

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

C203398

CONTRACT AND
CONTRACT BONDS

FOR CONTRACT NO. C203398

WBS 34817.3.S8 STATE FUNDED

T.I.P NO. U-2519CB

COUNTY OF CUMBERLAND

THIS IS THE ROADWAY & STRUCTURE CONTRACT

ROUTE NUMBER LENGTH 6.725 MILES

LOCATION FAYETTEVILLE OUTER LOOP FROM SOUTH OF SR-1400 (CLIFFDALE RD)
TO EAST OF SR-1007 (ALL AMERICAN FREEWAY).

CONTRACTOR CONTI ENTERPRISES, INC

ADDRESS 2045 LINCOLN HIGHWAY

EDISON, NJ 08817

BIDS OPENED AUGUST 19, 2014

CONTRACT EXECUTION SEP 22 2014

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

PROPOSAL

DATE AND TIME OF BID OPENING: **AUGUST 19, 2014 AT 2:00 PM**

CONTRACT ID C203398
WBS 34817.3.S8

FEDERAL-AID NO. STATE FUNDED
COUNTY CUMBERLAND
T.I.P. NO. U-2519CB
MILES 6.725
ROUTE NO.

LOCATION FAYETTEVILLE OUTER LOOP FROM SOUTH OF SR-1400 (CLIFFDALE RD)
TO EAST OF SR-1007 (ALL AMERICAN FREEWAY).

TYPE OF WORK GRADING, DRAINAGE, PAVING, AND STRUCTURES.

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 ROADWAY & STRUCTURE PROPOSAL

5% BID BOND OR BID DEPOSIT REQUIRED

**PROPOSAL FOR THE CONSTRUCTION OF
CONTRACT No. C203398 IN CUMBERLAND 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. **C203398**; 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. **C203398** in **Cumberland 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.

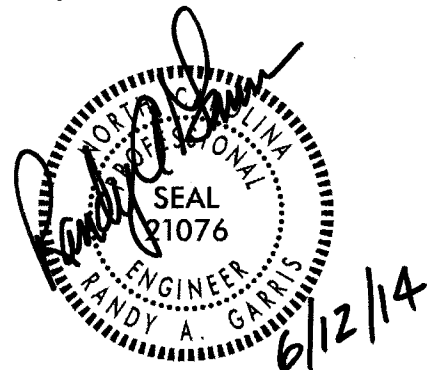
The published volume entitled *North Carolina Department of Transportation, Raleigh, Standard Specifications for Roads and Structures, January 2012* with all amendments and supplements thereto, is by reference incorporated into and made a part of this contract; that, except as herein modified, all the 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

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

(8-15-00) (Rev. 12-18-07)

108

SP1 G07 A

The date of availability for this contract is **September 29, 2014**, 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 **March 29, 2019**.

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 Hundred Dollars (\$200.00)** per calendar day. These liquidated damages will not be cumulative with any liquidated damages which may become chargeable under Intermediate Contract Time Number 1.

INTERMEDIATE CONTRACT TIME NUMBER 1 AND LIQUIDATED DAMAGES:

(7-1-95) (Rev. 2-21-12)

108

SP1 G13 A

Except for that work required under the Project Special Provisions entitled *Planting, Reforestation* and/or *Permanent Vegetation Establishment*, included elsewhere in this proposal, the Contractor will be required to complete all work included in this contract and shall place and maintain traffic on same.

The date of availability for this intermediate contract time is **September 29, 2014**.

The completion date for this intermediate contract time is **October 1, 2018**.

The liquidated damages for this intermediate contract time are **Five Thousand Dollars (\$5,000.00)** per calendar day.

Upon apparent completion of all the work required to be completed by this intermediate date, a final inspection will be held in accordance with Article 105-17 and upon acceptance, the Department will assume responsibility for the maintenance of all work except *Planting, Reforestation* and/or *Permanent Vegetation Establishment*. The Contractor will be responsible for and shall make corrections of all damages to the completed roadway caused by his planting operations, whether occurring prior to or after placing traffic through the project.

INTERMEDIATE CONTRACT TIME NUMBER 2 AND LIQUIDATED DAMAGES:

(2-20-07)

108

SPI 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 **ANY ROAD** during the following time restrictions:

DAY AND TIME RESTRICTIONS**Monday through Friday****5:00 AM to 9:00 AM****and****4:00 PM to 6:00 PM**

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

If **Independence Day** is on a Friday, Saturday, Sunday or Monday, then between the hours of **5:00 AM** the Thursday before Independence Day and **6:00 PM** the Tuesday after Independence Day.
6. For **Labor Day**, between the hours of **5:00 AM** Friday and **6:00 PM** Tuesday.
7. For **Thanksgiving Day**, between the hours of **5:00 AM** Tuesday and **6:00 PM** Monday.
8. For **Christmas**, between the hours of **5:00 AM** the Friday before the week of Christmas Day and **6:00 PM** the following Tuesday after the week of Christmas Day.
9. For the **Fort Bragg Fair** occurring at the **Fort Bragg Fairgrounds**, between **24 hours before the start** and **24 hours after the end of the Fort Bragg Fair**.

