**
Longitude: **-77.065027**

Location description: **Emerald Isle Bridge (Bridge 6) over Bogue Sound near Cape Carteret, Carteret Co, NC.**

Description of projects area and activity: **Proposal to place 156 pile jackets and/or encapsulations on existing bridge structure. jackets will average 7' long with 3' below MLW and 2' above MHW. 51 of 156 piles extend 3' below MLW into substrate and will be jetted in utilizing a turbidity curtain. Additional maintenance will occur on/or throughout the bridge structure including areas below MHW.**

Applicable Law: ☐ Section 404 (Clean Water Act, 33 USC 1344)
☒ Sections 10 (Rivers and Harbors Act, 33 USC 403)

Authorization: Regional General Permit Number or Nationwide Permit Number: **NWP 3 Maintenance.**
SEE ATTACHED RGP or NWP GENERAL, REGIONAL AND SPECIAL CONDITIONS

Your work is authorized by the above referenced permit provided it is accomplished in strict accordance with the attached conditions and your submitted application and attached information dated 10/21/2016. Any violation of the attached conditions or deviation from your submitted plans may subject the permittee to a stop work order, a restoration order, a Class I administrative penalty, and/or appropriate legal action.

This verification will remain valid until the expiration date identified below unless the nationwide authorization is modified, suspended or revoked. If, prior to the expiration date identified below, the nationwide permit authorization is reissued and/or modified, this verification will remain valid until the expiration date identified below, provided it complies with all requirements of the modified nationwide permit. If the nationwide permit authorization expires or is suspended, revoked, or is modified, such that the activity would no longer comply with the terms and conditions of the nationwide permit, activities which have commenced (i.e., are under construction) or are under contract to commence in reliance upon the nationwide permit, will remain authorized provided the activity is completed within twelve months of the date of the nationwide permit's expiration, modification or revocation, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend or revoke the authorization.

Activities subject to Section 404 (as indicated above) may also require an individual Section 401 Water Quality Certification. You should contact the NC Division of Water Resources (telephone 919-807-6300) to determine Section 401 requirements.

For activities occurring within the twenty coastal counties subject to regulation under the Coastal Area Management Act (CAMA), prior to beginning work you must contact the N.C. Division of Coastal Management in Elizabeth City, NC, at (252) 264-3901.

This Department of the Army verification does not relieve the permittee of the responsibility to obtain any other required Federal, State or local approvals/permits.

If there are any questions regarding this verification, any of the conditions of the Permit, or the Corps of Engineers regulatory program, please contact **Thomas Steffens at 910-251-4615 or Thomas.A.Steffens@usace.army.mil**.

Corps Regulatory Official: STEFFENS.THOMAS.A... Date: **November 21, 2016**
Expiration Date of Verification: **03/18/2017**
NCRUM.1284706273

Digitally signed by STEFFENS.THOMAS.ANCRUM.1284706273
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=STEFFENS.THOMAS.ANCRUM.1284706273
Date: 2016.11.21 17:21:29 -05'00'

Determination of Jurisdiction:

A. ☒ There are waters, including wetlands, on the above described project area that may be subject to Section 404 of the Clean Water Act (CWA) (33 USC § 1344) and/or Section 10 of the Rivers and Harbors Act (RHA) (33 USC § 403). This preliminary determination is not an appealable action under the Regulatory Program Administrative Appeal Process (Reference 33 CFR Part 331). However, you may request an approved JD, which is an appealable action, by contacting the Corps district for further instruction. Please note, if work is authorized by either a general or nationwide permit, and you wish to request an appeal of an approved JD,the appeal m ust be received by the Corps and the appeal process concluded prior to the commencement of any work in waters of the United States and prior to any work that could alter the hydrology of waters of the United States.

B. ☐ There are Navigable Waters of the United States within the above described project area subject to the permit requirements of Section 10 of the Rivers and Harbors Act (RHA) (33 USC § 403) and Section 404 of the Clean Water Act (CWA) (33 USC § 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

C. ☐ There are waters, including wetlands, within the above described project area that are subject to the permit requirements of Section 404 of the Clean Water Act (CWA) (33 USC § 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

D. ☐ The jurisdictional areas within the above described project area have been identified under a previous action. Please reference jurisdictional determination issued . Action ID: **SAW-** .

Basis For Determination: This area exhibits a High Tide Line as indicated by physical markings on structures and is part of the Bogue Sound.

Remarks:

E. Attention USDA Program Participants

This delineation/determination has been conducted to identify the limits of Corps' Clean Water Act jurisdiction for the particular site identified in this request. The delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA Program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

F. Appeals Information (This information applies only to approved jurisdiction determinations as indicated in B and C above).

This correspondence constitutes an approved jurisdiction determination for the above described site. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and request for appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA form to the following address:

US Army Corps of Engineers
South Atlantic Division
Attn: Jason Steele, Review Officer
60 Forsyth Street SW, Room 10M15
Atlanta, Georgia 30303-8801
Phone: (404) 562-5137

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by .
It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this correspondence.

Corps Regulatory Official: STEFFENS.THOMAS.A NCRUM.1284706273
Thomas Steffens

Digitally signed by STEFFENS.THOMAS.ANCRUM.1284706273
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=STEFFENS.THOMAS.ANCRUM.1284706273
Date: 2016.11.21 17:20:48 -05'00'

SAW-2016-02328

P-14

Date of JD: **11/21/2016**
Expiration Date of JD:

The Wilmington District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete our Customer Satisfaction Survey, located online at http://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0.

Copy furnished:

Agent:

Address:

Telephone Number:

SAW-2016-02328

SPECIAL CONDITIONS

NAVIGATION: This permit does not authorize the interference with any existing or proposed Federal project, and the Permittee will not be entitled to compensation for damage or injury to the authorized structure or work which may be caused from existing or future operations undertaken by the United States in the public interest.

1. No attempt will be made by the Permittee to prevent the full and free use by the public of all navigable waters at or adjacent to the authorized work. Use of the permitted activity must not interfere with the public's right to free navigation on all navigable waters of the United States.

2. The Permittee must install and maintain, at its expense, any signal lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, on all authorized facilities constructed within navigable waters of the United States.

3. The permittee shall notify NOAA/NATIONAL OCEAN SERVICE Chief Source Data Unit N CS261, 1315 E West HWY- RM 7316, Silver Spring, MD 20910-3282 at least two weeks prior to beginning work and upon completion of work.

ESSENTIAL FISH HABITAT: An in-water moratorium will be observed from April 1 through September 31 to minimize impacts to essential fish habitat.

MANATEE CONDITION: In order to further protect the endangered West Indian Manatee, Trichechus manatus, the applicant must implement the U.S. Fish and Wildlife Service's Manatee Guidelines, and strictly adhere to all requirements therein. The guidelines can be found at http://www.fws.gov/nc-es/mammal/manatee_guidelines.pdf.

WATER CONTAMINATION: All mechanized equipment will be regularly inspected and maintained to prevent contamination of waters and wetlands from fuels, lubricants, hydraulic fluids, or other toxic materials. In the event of a spill of petroleum products or any other hazardous waste, the permittee shall immediately report it to the N.C. Division of Water Quality at (919) 733-3300 or (800) 858-0368 and provisions of the North Carolina Oil Pollution and Hazardous Substances Control Act will be followed.

STEFFENS.THOMAS.ANCRUM.1284706273

Digitally signed by STEFFENS.THOMAS.ANCRUM.1284706273
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=STEFFENS.THOMAS.ANCRUM.1284706273
Date: 2016.11.21 17:20:26 -05'00'

P-16

Action ID Number: SAW-2016-02328 **County:** Carteret

Permittee: NCDOT, Division 2
Jay Johnson

Project Name: NCDOT B-5939 Bridge 6 Emerald Isle Bridge Bogue Sound Maintenance

Date Verification Issued: November 21, 2016

Project Manager: Thomas Steffens

STEFFENS.THOMAS.ANCRUM.1284706273

Digitally signed by STEFFENS.THOMAS.ANCRUM.1284706273
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=STEFFENS.THOMAS.ANCRUM.1284706273
Date: 2016.11.21 17:20:03 -05'00'

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the following address:

US ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT
Attn: Thomas Steffens
Washington Regulatory Field Office
2407 West 5th Street
Washington, North Carolina
27889

Please note that your permitted activity is subject to a compliance inspection by a U. S. Army Corps of Engineers representative. Failure to comply with any terms or conditions of this authorization may result in the Corps suspending, modifying or revoking the authorization and/or issuing a Class I administrative penalty, or initiating other appropriate legal action.

I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and condition of the said permit, and required mitigation was completed in accordance with the permit conditions.

_____ _____

Signature of Permittee **Date**

P-17

U.S. ARMY CORPS OF ENGINEERS

WILMINGTON DISTRICT

Action Id. SAW-2016-02327 County: Carteret U.S.G.S. Quad: NC-SWANSBORO

GENERAL PERMIT (REGIONAL AND NATIONWIDE) VERIFICATION

Permittee: NCDOT, Division 2
Jay Johnson
Address: Post Office Box 1587

Greenville, NC, 27835
Telephone Number:

Size (acres) 1.0
Nearest Waterway Atlantic Ocean
USGS HUC 03020301

Nearest Town Cape Carteret
River Basin Onslow Bay
Coordinates Latitude: 34.673159
Longitude: -77.065027

Location description: Emerald Isle bridge (Bridge 6) over Bogue Sound near Cape Carteret, Carteret County, NC.

Description of projects area and activity: Proposal to place 156 pile jackets and/or encapsulations on existing bridge structure. jackets will average 7' long with 3' below MLW and 2' above MHW. 51 of 156 piles extend 3' below MLW into substrate and will be jetted in utilizing a turbidity curtain. Additional maintenance will occur on/or throughout the bridge structure including areas below MHW.

Applicable Law: ☐ Section 404 (Clean Water Act, 33 USC 1344)
☒ Sections 10 (Rivers and Harbors Act, 33 USC 403)

Authorization: Regional General Permit Number or Nationwide Permit Number: NWP 25 Structural Discharges.
SEE ATTACHED RGP or NWP GENERAL, REGIONAL AND SPECIAL CONDITIONS

Your work is authorized by the above referenced permit provided it is accomplished in strict accordance with the attached conditions and your submitted application and attached information dated 10/21/2016. Any violation of the attached conditions or deviation from your submitted plans may subject the permittee to a stop work order, a restoration order, a Class I administrative penalty, and/or appropriate legal action.

This verification will remain valid until the expiration date identified below unless the nationwide authorization is modified, suspended or revoked. If, prior to the expiration date identified below, the nationwide permit authorization is reissued and/or modified, this verification will remain valid until the expiration date identified below, provided it complies with all requirements of the modified nationwide permit. If the nationwide permit authorization expires or is suspended, revoked, or is modified, such that the activity would no longer comply with the terms and conditions of the nationwide permit, activities which have commenced (i.e., are under construction) or are under contract to commence in reliance upon the nationwide permit, will remain authorized provided the activity is completed within twelve months of the date of the nationwide permit's expiration, modification or revocation, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend or revoke the authorization.

Activities subject to Section 404 (as indicated above) may also require an individual Section 401 Water Quality Certification. You should contact the NC Division of Water Resources (telephone 919-807-6300) to determine Section 401 requirements.

For activities occurring within the twenty coastal counties subject to regulation under the Coastal Area Management Act (CAMA), prior to beginning work you must contact the N.C. Division of Coastal Management in Morehead City, NC, at (252) 808-2808.

This Department of the Army verification does not relieve the permittee of the responsibility to obtain any other required Federal, State or local approvals/permits.

If there are any questions regarding this verification, any of the conditions of the Permit, or the Corps of Engineers regulatory program, please contact Thomas Steffens at 910-251-4615 or Thomas.A.Steffens@usace.army.mil.

Corps Regulatory Official: STEFFENS.THOMAS.A.1284706273 Date: November 21, 2016
Expiration Date of Verification: 03/18/2017

NCRUM.1284706273

Digitally signed by STEFFENS.THOMAS.A.1284706273
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=STEFFENS.THOMAS.ANCRUM.1284706273
Date: 2016.11.21 17:18:53 -05'00'

Determination of Jurisdiction:

A. ☒ There are waters, including wetlands, on the above described project area that may be subject to Section 404 of the Clean Water Act (CWA) (33 USC § 1344) and/or Section 10 of the Rivers and Harbors Act (RHA) (33 USC § 403). This preliminary determination is not an appealable action under the Regulatory Program Administrative Appeal Process (Reference 33 CFR Part 331). However, you may request an approved JD, which is an appealable action, by contacting the Corps district for further instruction. Please note, if work is authorized by either a general or nationwide permit, and you wish to request an appeal of an approved JD,the appeal m ust be received by the Corps and the appeal process concluded prior to the commencement of any work in waters of the United States and prior to any work that could alter the hydrology of waters of the United States.

B. ☐ There are Navigable Waters of the United States within the above described project area subject to the permit requirements of Section 10 of the Rivers and Harbors Act (RHA) (33 USC § 403) and Section 404 of the Clean Water Act (CWA) (33 USC § 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

C. ☐ There are waters, including wetlands, within the above described project area that are subject to the permit requirements of Section 404 of the Clean Water Act (CWA) (33 USC § 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

D. ☐ The jurisdictional areas within the above described project area have been identified under a previous action. Please reference jurisdictional determination issued . Action ID: **SAW-** .

Basis For Determination: This area exhibits a High Tide Line as indicated by physical markings on structures and is part of the Bogue Sound.

Remarks:

E. Attention USDA Program Participants

This delineation/determination has been conducted to identify the limits of Corps' Clean Water Act jurisdiction for the particular site identified in this request. The delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA Program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

F. Appeals Information (This information applies only to approved jurisdiction determinations as indicated in B and C above).

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US Army Corps of Engineers
South Atlantic Division
Attn: Jason Steele, Review Officer
60 Forsyth Street SW, Room 10M15
Atlanta, Georgia 30303-8801
Phone: (404) 562-5137

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It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this correspondence.

Corps Regulatory Official: STEFFENS.THOMAS.A
Thomas Steffens
NCRUM.1284706273

Digitally signed by STEFFENS.THOMAS.ANCRUM.1284706273
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=STEFFENS.THOMAS.ANCRUM.1284706273
Date: 2016.11.21 17:18:23 -05'00'

SAW-2016-02327

P-19

Date of JD: **11/21/2016**
Expiration Date of JD:

The Wilmington District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete our Customer Satisfaction Survey, located online at http://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0.

Copy furnished:

Agent:

Address:

Telephone Number:

SAW-2016-02327

SPECIAL CONDITIONS

NAVIGATION: This permit does not authorize the interference with any existing or proposed Federal project, and the Permittee will not be entitled to compensation for damage or injury to the authorized structure or work which may be caused from existing or future operations undertaken by the United States in the public interest.

1. No attempt will be made by the Permittee to prevent the full and free use by the public of all navigable waters at or adjacent to the authorized work. Use of the permitted activity must not interfere with the public's right to free navigation on all navigable waters of the United States.

2. The Permittee must install and maintain, at its expense, any signal lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, on all authorized facilities constructed within navigable waters of the United States.

3. The permittee shall notify NOAA/NATIONAL OCEAN SERVICE Chief Source Data Unit N CS261, 1315 E West HWY- RM 7316, Silver Spring, MD 20910-3282 at least two weeks prior to beginning work and upon completion of work.

ESSENTIAL FISH HABITAT: An in-water moratorium will be observed from April 1 through September 31 to minimize impacts to essential fish habitat.

MANATEE CONDITION: In order to further protect the endangered West Indian Manatee, Trichechus manatus, the applicant must implement the U.S. Fish and Wildlife Service's Manatee Guidelines, and strictly adhere to all requirements therein. The guidelines can be found at http://www.fws.gov/nc-es/mammal/manatee_guidelines.pdf.

WATER CONTAMINATION: All mechanized equipment will be regularly inspected and maintained to prevent contamination of waters and wetlands from fuels, lubricants, hydraulic fluids, or other toxic materials. In the event of a spill of petroleum products or any other hazardous waste, the permittee shall immediately report it to the N.C. Division of Water Quality at (919) 733-3300 or (800) 858-0368 and provisions of the North Carolina Oil Pollution and Hazardous Substances Control Act will be followed.

STEFFENS.THOMAS.ANCRUM.1284706273

Digitally signed by STEFFENS.THOMAS.ANCRUM.1284706273
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=STEFFENS.THOMAS.ANCRUM.1284706273
Date: 2016.11.21 17:17:49 -05'00'

P-21

Action ID Number: SAW-2016-02327 **County:** Carteret

Permittee: NCDOT, Division 2
Jay Johnson

Project Name: NCDOT B-5939 Bridge 6 Emerald Isle Bridge Bogue Sound Maintenance

Date Verification Issued: November 21, 2016

Project Manager: Thomas Steffens STEFFENS.THOMAS.ANCRUM.1284706273 Digitally signed by STEFFENS.THOMAS.ANCRUM.1284706273 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=STEFFENS.THOMAS.ANCRUM.1284706273 Date: 2016.11.21 17:17:15 -05'00'

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the following address:

US ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT
Attn: Thomas Steffens
Washington Regulatory Field Office
2407 West 5th Street
Washington, North Carolina
27889

Please note that your permitted activity is subject to a compliance inspection by a U. S. Army Corps of Engineers representative. Failure to comply with any terms or conditions of this authorization may result in the Corps suspending, modifying or revoking the authorization and/or issuing a Class I administrative penalty, or initiating other appropriate legal action.

I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and condition of the said permit, and required mitigation was completed in accordance with the permit conditions.

_____ _____

Signature of Permittee **Date**

P-22

NATIONWIDE PERMIT 3
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
FINAL NOTICE OF ISSUANCE AND MODIFICATION OF NATIONWIDE PERMITS
FEDERAL REGISTER
AUTHORIZED MARCH 19, 2012

Maintenance. (a) The repair, rehabilitation, or replacement of any previously authorized, currently serviceable structure, or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3, provided that the structure or fill is not to be put to uses differing from those uses specified or contemplated for it in the original permit or the most recently authorized modification. Minor deviations in the structure's configuration or filled area, including those due to changes in materials, construction techniques, requirements of other regulatory agencies, or current construction codes or safety standards that are necessary to make the repair, rehabilitation, or replacement are authorized. Any stream channel modification is limited to the minimum necessary for the repair, rehabilitation, or replacement of the structure or fill; such modifications, including the removal of material from the stream channel, must be immediately adjacent to the project or within the boundaries of the structure or fill. This NWP also authorizes the repair, rehabilitation, or replacement of those structures or fills destroyed or damaged by storms, floods, fire or other discrete events, provided the repair, rehabilitation, or replacement is commenced, or is under contract to commence, within two years of the date of their destruction or damage. In cases of catastrophic events, such as hurricanes or tornadoes, this two-year limit may be waived by the district engineer, provided the permittee can demonstrate funding, contract, or other similar delays.

(b) This NWP also authorizes the removal of accumulated sediments and debris in the vicinity of existing structures (e.g., bridges, culverted road crossings, water intake structures, etc.) and/or the placement of new or additional riprap to protect the structure. The removal of sediment is limited to the minimum necessary to restore the waterway in the vicinity of the structure to the approximate dimensions that existed when the structure was built, but cannot extend farther than 200 feet in any direction from the structure. This 200 foot limit does not apply to maintenance dredging to remove accumulated sediments blocking or restricting outfall and intake structures or to maintenance dredging to remove accumulated sediments from canals associated with outfall and intake structures. All dredged or excavated materials must be deposited and retained in an area that has no waters of the United States unless otherwise specifically approved by the district engineer under separate authorization. The placement of new or additional riprap must be the minimum necessary to protect the structure or to ensure the safety of the structure. Any bank stabilization measures not directly associated with the structure will require a separate authorization from the district engineer.