10. For **Oktoberfest**, between **24 hours before the start** and **24 hours after the end of Oktoberfest**.
11. For **The All American Marathon**, between **24 hours before the start** and **24 hours after the end of the marathon**.

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 Fifty Dollars (\$1,250.00)** per **fifteen (15)-minute time period**.

INTERMEDIATE CONTRACT TIME NUMBER 3 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 **Cliffdale Road (-Y5-)** for the purpose of **Overhead Girder Installation** during the following time restrictions:

DAY AND TIME RESTRICTIONS

**Monday through Sunday
5:00 AM to 9:00 PM**

The time of availability for this intermediate contract time will be the time the Contractor begins to install traffic control devices required for road 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 road 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 4 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 **All American Freeway** for the purpose of **Overhead Girder Installation** during the following time restrictions:

DAY AND TIME RESTRICTIONS**4:00 AM Monday to 9:00 PM Friday**

The time of availability for this intermediate contract time will be the time the Contractor begins to install traffic control devices required for road 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 road 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 5 AND LIQUIDATED DAMAGES:

(2-20-07) (Rev. 6-18-13)

108

SP1 G14 F

The Contractor shall complete the work required of **Area 2, Phase I, Step 5** as shown on Sheet **TMP-12** and shall place and maintain traffic on same.

The time of availability for this intermediate contract time is the **Friday at 11:00 PM** that the Contractor elects to begin the work.

The completion time for this intermediate contract time is the following **Monday at 5:00 AM** after the time of availability.

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

INTERMEDIATE CONTRACT TIME NUMBER 6 AND LIQUIDATED DAMAGES:

(2-20-07) (Rev. 6-18-13)

108

SP1 G14 F

The Contractor shall complete the work required of **Area 2, Phase I, Step 10** as shown on Sheet **TMP-12** and shall place and maintain traffic on same.

The time of availability for this intermediate contract time is the **Friday at 11:00 PM** that the Contractor elects to begin the work.

The completion time for this intermediate contract time is the following **Monday at 5:00 AM** after the time of availability.

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

INTERMEDIATE CONTRACT TIME NUMBER 7 AND LIQUIDATED DAMAGES:

(2-20-07) (Rev. 6-18-13)

108

SP1 G14 H

The Contractor shall complete the work required of **Area 2, Phase II, Step 2 thru Step 5** as shown on Sheet **TMP- 12** and shall place and maintain traffic on same.

The date of availability for this intermediate contract time is the **Friday at 9:00 PM** that the Contractor elects to begin the work.

The completion date for this intermediate contract time is the date which is **seventeen (17)** consecutive calendar days at **5:00 AM** after and including the date the Contractor begins this work.

The liquidated damages are **Two Thousand Five Hundred Dollars (\$2,500.00)** per calendar day.

PERMANENT VEGETATION ESTABLISHMENT:

(2-16-12) (Rev. 10-15-13)

104

SP1 G16

Establish a permanent stand of the vegetation mixture shown in the contract. During the period between initial vegetation planting and final project acceptance, perform all work necessary to establish permanent vegetation on all erodible areas within the project limits, as well as, in borrow and waste pits. This work shall include erosion control device maintenance and installation, repair seeding and mulching, supplemental seeding and mulching, mowing, and fertilizer topdressing, as directed. All work shall be performed in accordance with the applicable section of the *2012 Standard Specifications*. All work required for initial vegetation planting shall be performed as a part of the work necessary for the completion and acceptance of the Intermediate Contract Time (ICT). Between the time of ICT and Final Project acceptance, or otherwise referred to as the vegetation establishment period, the Department will be responsible for preparing the required National Pollutant Discharge Elimination System (NPDES) inspection records.

Once the Engineer has determined that the permanent vegetation establishment requirement has been achieved at an 80% vegetation density (the amount of established vegetation per given area to stabilize the soil) and no erodible areas exist within the project limits, the Contractor will be notified to remove the remaining erosion control devices that are no longer needed. The Contractor will be responsible for, and shall correct any areas disturbed by operations performed in permanent vegetation establishment and the removal of temporary erosion control measures, whether occurring prior to or after placing traffic on the project.

Payment for *Response for Erosion Control, Seeding and Mulching, Repair Seeding, Supplemental Seeding, Mowing, Fertilizer Topdressing, Silt Excavation, and Stone for Erosion Control* will be made at contract unit prices for the affected items. Work required that is not represented by contract line items will be paid in accordance with Articles 104-7 or 104-3 of the *2012 Standard Specifications*. No additional compensation will be made for maintenance and removal of temporary erosion control items.

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 at Wednesday, July 16, 2014 at 10:00 am.

Cumberland County Maintenance Yard
549 Transportation Drive
Fayetteville, NC 28301
910-486-1421

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.