(c) This NWP also authorizes temporary structures, fills, and work necessary to conduct the maintenance activity. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in

their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

(d) This NWP does not authorize maintenance dredging for the primary purpose of navigation. This NWP does not authorize beach restoration. This NWP does not authorize new stream channelization or stream relocation projects.

* Notification: For activities authorized by paragraph (b) of this NWP, the permittee must submit a pre-construction notification to the district engineer prior to commencing the activity (see general condition 31). The pre-construction notification must include information regarding the original design capacities and configurations of the outfalls, intakes, small impoundments, and canals. (Sections 10 and 404)

Note: This NWP authorizes the repair, rehabilitation, or replacement of any previously authorized structure or fill that does not qualify for the Clean Water Act Section 404(f) exemption for maintenance.

P-24

NATIONWIDE PERMIT 25
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
FINAL NOTICE OF ISSUANCE AND MODIFICATION OF NATIONWIDE PERMITS
FEDERAL REGISTER
AUTHORIZED MARCH 19, 2012

Structural Discharges. Discharges of material such as concrete, sand, rock, etc., into tightly sealed forms or cells where the material will be used as a structural member for standard pile supported structures, such as bridges, transmission line footings, and walkways, or for general navigation, such as mooring cells, including the excavation of bottom material from within the form prior to the discharge of concrete, sand, rock, etc. This NWP does not authorize filled structural members that would support buildings, building pads, homes, house pads, parking areas, storage areas and other such structures. The structure itself may require a separate section 10 permit if located in navigable waters of the United States. (Section 404)

NATIONWIDE PERMIT CONDITIONS

The following General Conditions must be followed in order for any authorization by a NWP to be valid:

1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation.

(b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.

(c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species.

3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. Management of Water Flows. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.

13. Removal of Temporary Fills. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. Wild and Scenic Rivers. No activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a “study river” for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service).

17. Tribal Rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

18. Endangered Species. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed.

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will review the documentation and determine whether it is sufficient to address ESA compliance for the NWP activity, or whether additional ESA consultation is necessary.

* (c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that might be affected by the proposed work or that utilize the designated critical habitat that might be affected by the proposed work. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps' determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the project, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification the proposed activities will have "no effect" on listed species or critical habitat, or until Section 7 consultation has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific regional endangered species conditions to the NWPs.

(e) Authorization of an activity by a NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the U.S. FWS or the NMFS, The Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word "harm" in the definition of "take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(f) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. FWS and NMFS or their world wide web pages at http://www.fws.gov/ or http://www.fws.gov/ipac and http://www.noaa.gov/fisheries.html respectively.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for obtaining any "take" permits required under the U.S. Fish and Wildlife Service's regulations governing compliance with the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act. The permittee should contact the appropriate local office of the U.S. Fish and Wildlife Service to determine if such "take" permits are required for a particular activity.

20. Historic Properties. (a) In cases where the district engineer determines that the activity may affect properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(b) Federal permittees should follow their own procedures for complying with the requirements of Section 106 of the National Historic Preservation Act. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will review the documentation and determine whether it is sufficient to address section 106 compliance for the NWP activity, or whether additional section 106 consultation is necessary.

* (c) Non-federal permittees must submit a pre-construction notification to the district engineer if the authorized activity may have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of or potential for the presence of historic resources can be sought from the State Historic Preservation Officer or Tribal Historic Preservation Officer, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of Section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted and these efforts, the district engineer shall determine whether the proposed activity has the potential to cause an effect on the historic properties. Where the non-Federal applicant has identified historic properties on which the activity may have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects or that consultation under Section 106 of the NHPA has been completed.

(d) The district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA Section 106 consultation is required. Section 106 consultation is not required when the Corps determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR §800.3(a)). If NHPA

section 106 consultation is required and will occur, the district engineer will notify the non-Federal applicant that he or she cannot begin work until Section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(e) Prospective permittees should be aware that section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. Designated Critical Resource Waters. Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment.

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, and 52 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with general condition 31, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

23. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that adverse effects on the aquatic environment are minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse effects of the proposed activity are minimal, and provides a project-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effects on the aquatic environment. Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332.

(1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in minimal adverse effects on the aquatic environment.

(2) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, wetland restoration should be the first compensatory mitigation option considered.

(3) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) – (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)).

(4) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan only needs to address the baseline conditions at the impact site and the number of credits to be provided.

(5) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan.

(d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation, such as stream rehabilitation, enhancement, or preservation, to ensure that the activity results in minimal adverse effects on the aquatic environment.

(e) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any project resulting in the loss of greater than 1/2-acre of waters of

the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that a project already meeting the established acreage limits also satisfies the minimal impact requirement associated with the NWPs.

(f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the restoration or establishment, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, riparian areas may be the only compensatory mitigation required. Riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to establish a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or establishing a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(g) Permittees may propose the use of mitigation banks, in-lieu fee programs, or separate permittee-responsible mitigation. For activities resulting in the loss of marine or estuarine resources, permittee-responsible compensatory mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management.

(h) Where certain functions and services of waters of the United States are permanently adversely affected, such as the conversion of a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse effects of the project to the minimal level.

24. Safety of Impoundment Structures. To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. Water Quality. Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA Section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

"When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

_____

(Transferee)

_____

(Date)

* 30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include:

(a) A statement that the authorized work was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions;

(b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and

(c) The signature of the permittee certifying the completion of the work and mitigation.

* 31. Pre-Construction Notification. (a) Timing. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

(1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

(2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or in the vicinity of the project, or to notify the Corps pursuant to general condition 20 that the activity may have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or Section 106 of the National Historic Preservation (see 33 CFR 330.4(g)) has been completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) Contents of Pre-Construction Notification: The PCN must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed project;

(3) A description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause, including the anticipated amount of loss of water of the United States expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. The description should be sufficiently detailed to allow the district engineer to determine that the adverse effects of the project will be minimal and to determine the need for compensatory mitigation. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the project and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans);

(4) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many waters of the United States. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate;

(5) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse effects are minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(6) If any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, for non-Federal applicants the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work. Federal applicants must provide documentation demonstrating compliance with the Endangered Species Act; and

(7) For an activity that may affect a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, for non-Federal applicants the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property. Federal applicants must provide documentation demonstrating compliance with Section 106 of the National Historic Preservation Act.

(c) Form of Pre-Construction Notification: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is a PCN and must include all of the information required in paragraphs (b)(1) through (7) of this general condition. A letter containing the required information may also be used.

(d) Agency Coordination: (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

(2) For all NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States, for NWP 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 activities that require pre-construction notification and will result in the loss of greater than 300 linear feet of intermittent and ephemeral stream bed, and for all NWP 48 activities that require pre-construction notification, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (U.S. FWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Office (THPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to telephone or fax the district engineer notice that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure the net adverse environmental effects to the aquatic environment of the proposed activity are minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

(3) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

(4) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of pre-construction notifications to expedite agency coordination.

D. District Engineer's Decision

1. In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. For a linear project, this determination will include an evaluation of the individual crossings to determine whether they individually satisfy the terms and conditions of the NWP(s), as well as the cumulative effects caused by all of the crossings authorized by NWP. If an applicant requests a waiver of the 300 linear foot limit on impacts to intermittent or ephemeral streams or of an otherwise applicable limit, as provided for in NWPs 13, 21, 29, 36, 39, 40, 42, 43, 44, 50, 51 or 52, the district engineer will only grant the waiver upon a written determination that the NWP activity will result in minimal adverse effects. When making minimal effects determinations the district engineer will consider the direct and indirect effects caused by the NWP activity. The district engineer will also consider site specific factors, such as the environmental setting in the

vicinity of the NWP activity, the type of resource that will be affected by the NWP activity, the functions provided by the aquatic resources that will be affected by the NWP activity, the degree or magnitude to which the aquatic resources perform those functions, the extent that aquatic resource functions will be lost as a result of the NWP activity (e.g., partial or complete loss), the duration of the adverse effects (temporary or permanent), the importance of the aquatic resource functions to the region (e.g., watershed or ecoregion), and mitigation required by the district engineer. If an appropriate functional assessment method is available and practicable to use, that assessment method may be used by the district engineer to assist in the minimal adverse effects determination. The district engineer may add case-specific special conditions to the NWP authorization to address site-specific environmental concerns.

2. If the proposed activity requires a PCN and will result in a loss of greater than 1/10-acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for projects with smaller impacts. The district engineer will consider any proposed compensatory mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment of the proposed activity are minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects on the aquatic environment are minimal, after considering mitigation, the district engineer will notify the permittee and include any activity-specific conditions in the NWP verification the district engineer deems necessary. Conditions for compensatory mitigation requirements must comply with the appropriate provisions at 33 CFR 332.3(k). The district engineer must approve the final mitigation plan before the permittee commences work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the proposed compensatory mitigation plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure no more than minimal adverse effects on the aquatic environment. If the net adverse effects of the project on the aquatic environment (after consideration of the compensatory mitigation proposal) are determined by the district engineer to be minimal, the district engineer will provide a timely written response to the applicant. The response will state that the project can proceed under the terms and conditions of the NWP, including any activity-specific conditions added to the NWP authorization by the district engineer.

3. If the district engineer determines that the adverse effects of the proposed work are more than minimal, then the district engineer will notify the applicant either: (a) That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (b) that the project is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level; or (c) that the project is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse effects occur to the aquatic environment, the activity will be authorized within the 45-day PCN period, with activity-specific

conditions that state the mitigation requirements. The authorization will include the necessary conceptual or detailed mitigation or a requirement that the applicant submit a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level. When mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan or has determined that prior approval of a final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation.

FURTHER INFORMATION

1. District Engineers have authority to determine if an activity complies with the terms and conditions of an NWP.

2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law.

3. NWPs do not grant any property rights or exclusive privileges.

4. NWPs do not authorize any injury to the property or rights of others.

5. NWPs do not authorize interference with any existing or proposed Federal project.

DEFINITIONS

Best management practices (BMPs): Policies, practices, procedures, or structures implemented to mitigate the adverse environmental effects on surface water quality resulting from development. BMPs are categorized as structural or non-structural.

Compensatory mitigation: The restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

Currently serviceable: Useable as is or with some maintenance, but not so degraded as to essentially require reconstruction.

Direct effects: Effects that are caused by the activity and occur at the same time and place.

Discharge: The term "discharge" means any discharge of dredged or fill material.

Enhancement: The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

Ephemeral stream: An ephemeral stream has flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

Establishment (creation): The manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area.

High Tide Line: The line of intersection of the land with the water's surface at the maximum height reached by a rising tide. The high tide line may be determined, in the absence

of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gages, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other high tides that occur with periodic frequency but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds such as those accompanying a hurricane or other intense storm.

Historic Property: Any prehistoric or historic district, site (including archaeological site), building, structure, or other object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria (36 CFR part 60).

Independent utility: A test to determine what constitutes a single and complete non-linear project in the Corps regulatory program. A project is considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility.

Indirect effects: Effects that are caused by the activity and are later in time or farther removed in distance, but are still reasonably foreseeable.

Intermittent stream: An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

Loss of waters of the United States: Waters of the United States that are permanently adversely affected by filling, flooding, excavation, or drainage because of the regulated activity. Permanent adverse effects include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody. The acreage of loss of waters of the United States is a threshold measurement of the impact to jurisdictional waters for determining whether a project may qualify for an NWP; it is not a net threshold that is calculated after considering compensatory mitigation that may be used to offset losses of aquatic functions and services. The loss of stream bed includes the linear feet of stream bed that is filled or excavated. Waters of the United States temporarily filled, flooded, excavated, or drained, but restored to pre-construction contours and elevations after construction, are not included in the measurement of loss of waters of the United States. Impacts resulting from activities eligible for exemptions under Section 404(f) of the Clean Water Act are not considered when calculating the loss of waters of the United States.

Non-tidal wetland: A non-tidal wetland is a wetland that is not subject to the ebb and flow of tidal waters. The definition of a wetland can be found at 33 CFR 328.3(b). Non-tidal wetlands contiguous to tidal waters are located landward of the high tide line (i.e., spring high tide line).

Open water: For purposes of the NWPs, an open water is any area that in a year with normal patterns of precipitation has water flowing or standing above ground to the extent that an ordinary high water mark can be determined. Aquatic vegetation within the area of standing or

flowing water is either non-emergent, sparse, or absent. Vegetated shallows are considered to be open waters. Examples of "open waters" include rivers, streams, lakes, and ponds.

Ordinary High Water Mark: An ordinary high water mark is a line on the shore established by the fluctuations of water and indicated by physical characteristics, or by other appropriate means that consider the characteristics of the surrounding areas (see 33 CFR 328.3(e)).

Perennial stream: A perennial stream has flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.

Practicable: Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

Pre-construction notification: A request submitted by the project proponent to the Corps for confirmation that a particular activity is authorized by nationwide permit. The request may be a permit application, letter, or similar document that includes information about the proposed work and its anticipated environmental effects. Pre-construction notification may be required by the terms and conditions of a nationwide permit, or by regional conditions. A pre-construction notification may be voluntarily submitted in cases where pre-construction notification is not required and the project proponent wants confirmation that the activity is authorized by nationwide permit.

Preservation: The removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.

Re-establishment: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.

Rehabilitation: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

Restoration: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: re-establishment and rehabilitation.

Riffle and pool complex: Riffle and pool complexes are special aquatic sites under the 404(b)(1) Guidelines. Riffle and pool complexes sometimes characterize steep gradient sections of streams. Such stream sections are recognizable by their hydraulic characteristics. The rapid movement of water over a course substrate in riffles results in a rough flow, a turbulent surface, and high dissolved oxygen levels in the water. Pools are deeper areas associated with riffles. A slower stream velocity, a streaming flow, a smooth surface, and a finer substrate characterize pools.

Riparian areas: Riparian areas are lands adjacent to streams, lakes, and estuarine-marine shorelines. Riparian areas are transitional between terrestrial and aquatic ecosystems, through

which surface and subsurface hydrology connects riverine, lacustrine, estuarine, and marine waters with their adjacent wetlands, non-wetland waters, or uplands. Riparian areas provide a variety of ecological functions and services and help improve or maintain local water quality. (See general condition 23.)

Shellfish seeding: The placement of shellfish seed and/or suitable substrate to increase shellfish production. Shellfish seed consists of immature individual shellfish or individual shellfish attached to shells or shell fragments (i.e., spat on shell). Suitable substrate may consist of shellfish shells, shell fragments, or other appropriate materials placed into waters for shellfish habitat.

Single and complete linear project: A linear project is a project constructed for the purpose of getting people, goods, or services from a point of origin to a terminal point, which often involves multiple crossings of one or more waterbodies at separate and distant locations. The term "single and complete project" is defined as that portion of the total linear project proposed or accomplished by one owner/developer or partnership or other association of owners/developers that includes all crossings of a single water of the United States (i.e., a single waterbody) at a specific location. For linear projects crossing a single or multiple waterbodies several times at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. However, individual channels in a braided stream or river, or individual arms of a large, irregularly shaped wetland or lake, etc., are not separate waterbodies, and crossings of such features cannot be considered separately.

Single and complete non-linear project: For non-linear projects, the term "single and complete project" is defined at 33 CFR 330.2(i) as the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers. A single and complete non-linear project must have independent utility (see definition of "independent utility"). Single and complete non-linear projects may not be "piecemealed" to avoid the limits in an NWP authorization.

Stormwater management: Stormwater management is the mechanism for controlling stormwater runoff for the purposes of reducing downstream erosion, water quality degradation, and flooding and mitigating the adverse effects of changes in land use on the aquatic environment.

Stormwater management facilities: Stormwater management facilities are those facilities, including but not limited to, stormwater retention and detention ponds and best management practices, which retain water for a period of time to control runoff and/or improve the quality (i.e., by reducing the concentration of nutrients, sediments, hazardous substances and other pollutants) of stormwater runoff.

Stream bed: The substrate of the stream channel between the ordinary high water marks. The substrate may be bedrock or inorganic particles that range in size from clay to boulders. Wetlands contiguous to the stream bed, but outside of the ordinary high water marks, are not considered part of the stream bed.

Stream channelization: The manipulation of a stream's course, condition, capacity, or location that causes more than minimal interruption of normal stream processes. A channelized stream remains a water of the United States.

Structure: An object that is arranged in a definite pattern of organization. Examples of structures include, without limitation, any pier, boat dock, boat ramp, wharf, dolphin, weir, boom, breakwater, bulkhead, revetment, riprap, jetty, artificial island, artificial reef, permanent

mooring structure, power transmission line, permanently moored floating vessel, piling, aid to navigation, or any other manmade obstacle or obstruction.

Tidal wetland: A tidal wetland is a wetland (i.e., water of the United States) that is inundated by tidal waters. The definitions of a wetland and tidal waters can be found at 33 CFR 328.3(b) and 33 CFR 328.3(f), respectively. Tidal waters rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water surface can no longer be practically measured in a predictable rhythm due to masking by other waters, wind, or other effects. Tidal wetlands are located channelward of the high tide line, which is defined at 33 CFR 328.3(d).

Vegetated shallows: Vegetated shallows are special aquatic sites under the 404(b)(1) Guidelines. They are areas that are permanently inundated and under normal circumstances have rooted aquatic vegetation, such as seagrasses in marine and estuarine systems and a variety of vascular rooted plants in freshwater systems.

Waterbody: For purposes of the NWPs, a waterbody is a jurisdictional water of the United States. If a jurisdictional wetland is adjacent – meaning bordering, contiguous, or neighboring – to a waterbody determined to be a water of the United States under 33 CFR 328.3(a)(1)-(6), that waterbody and its adjacent wetlands are considered together as a single aquatic unit (see 33 CFR 328.4(c)(2)). Examples of "waterbodies" include streams, rivers, lakes, ponds, and wetlands.

Final Regional Conditions 2012

NOTICE ABOUT WEB LINKS IN THIS DOCUMENT:
The web links (both internal to our District and any external links to collaborating agencies) in this document are valid at the time of publication. However, the Wilmington District Regulatory Program web page addresses, as with other agency web sites, may change over the timeframe of the five-year Nationwide Permit renewal cycle, in response to policy mandates or technology advances. While we will make every effort to check on the integrity of our web links and provide re-direct pages whenever possible, we ask that you report any broken links to us so we can keep the page information current and usable. We apologize in advanced for any broken links that you may encounter, and we ask that you navigate from the regulatory home page (wetlands and stream permits) of the Wilmington District Corps of Engineers, to the "Permits" section of our web site to find links for pages that cannot be found by clicking directly on the listed web link in this document.

Final 2012 Regional Conditions for Nationwide Permits (NWP) in the Wilmington District

1.0 Excluded Waters

The Corps has identified waters that will be excluded from the use of all NWP's during certain timeframes. These waters are:

1.1 Anadromous Fish Spawning Areas

Waters of the United States identified by either the North Carolina Division of Marine Fisheries (NCDMF) or the North Carolina Wildlife Resources Commission (NCWRC) as anadromous fish spawning areas are excluded during the period between February 15 and June 30, without prior written approval from NCDMF or NCWRC and the Corps.

1.2 Trout Waters Moratorium

Waters of the United States in the twenty-five designated trout counties of North Carolina are excluded during the period between October 15 and April 15 without prior written approval from the NCWRC. (See Section 2.7 for a list of the twenty-five trout counties).

1.3 Sturgeon Spawning Areas as Designated by the National Marine Fisheries Service (NMFS)

Waters of the United States designated as sturgeon spawning areas are excluded during the period between February 1 and June 30, without prior written approval from the NMFS.

* 2.0 Waters Requiring Additional Notification

The Corps has identified waters that will be subject to additional notification requirements for activities authorized by all NWP's. These waters are:

* 2.1 Western NC Counties that Drain to Designated Critical Habitat

For proposed activities within Waters of the U.S. that require a Pre-Construction Notification pursuant to General Condition 31 (PCN) and are located in the sixteen counties listed below, applicants must provide a copy of the PCN to the US Fish and Wildlife Service, 160 Zillicoa Street, Asheville, North Carolina 28801. This PCN must be sent concurrently to the US Fish and Wildlife Service and the Corps Asheville Regulatory Field Office. Please see General Condition 18 for specific notification requirements related to Federally Endangered Species and the following website for information on the location of designated critical habitat.

Counties with tributaries that drain to designated critical habitat that require notification to the Asheville US Fish and Wildlife Service: Avery, Cherokee, Forsyth, Graham, Haywood, Henderson, Jackson, Macon Mecklenburg, Mitchell, Stokes, Surry, Swain, Transylvania, Union and Yancey.

Website and office addresses for Endangered Species Act Information:

The Wilmington District has developed the following website for applicants which provides guidelines on how to review linked websites and maps in order to fulfill NWP general condition 18 requirements: http://www.saw.usace.army.mil/wetlands/ESA

Applicants who do not have internet access may contact the appropriate US Fish and Wildlife Service offices listed below or the US Army Corps of Engineers at (910) 251- 4633:

US Fish and Wildlife Service
Asheville Field Office
160 Zillicoa Street
Asheville, NC 28801
Telephone: (828) 258-3939

Asheville US Fish and Wildlife Service Office counties: All counties west of and including Anson, Stanly, Davidson, Forsyth and Stokes Counties

US Fish and Wildlife Service
Raleigh Field Office
Post Office Box 33726
Raleigh, NC 27636-3726
Telephone: (919) 856-4520

Raleigh US Fish and Wildlife Service Office counties: all counties east of and including Richmond, Montgomery, Randolph, Guilford, and Rockingham Counties.

* **2.2 Special Designation Waters**

Prior to the use of any NWP in any of the following identified waters and contiguous wetlands in North Carolina, applicants must comply with Nationwide Permit General Condition 31 (PCN). The North Carolina waters and contiguous wetlands that require additional notification requirements are:

"Outstanding Resource Waters" (ORW) or "High Quality Waters" (HQW) as designated by the North Carolina Environmental Management Commission; "Inland Primary Nursery Areas" (IPNA) as designated by the NCWRC; "Contiguous Wetlands" as defined by the North Carolina Environmental Management Commission; or "Primary Nursery Areas" (PNA) as designated by the North Carolina Marine Fisheries Commission.

2.3 Coastal Area Management Act (CAMA) Areas of Environmental Concern

Non-federal applicants for any NWP in a designated "Area of Environmental Concern" (AEC) in the twenty (20) counties of Eastern North Carolina covered by the North Carolina Coastal Area Management Act (CAMA) must also obtain the required CAMA permit. Development activities for non-federal projects may not commence until a copy of the approved CAMA permit is furnished to the appropriate Wilmington District Regulatory Field Office (Wilmington Field Office – 69 Darlington Avenue, Wilmington, NC 28403 or Washington Field Office – 2407 West 5th Street, Washington, NC 27889).

* **2.4 Barrier Islands**

Prior to the use of any NWP on a barrier island of North Carolina, applicants must comply with Nationwide Permit General Condition 31 (PCN).

* **2.5 Mountain or Piedmont Bogs**

Prior to the use of any NWP in a Bog classified by the North Carolina Wetland Assessment Methodology (NCWAM), applicants shall comply with Nationwide Permit General Condition 31 (PCN). The latest version of NCWAM is located on the NC DWQ web site at: http://portal.ncdenr.org/web/wq/swp/ws/pdu/ncwam .

* **2.6 Animal Waste Facilities**

Prior to use of any NWP for construction of animal waste facilities in waters of the US, including wetlands, applicants shall comply with Nationwide Permit General Condition 31 (PCN).

* **2.7 Trout Waters**

Prior to any discharge of dredge or fill material into streams or waterbodies within the twenty-five (25) designated trout counties of North Carolina, the applicant shall comply with Nationwide Permit General Condition 31 (PCN). The applicant shall also provide a copy of the notification to the appropriate NCWRC office to facilitate the determination of any potential

impacts to designated Trout Waters. Notification to the Corps of Engineers will include a statement with the name of the NCWRC biologist contacted, the date of the notification, the location of work, a delineation of wetlands, a discussion of alternatives to working in the mountain trout waters, why alternatives were not selected, and a plan to provide compensatory mitigation for all unavoidable adverse impacts to mountain trout waters.

NCWRC and NC Trout Counties

Western Piedmont Region Coordinator	Alleghany	Caldwell	Watauga
20830 Great Smoky Mtn. Expressway	Ashe	Mitchell	Wilkes
Waynesville, NC 28786	Avery	Stokes	
Telephone: (828) 452-2546	Burke	Surry	

Mountain Region Coordinator	Buncombe	Henderson	Polk
20830 Great Smoky Mtn. Expressway	Cherokee	Jackson	Rutherford
Waynesville, NC 28786	Clay	Macon	Swain
Telephone: (828) 452-2546	Graham	Madison	Transylvania
Fax: (828) 452-7772	Haywood	McDowell	Yancey

3.0 List of Corps Regional Conditions for All Nationwide Permits

The following conditions apply to all Nationwide Permits in the Wilmington District:

3.1 Limitation of Loss of Perennial Stream Bed

NWPs may not be used for activities that may result in the loss or degradation of greater than 300 total linear feet of perennial, intermittent or ephemeral stream, unless the District Commander has waived the 300 linear foot limit for ephemeral and intermittent streams on a case-by-case basis and he determines that the proposed activity will result in minimal individual and cumulative adverse impacts to the aquatic environment. Loss of stream includes the linear feet of stream bed that is filled, excavated, or flooded by the proposed activity. Waivers for the loss of ephemeral and intermittent streams must be in writing and documented by appropriate/accepted stream quality assessments*. This waiver only applies to the 300 linear feet threshold for NWPs.

*NOTE: Applicants should utilize the most current methodology prescribed by Wilmington District to assess stream function and quality. Information can be found at:

http://www.saw.usace.army.mil/wetlands/permits/nwp/nwp2012 (see “Quick Links”)

3.2 Mitigation for Loss of Stream Bed

For any NWP that results in a loss of more than 150 linear feet of perennial and/or ephemeral/intermittent stream, the applicant shall provide a mitigation proposal to compensate for more than minimal individual and cumulative adverse impacts to the aquatic environment. For stream losses less than 150 linear feet, that require a PCN, the District Commander may determine, on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effect on the aquatic environment.

3.3 Pre-construction Notification for Loss of Streambed Exceeding 150 Feet.

Prior to use of any NWP for any activity which impacts more than 150 total linear feet of perennial stream or ephemeral/ intermittent stream, the applicant must comply with Nationwide Permit General Condition 31 (PCN). This applies to NWPs that do not have specific notification requirements. If a NWP has specific notification requirements, the requirements of the NWP should be followed.

3.4 Restriction on Use of Live Concrete

For all NWPs which allow the use of concrete as a building material, live or fresh concrete, including bags of uncured concrete, may not come into contact with the water in or entering into waters of the US. Water inside coffer dams or casings that has been in contact with wet concrete shall only be returned to waters of the US when it is no longer poses a threat to aquatic organisms.

3.5 Requirements for Using Riprap for Bank Stabilization

For all NWPs that allow for the use of riprap material for bank stabilization, the following measures shall be applied:

3.5.1. Filter cloth must be placed underneath the riprap as an additional requirement of its use in North Carolina waters.

3.5.2. The placement of riprap shall be limited to the areas depicted on submitted work plan drawings.

3.5.3. The riprap material shall be clean and free from loose dirt or any pollutant except in trace quantities that would not have an adverse environmental effect.

3.5.4. It shall be of a size sufficient to prevent its movement from the authorized alignment by natural forces under normal conditions.

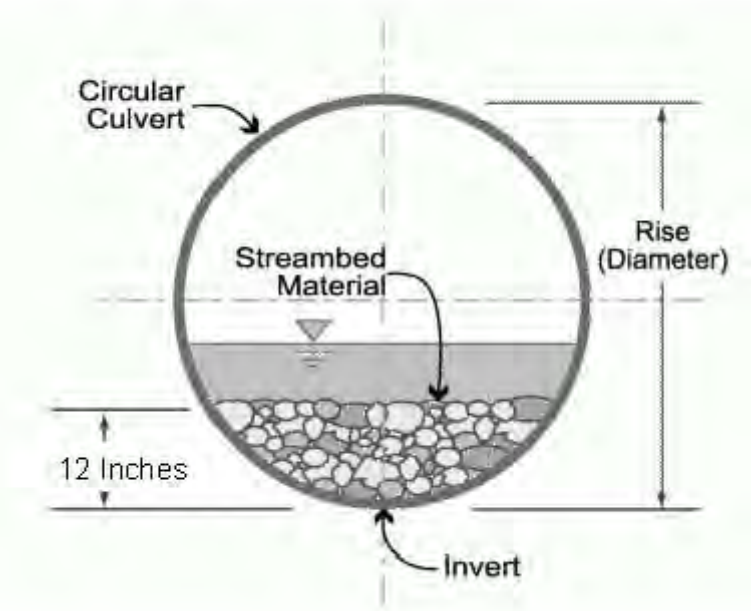
3.5.5. The riprap material shall consist of clean rock or masonry material such as, but not limited to, granite, marl, or broken concrete.

3.5.6. A waiver from the specifications in this Regional Condition may be requested in writing. The waiver will only be issued if it can be demonstrated that the impacts of complying with this Regional condition would result in greater adverse impacts to the aquatic environment.

3.6 Safe Passage Requirements for Culvert Placement

For all NWPs that involve the construction/installation of culverts, measures will be included in the construction/installation that will promote the safe passage of fish and other aquatic organisms. The dimension, pattern, and profile of the stream above and below a pipe or culvert should not be modified by widening the stream channel or by reducing the depth of the stream in connection with the construction activity. The width, height, and gradient of a proposed culvert should be such as to pass the average historical low flow and spring flow without adversely altering flow velocity. Spring flow should be determined from gage data, if available. In the absence of such data, bankfull flow can be used as a comparable level.

In the twenty (20) counties of North Carolina designated as coastal counties by the Coastal Area Management Act (CAMA): All pipes/culverts must be sufficiently sized to allow for the burial of the bottom of the pipe/culvert at least one foot below normal bed elevation when they are placed within the Public Trust Area of Environmental Concern (AEC) and/or the Estuarine Waters AEC as designated by CAMA, and/or all streams appearing as blue lines on United States Geological Survey (USGS) 7.5-minute quadrangle maps.



In all other counties: Culverts greater than 48 inches in diameter will be buried at least one foot below the bed of the stream. Culverts 48 inches in diameter or less shall be buried or placed on the stream bed as practicable and appropriate to maintain aquatic passage, and every effort shall be made to maintain the existing channel slope. The bottom of the culvert must be placed at a

depth below the natural stream bottom to provide for passage during drought or low flow conditions.

Culverts are to be designed and constructed in a manner that minimizes destabilization and head cutting. Destabilizing the channel and head cutting upstream should be considered and appropriate actions incorporated in the design and placement of the culvert.

A waiver from the depth specifications in this condition may be requested in writing. The waiver will be issued if it can be demonstrated that the proposal would result in the least impacts to the aquatic environment.

All counties: Culverts placed within riparian and/or riverine wetlands must be installed in a manner that does not restrict the flow and circulation patterns of waters of the United States. Culverts placed across wetland fills purely for the purposes of equalizing surface water do not have to be buried.

3.7 Notification to NCDENR Shellfish Sanitation Section

Applicants shall notify the NCDENR Shellfish Sanitation Section prior to dredging in or removing sediment from an area closed to shell fishing where the effluent may be released to an area open for shell fishing or swimming in order to avoid contamination from the disposal area and cause a temporary shellfish closure to be made. Such notification shall also be provided to the appropriate Corps of Engineers Regulatory Field Office. Any disposal of sand to the ocean beach should occur between November 1 and April 30 when recreational usage is low. Only clean sand should be used and no dredged sand from closed shell fishing areas may be used. If beach disposal were to occur at times other than stated above or if sand from a closed shell fishing area is to be used, a swimming advisory shall be posted, and a press release shall be issued by the permittee.

3.8 Preservation of Submerged Aquatic Vegetation

Adverse impacts to Submerged Aquatic Vegetation (SAV) are not authorized by any NWP within any of the twenty coastal counties defined by North Carolina's Coastal Area Management Act of 1974 (CAMA).

3.9 Sedimentation and Erosion Control Structures and Measures

3.9.1. All PCNs will identify and describe sedimentation and erosion control structures and measures proposed for placement in waters of the US. The structures and measures should be depicted on maps, surveys or drawings showing location and impacts to jurisdictional wetlands and streams.

GENERAL CERTIFICATION FOR PROJECTS ELIGIBLE FOR U.S. ARMY CORPS OF ENGINEERS NATIONWIDE PERMIT NUMBERS: 3 (MAINTENANCE), 4 (FISH AND WILDLIFE HARVESTING, ENHANCEMENT, AND ATTRACTION DEVICES AND ACTIVITIES), 5 (SCIENTIFIC MEASUREMENT DEVICES—25 CUBIC YARDS FOR WEIRS AND FLUMES), 6 (SURVEY ACTIVITIES—25 CUBIC YARDS FOR TEMPORARY PADS), 7 (OUTFALL STRUCTURES AND ASSOCIATED INTAKE STRUCTURES), 19 (MINOR DREDGING), 20 (OIL SPILL CLEANUP), 22 (REMOVAL OF VESSELS), 25 (STRUCTURAL DISCHARGE), 30(MOIST SOIL MANAGEMENT FOR WILDLIFE), 32 (COMPLETED ENFORCEMENT ACTIONS), 36 (BOAT RAMPS [IN NONWETLAND SITES]), AND REGIONAL PERMIT 197800056 (PIERS, DOCKS AND BOATHOUSES), AND REGIONAL PERMIT 197800125 (BOAT RAMPS) AND RIPARIAN AREA PROTECTION RULES (BUFFER RULES)

Water Quality Certification Number 3883 is issued in conformity with the requirements of Section 401, Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Quality (DWQ) Regulations in 15 NCAC 02H .0500 and 15 NCAC 02B .0200 for the discharge of fill material to waters and wetland areas which are waters of the United States as described in 33 CFR 330 Appendix A (B) (3, 4, 5, 6, 7, 19, 20, 22, 25, 30, 32, and 36) and Regional Permits 197800056 and 19780125 and for the Riparian Area Protection Rules (Buffer Rules) in 15A NCAC 02B .0200.

The State of North Carolina certifies that the specified category of activity will not violate applicable portions of Sections 301, 302, 303, 306 and 307 of the Public Laws 92-500 and 95-217 if conducted in accordance with the conditions hereinafter set forth.

Activities meeting any one (1) of the following thresholds or circumstances require *written approval* for a 401 Water Quality Certification from the Division of Water Quality (the "Division"):

a. Impacts equal to or greater than 40 linear feet of additional permanent stream impact (including stream relocations) at an existing stream impact location; or
b. Temporary or permanent impacts equal to or greater than one-tenth (1/10) of an acre of wetlands; or
c. Any impact associated with a Notice of Violation or an enforcement action for violation(s) of DWQ Wetland Rules (15A NCAC 02H .0500), Isolated Wetland Rules (15A NCAC 02H .1300), DWQ Surface Water or Wetland Standards, or Riparian Buffer Rules (15A NCAC 02B .0200); or
* d. Any impacts to streams and/or buffers in the Neuse, Tar-Pamlico, or Catawba River Basins or in the Randleman, Jordan or Goose Creek Watersheds (or any other basin or watershed with Riparian Area Protection Rules [Buffer Rules] in effect at the time of application) *unless* the activities are listed as "EXEMPT" from these rules or a Buffer Authorization Certificate is issued through N.C. Division of Coastal Management (DCM) delegation for "ALLOWABLE" activities.

* In accordance with North Carolina General Statute 143-215.3D(e), written approval for a 401 Water Quality General Certification must include the appropriate fee. If a project also requires a CAMA Permit, then one payment to both agencies shall be submitted and will be the higher of the two fees.

Activities included in this General Certification that do not meet one of the thresholds listed above do not require written approval from the Division as long as they comply with the Conditions of Certification listed below. If any of these Conditions cannot be met, then written approval from the Division is required.

Conditions of Certification:

1. No Impacts Beyond those Authorized in the Written Approval or Beyond the Threshold of Use of this Certification

   No waste, spoil, solids, or fill of any kind shall occur in wetlands, waters, or riparian areas beyond the footprint of the impacts depicted in the Pre-Construction Notification, as authorized in the written approval from the Division or beyond the thresholds established for use of this Certification without written authorization, including incidental impacts. All construction activities, including the design, installation, operation, and maintenance of sediment and erosion control Best Management Practices shall be performed so that no violations of state water quality standards, statutes, or rules occur. Approved plans and specifications for this project are incorporated by reference and are enforceable parts of this permit.

2. Standard Erosion and Sediment Control Practices

   Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices and if applicable, comply with the specific conditions and requirements of the NPDES Construction Stormwater Permit issued to the site:

   a. Design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal or exceed the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*. The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.

   b. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual.*

   c. Reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act and the Mining Act of 1971.

   d. Sufficient materials required for stabilization and/or repair of erosion control measures and stormwater routing and treatment shall be on site at all times.

   e. If the project occurs in waters or watersheds classified as Primary Nursery Areas (PNAs), SA, WS-I, WS-II, High Quality (HQW), or Outstanding Resource (ORW) waters, then the sedimentation and erosion control designs must comply with the requirements set forth in 15A NCAC 04B .0124, *Design Standards in Sensitive Watersheds.*

3. No Sediment and Erosion Control Measures in Wetlands or Waters

   Sediment and erosion control measures shall not be placed in wetlands or waters. Exceptions to this condition require application submittal to and written approval by the Division. If placement of sediment and erosion control devices in wetlands and waters is unavoidable, then design and placement of temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands, stream beds, or banks, adjacent to or upstream and downstream of the above structures. All sediment and erosion control devices shall be removed and the natural grade restored within two (2) months of the date that the Division of Land Resources (DLR) or locally delegated program has released the specific area within the project.

4. Construction Stormwater Permit NCG010000

   An NPDES Construction Stormwater Permit is required for construction projects that disturb one (1) or more acres of land. This Permit allows stormwater to be discharged during land disturbing construction activities as stipulated in the conditions of the permit. If your project is covered by this permit, full compliance with permit conditions including the erosion & sedimentation control plan, inspections and maintenance, self-monitoring, record keeping and reporting requirements is required. A copy of the general permit (NCG010000), inspection log sheets, and other information may be found at http://portal.ncdenr.org/web/wq/ws/su/npdessw#tab-w .

   The North Carolina Department of Transportation (NCDOT) shall be required to be in full compliance with the conditions related to construction activities within the most recent version of their individual NPDES (NCS000250) stormwater permit.

5. Work in the Dry

   All work in or adjacent to stream waters shall be conducted so that the flowing stream does not come in contact with the disturbed area. Approved best management practices from the most current version of the NC Sediment and Erosion Control Manual, or the NC DOT Construction and Maintenance Activities Manual, such as sandbags, rock berms, cofferdams, and other diversion structures shall be used to minimize excavation in flowing water. Exceptions to this condition require application submittal to and written approval by the Division.

6. Construction Moratoriums and Coordination

   If activities must occur during periods of high biological activity (i.e. sea turtle nesting, fish spawning, or bird nesting), then biological monitoring may be required at the request of other state or federal agencies and coordinated with these activities.

   All moratoriums on construction activities established by the NC Wildlife Resources Commission (WRC), US Fish and Wildlife Service (USFWS), NC Division of Marine Fisheries (DMF), or National Marine Fisheries Service (NMFS) to lessen impacts on trout, anadromous fish, larval/post-larval fishes and crustaceans, or other aquatic species of concern shall be implemented. Exceptions to this condition require written approval by the resource agency responsible for the given moratorium.

   Work within the twenty-five (25) designated trout counties or identified state or federal endangered or threatened species habitat shall be coordinated with the appropriate WRC, USFWS, NMFS, and/or DMF personnel.

7. Riparian Area Protection Rules (Buffer Rules)

   Activities located in the protected riparian areas (whether jurisdictional wetlands or not), within the Neuse, Tar-Pamlico, or Catawba River Basins or in the Randleman, Jordan, or Goose Creek Watersheds (or any other basin or watershed with buffer rules) shall be limited to "uses" identified within and constructed in accordance with 15A NCAC 02B .0233, .0259, .0243, .0250, .0267 and .0605, and shall be located, designed, constructed, and maintained to have minimal disturbance to protect water quality to the maximum extent practicable through the use of best management practices. All buffer rule requirements, including diffuse flow requirements, must be met.

8. Placement of Culverts and Other Structures in Waters and Wetlands

   Culverts required for this project shall be designed and installed in such a manner that the original stream profiles are not altered and allow for aquatic life movement during low flows. Existing stream dimensions (including the cross section dimensions, pattern, and longitudinal profile) must be maintained above and below locations of each culvert.

   Placement of culverts and other structures in waters and streams must be below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than or equal to 48 inches, to allow low flow passage of water and aquatic life.

   When topographic constraints indicate culvert slopes of greater than 5%, culvert burial is not required, provided that all alternative options for flattening the slope have been investigated and aquatic life movement/ connectivity has been provided when possible (rock ladders, crossvanes, etc). Notification to the Division including supporting documentation to include a location map of the culvert, culvert profile drawings, and slope calculations shall be provided to the Division 60 days prior to the installation of the culvert.

   When bedrock is present in culvert locations, culvert burial is not required provided that there is sufficient documentation of the presence of bedrock. Notification to the Division including supporting documentation such as, but not limited to, a location map of the culvert, geotechnical reports, photographs, etc shall be provided to the Division a minimum of 60 days prior to the installation of the culvert. If bedrock is discovered during construction, then the Division shall be notified by phone or email within 24 hours of discovery.

   If other site-specific topographic constraints preclude the ability to bury the culverts as described above and/or it can be demonstrated that burying the culvert would result in destabilization of the channel, then exceptions to this condition require application submittal to, and written approval by, the Division of Water Quality, regardless of the total impacts to streams or wetlands from the project.

   Installation of culverts in wetlands must ensure continuity of water movement and be designed to adequately accommodate high water or flood conditions. Additionally, when roadways, causeways, or other fill projects are constructed across FEMA-designated floodways or wetlands, openings such as culverts or bridges must be provided to maintain the natural hydrology of the system as well as prevent constriction of the floodway that may result in destabilization of streams or wetlands.

   The establishment of native, woody vegetation and other soft stream bank stabilization techniques must be used where practicable instead of riprap or other bank hardening methods.

9. If concrete is used during the construction, then all necessary measures shall be taken to prevent direct contact between uncured or curing concrete and waters of the state. Water that inadvertently contacts uncured concrete shall not be discharged to waters of the state due to the potential for elevated pH and possible aquatic life/ fish kills.

10. Applications for riprap groins proposed in accordance with 15A NCAC 07H .1401 (NC Division of Coastal Management General Permit for construction of Wooden and Riprap Groins in Estuarine and Public Trust Waters) must meet all the specific conditions for design and construction specified in 15A NCAC 07H .1405.

11. Bridge deck drains shall not discharge directly into the stream. Stormwater shall be directed across the bridge and pre-treated through site-appropriate means (grassed swales, pre-formed scour holes, vegetated buffers, etc.) before entering the stream. Please refer to the most current version of *Stormwater Best Management Practices*. Exceptions to this condition require written approval by the Division.

* 12. Compensatory Mitigation

    In accordance with 15A NCAC 02H .0506 (h), compensatory mitigation may be required for losses of equal to or greater than 150 linear feet of streams (intermittent and perennial) and/or equal to or greater than one (1) acre of wetlands. For linear public transportation projects, impacts equal to or exceeding 150 linear feet per stream shall require mitigation.

    Buffer mitigation may be required for any project with Buffer Rules in effect at the time of application for activities classified as "Allowable with Mitigation" or "Prohibited" within the Table of Uses.

    A determination of buffer, wetland, and stream mitigation requirements shall be made for any General Water Quality Certification for this Nationwide and/or Regional General Permit. Design and monitoring protocols shall follow the US Army Corps of Engineers Wilmington District *Stream Mitigation Guidelines* (April 2003) or its subsequent updates. Compensatory mitigation plans shall be submitted to the Division for written approval as required in those protocols. The mitigation plan must be implemented and/or constructed before any impacts occur on site. Alternatively, the Division will accept payment into an in-lieu fee program or a mitigation bank. In these cases, proof of payment shall be provided to the Division before any impacts occur on site.

13. All temporary fill and culverts shall be removed and the impacted area returned to natural conditions within 60 days of the determination that the temporary impact is no longer necessary. The impacted areas shall be restored to original grade, including each stream's original cross sectional dimensions, plan form pattern, and longitudinal bed and bed profile, and the various sites shall be stabilized with natural woody vegetation (except for the approved maintenance areas) and restored to prevent erosion.

14. All temporary pipes/ culverts/ riprap pads etc, shall be installed in all streams as outlined in the most recent edition of the *North Carolina Sediment and Erosion Control Planning and Design Manual* or the *North Carolina Surface Mining Manual* so as not to restrict stream flow or cause dis-equilibrium during use of this General Certification.

15. Any riprap required for proper culvert placement, stream stabilization, or restoration of temporarily disturbed areas shall be restricted to the area directly impacted by the approved construction activity. All rip-rap shall buried and/or "keyed in" such that the original stream elevation and streambank contours are restored and maintained. Placement of rip-rap or other approved materials shall not result in de-stabilization of the stream bed or banks upstream or downstream of the area.

16. Any rip-rap used for stream stabilization shall be of a size and density so as not to be able to be carried off by wave, current action, or stream flows and consist of clean rock or masonry material free of debris or toxic pollutants. Rip-rap shall not be installed in the streambed except in specific areas required for velocity control and to ensure structural integrity of bank stabilization measures.

17. A one-time application of fertilizer to re-establish vegetation is allowed in disturbed areas including riparian buffers, but is restricted to no closer than 10 feet from top of bank of streams. Any fertilizer application must comply with all other Federal, State and Local regulations.

* 18. If an environmental document is required under the National or State Environmental Policy Act (NEPA or SEPA), then this General Certification is not valid until a Finding of No Significant Impact (FONSI) or Record of Decision (ROD) is issued by the State Clearinghouse.

19. In the twenty (20) coastal counties, the appropriate DWQ Regional Office must be contacted to determine if Coastal Stormwater Regulations will be required.

20. This General Certification does not relieve the applicant of the responsibility to obtain all other required Federal, State, or Local approvals.

21. The applicant/permittee and their authorized agents shall conduct all activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act), and any other appropriate requirements of State and Federal Law. If the Division determines that such standards or laws are not being met, including failure to sustain a designated or achieved use, or that State or Federal law is being violated, or that further conditions are necessary to assure compliance, then the Division may reevaluate and modify this General Water Quality Certification.

* 22. When written authorization is required for use of this certification, upon completion of all permitted impacts included within the approval and any subsequent modifications, the applicant shall be required to return the certificate of completion attached to the approval. One copy of the certificate shall be sent to the DWQ Central Office in Raleigh at 1650 Mail Service Center, Raleigh, NC, 27699-1650.

23. Additional site-specific conditions, including monitoring and/or modeling requirements, may be added to the written approval letter for projects proposed under this Water Quality Certification in order to ensure compliance with all applicable water quality and effluent standards.

24. This certification grants permission to the director, an authorized representative of the Director, or DENR staff, upon the presentation of proper credentials, to enter the property during normal business hours.

This General Certification shall expire on the same day as the expiration date of the corresponding Nationwide and/or Regional General Permit. The conditions in effect on the date of issuance of Certification for a specific project shall remain in effect for the life of the project, regardless of the expiration date of this Certification.

Non-compliance with or violation of the conditions herein set forth by a specific project may result in revocation of this General Certification for the project and may also result in criminal and/or civil penalties.

The Director of the North Carolina Division of Water Quality may require submission of a formal application for Individual Certification for any project in this category of activity if it is determined that the project is likely to have a significant adverse effect upon water quality, including state or federally listed endangered or threatened aquatic species, or degrade the waters so that existing uses of the wetland or downstream waters are precluded.

Public hearings may be held for specific applications or group of applications prior to a Certification decision if deemed in the public's best interest by the Director of the North Carolina Division of Water Quality.

Effective date: March 19, 2012

DIVISION OF WATER QUALITY

By

for

Charles Wakild, P.E.

Director

History Note: Water Quality Certification (WQC) Number 3883 issued March 19, 2012 replaces WQC Number 3687 issued November 1, 2007; WQC Number 3624 issued March 19, 2007; WQC Number 3494 issued December 31, 2004; and WQC Number 3376 issued March 18, 2002. This General Certification is rescinded when the Corps of Engineers reauthorizes any of the corresponding Nationwide and/or Regional General Permits or when deemed appropriate by the Director of the Division of Water Quality.

County : Carteret

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	455.4 SY		
0003	1519000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5B	38.3 TON		
0004	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	2.3 TON		
0005	3215000000-N	862	GUARDRAIL ANCHOR UNITS, TYPE III	4 EA		
0006	3345000000-E	864	REMOVE & RESET EXISTING GUARD-RAIL	912.5 LF		
0007	4400000000-E	1110	WORK ZONE SIGNS (STATIONARY)	298 SF		
0008	4405000000-E	1110	WORK ZONE SIGNS (PORTABLE)	378 SF		
0009	4410000000-E	1110	WORK ZONE SIGNS (BARRICADE MOUNTED)	124 SF		
0010	4415000000-N	1115	FLASHING ARROW BOARD	2 EA		
0011	4420000000-N	1120	PORTABLE CHANGEABLE MESSAGE SIGN	3 EA		
0012	4422000000-N	1120	PORTABLE CHANGEABLE MESSAGE SIGN (SHORT TERM)	42 DAY		
0013	4430000000-N	1130	DRUMS	289 EA		
0014	4435000000-N	1135	CONES	20 EA		
0015	4445000000-E	1145	BARRICADES (TYPE III)	184 LF		
0016	4455000000-N	1150	FLAGGER	100 DAY		
0017	4480000000-N	1165	TMA	2 EA		
0018	4510000000-N	SP	LAW ENFORCEMENT	64 HR		
0019	4516000000-N	1180	SKINNY DRUM	105 EA		

County : Carteret

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0020	4520000000-N	1266	TUBULAR MARKERS (FIXED)	95 EA		
0021	4650000000-N	1251	TEMPORARY RAISED PAVEMENT MARKERS	115 EA		
0022	4685000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)	100 LF		
0023	4686000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)	1,426 LF		
0024	4770000000-E	1205	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV)	1,835 LF		
0025	4810000000-E	1205	PAINT PAVEMENT MARKING LINES (4")	47,865 LF		
0026	4820000000-E	1205	PAINT PAVEMENT MARKING LINES (8")	870 LF		
0027	4847000000-E	1205	POLYUREA PAVEMENT MARKING LINES (4", **********) (HIGHLY REFLECTIVE ELEMENTS)	17,345 LF		
0028	4847110000-E	1205	POLYUREA PAVEMENT MARKING LINES (8", **********) (HIGHLY REFLECTIVE ELEMENTS)	356 LF		
0029	4850000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (4")	28,198 LF		
0030	4860000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (8")	340 LF		
0031	4900000000-N	1251	PERMANENT RAISED PAVEMENT MARKERS	165 EA		
0032	4905000000-N	1253	SNOWPLOWABLE PAVEMENT MARKERS	15 EA		

STRUCTURE ITEMS

0033	8161000000-E	420	GROOVING BRIDGE FLOORS	218,738 SF		
0034	8296000000-N	442	POLLUTION CONTROL	Lump Sum	L.S.	

County : Carteret

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0035	8559000000-E	SP	CLASS II, SURFACE PREPARATION	17.6 SY		
0036	8664000000-E	SP	SHOTCRETE REPAIRS	951.3 CF		
0037	8678000000-E	SP	EPOXY RESIN INJECTION	1,015 LF		
0038	8860000000-N	SP	GENERIC STRUCTURE ITEM MOOREHEAD CITY LIGHTING SYSTEM	Lump Sum	L.S.	
0039	8860000000-N	SP	GENERIC STRUCTURE ITEM PAINTING CONTAINMENT	Lump Sum	L.S.	
0040	8860000000-N	SP	GENERIC STRUCTURE ITEM REMOVAL OF EXISTING FENDER SYSTEM	Lump Sum	L.S.	
0041	8867000000-E	SP	GENERIC STRUCTURE ITEM 10" X 10" COMPOSITE LUMBER	4,032 LF		
0042	8867000000-E	SP	GENERIC STRUCTURE ITEM 14" COMPOSITE PILES	10,440 LF		
0043	8867000000-E	SP	GENERIC STRUCTURE ITEM 2" X 12" PLASTIC LUMBER	1,045.3 LF		
0044	8867000000-E	SP	GENERIC STRUCTURE ITEM 2" X 6" PLASTIC LUMBER	1,792 LF		
0045	8867000000-E	SP	GENERIC STRUCTURE ITEM 4" X 6" PLASTIC LUMBER	336 LF		
0046	8867000000-E	SP	GENERIC STRUCTURE ITEM 6" X 10" PLASTIC LUMBER	448 LF		
0047	8867000000-E	SP	GENERIC STRUCTURE ITEM BRIDGE JOINT REMOVAL	280.3 LF		
0048	8867000000-E	SP	GENERIC STRUCTURE ITEM CPJACKET (MONITORING)	26 LF		
0049	8867000000-E	SP	GENERIC STRUCTURE ITEM CPJACKET (NON MONITORING)	965 LF		
0050	8867000000-E	SP	GENERIC STRUCTURE ITEM PILE ENCAPSULATION	480 LF		
0051	8867000000-E	SP	GENERIC STRUCTURE ITEM SILICONE JOINT SEALANT	280.3 LF		

County : Carteret

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0052	8867000000-E	SP	GENERIC STRUCTURE ITEM TWO BAR METAL RAIL	9,190.6 LF		
0053	8867000000-E	SP	GENERIC STRUCTURE ITEM WIRE ROPE FOR FENDER SYSTEM	3,680 LF		
0054	8881000000-E	SP	GENERIC STRUCTURE ITEM PPC MATERIALS	714.2 CY		
0055	8882000000-E	SP	GENERIC STRUCTURE ITEM PRESTRESSED CONCRETE GIRDER REPAIR	1,100.5 CF		
0056	8889000000-E	SP	GENERIC STRUCTURE ITEM HARDWARE	24,302 LB		
0057	8892000000-E	SP	GENERIC STRUCTURE ITEM EPOXY COATING	18,428.6 SF		
0058	8892000000-E	SP	GENERIC STRUCTURE ITEM FRP STRENGTHENING SYSTEM	560 SF		
0059	8892000000-E	SP	GENERIC STRUCTURE ITEM TSA, FULL LENGTH (MONITORING)	773.8 SF		
0060	8892000000-E	SP	GENERIC STRUCTURE ITEM TSA, FULL LENGTH (NON MONITORING)	45,717.8 SF		
0061	8892000000-E	SP	GENERIC STRUCTURE ITEM TSA, PARTIAL LENGTH (MONITORING)	602.7 SF		
0062	8892000000-E	SP	GENERIC STRUCTURE ITEM TSA, PARTIAL LENGTH (NON MONITORING)	32,398.7 SF		
0063	8893000000-E	SP	GENERIC STRUCTURE ITEM PLACING AND FINISHING PPC OVERLAY	25,722 SY		
0064	8893000000-E	SP	GENERIC STRUCTURE ITEM SCARIFYING BRIDGE DECK	25,722 SY		
0065	8893000000-E	SP	GENERIC STRUCTURE ITEM SHOTBLASTING BRIDGE DECK	25,722 SY		
0066	8897000000-N	SP	GENERIC STRUCTURE ITEM ALTERNATE OUTRIGGER MOUNTING	15 EA		

County : Carteret

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0067	8897000000-N	SP	GENERIC STRUCTURE ITEM BRIDGE JACKING	3 EA		
0068	8897000000-N	SP	GENERIC STRUCTURE ITEM BRIDGE JACKING FOR SPAN RE-POSITIONING	2 EA		
0069	8897000000-N	SP	GENERIC STRUCTURE ITEM BRIDGE LIGHT STANDARDS	15 EA		
0070	8897000000-N	SP	GENERIC STRUCTURE ITEM BULK ANODE	156 EA		
0071	8897000000-N	SP	GENERIC STRUCTURE ITEM CLEANING AND PAINTING OF EXISTING BEARINGS WITH HRCSA	590 EA		
0072	8897000000-N	SP	GENERIC STRUCTURE ITEM MAINLAND LIGHT STANDARDS	6 EA		
0073	8897000000-N	SP	GENERIC STRUCTURE ITEM REMOVE LIGHT STANDARD FROM FOUNDATION	5 EA		
0074	8897000000-N	SP	GENERIC STRUCTURE ITEM REMOVE LIGHT STANDARD FOUNDATION	6 EA		
0075	8897000000-N	SP	GENERIC STRUCTURE ITEM REMOVE LIGHT STANDARD FROM OUTRIGGER	15 EA		
0076	8897000000-N	SP	GENERIC STRUCTURE ITEM REPALCEMENT OF BRIDGE BEARINGS, TYPE (P2)	10 EA		
0077	8897000000-N	SP	GENERIC STRUCTURE ITEM REPLACEMENT OF BRIDGE BEARINGS, TYPE (P3)	10 EA		
0078	8897000000-N	SP	GENERIC STRUCTURE ITEM REPLACEMENT OF BRIDGE BEARINGS. TYPE (P1)	8 EA		
0079	8897000000-N	SP	GENERIC STRUCTURE ITEM RESET BEARINGS	3 EA		
0080	8897000000-N	SP	GENERIC STRUCTURE ITEM ROADWAY LIGHT STANDARD LUMINAIRE-220W LED	21 EA		

County : Carteret

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0081	8897000000-N	SP	GENERIC STRUCTURE ITEM SPAN RE-POSITIONING	2 EA		
0082	8897000000-N	SP	GENERIC STRUCTURE ITEM SPLICING OF PRESTRESSING STRAND	40 EA		
0083	8897000000-N	SP	GENERIC STRUCTURE ITEM STANDARD FOUNDATION, TYPE R1	4 EA		
0084	8897000000-N	SP	GENERIC STRUCTURE ITEM STANDARD FOUNDATION, TYPE R2	2 EA		

0901/Apr11/Q558148.2/D590812210000/E84 **Total Amount Of Bid For Entire Project :**