MAJOR CONTRACT ITEMS:

(2-19-02)

104

SPI G28

The following listed items are the major contract items for this contract (see Article 104-5 of the 2012 *Standard Specifications*):

Line #	Description
7	Unclassified Excavation
390	Reinforced Concrete Deck Slab
394	Class A Concrete (Bridge)

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
3	Temporary Guard Building
4	Temporary Sprung Structure
135 thru 148	Guardrail and Guiderail
149 thru 154	Fencing
159 thru 182	Signing
206 thru 217 and 223 thru 226	Long-Life Pavement Markings
218	Removable Tape
231 thru 232	Permanent Pavement Markers
235 thru 260	Lighting
261 thru 266	Utility Construction
267 thru 303 And 305 thru 307	Erosion Control and Reforestation
304	Reforestation
308 thru 355	Signals/ITS System

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 **\$2.9971** 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

PAYOUT SCHEDULE:

(1-19-10) (Rev. 1-17-12)

108

SP1 G57

Submit an Anticipated Monthly Payout Schedule prior to beginning construction. The Anticipated Monthly Payout Schedule will be used by the Department to monitor funding levels for this project. Include a monthly percentage breakdown (in terms of the total contract amount) of the work anticipated to be completed. The schedule should begin with the date the Contractor plans to begin construction and end with the anticipated completion date. Submit updates of the Anticipated Monthly Payout Schedule on March 15, June 15, September 15, and December 15 of each calendar year until project acceptance. Submit the original Anticipated Monthly Payout Schedule and all subsequent updates to the Resident Engineer with a copy to the State Construction Engineer at 1 South Wilmington Street, 1543 Mail Service Center, Raleigh, NC 27699-1543.

SCHEDULE OF ESTIMATED COMPLETION PROGRESS:

(7-15-08) (Rev. 5-20-14)

108-2

SP1 G58

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

<u>Fiscal Year</u>		<u>Progress (% of Dollar Value)</u>
2015	(7/01/14 - 6/30/15)	27% of Total Amount Bid
2016	(7/01/15 - 6/30/16)	31% of Total Amount Bid
2017	(7/01/16 - 6/30/17)	23% of Total Amount Bid
2018	(7/01/17 - 6/30/18)	16% of Total Amount Bid
2019	(7/01/18 - 6/30/19)	3% 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. 12-17-13)

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.
<http://www.ncdot.org/doh/forms/files/DBE-IS.xls>

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

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

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

MBE and WBE Goal

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

(A) Minority Business Enterprises 5.0%

- (1) *If the MBE goal is more than zero*, the 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 5.0%

- (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://partner.ncdot.gov/VendorDirectory/default.html>

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

Listing of MBE/WBE Subcontractors

At the time of bid, 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 12:00 noon 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 12:00 noon 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 12:00 noon 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 12:00 noon on the next official state business day.

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 12:00 noon of 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 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 who have the capability to perform the work of the contract. 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 MBEs/WBEs with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.
- (D)
 - (1) Negotiating in good faith with interested MBEs/WBEs. It is the 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 Development Manager in the Business Opportunity and Work Force Development Unit 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 Contractor Utilization 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 not count toward the MBE contract goal requirement. Again, the same holds true for the work that a WBE subcontracts to a non-WBE firm. If a MBE or WBE contractor or subcontractor subcontracts a significantly greater portion of the work of the contract than would be expected on the basis of standard industry practices, it shall be presumed that the MBE or WBE is not performing a commercially useful function. The MBE/WBE may present evidence to rebut this presumption to the Department. The Department's decision on the rebuttal of this presumption may be subject to review by the Office of Inspector General, NCDOT.

(D) Joint Venture

When a MBE or WBE performs as a participant in a joint venture, the 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.

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.

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.

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.

(A) Electronic Bids Reporting

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

(B) Paper Bids Reporting

The Contractor shall report the accounting of payments on the Department's DBE-IS (*Subcontractor Payment Information*) with each invoice. Invoices will not be processed for payment until the DBE-IS is received.

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 D

Subsurface information is available on the roadway and structure portions of this project.

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.

RESOURCE CONSERVATION:

(5-21-13)

104-13

SP1 G118

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

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

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

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

DOMESTIC STEEL:

(4-16-13)

106

SP1 G120

Revise the *2012 Standard Specifications* as follows:

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

All steel and iron products that are permanently incorporated into this project shall be produced in the United States except minimal amounts of foreign steel and iron products may be used provided the combined material cost of the items involved does not exceed 0.1% of the total amount bid for the entire project or \$2,500, whichever is greater. 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.

PORTABLE CONCRETE BARRIER - (Partial Payments for Materials):

(7-1-95) (Rev. 8-16-11)

1170-4

SP1 G121

When so authorized by the Engineer, partial materials payments will be made up to 95 percent of the delivered cost of portable concrete barrier, provided that these materials have been delivered on the project and stored in an acceptable manner, and further provided the documents listed in Subarticle 109-5(C) of the *2012 Standard Specifications* have been furnished to the Engineer.

The provisions of Subarticle 109-5(B) of the *2012 Standard Specifications* will apply to the portable concrete barrier.

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.

COOPERATION BETWEEN CONTRACTORS:

(7-1-95)

105-7

SP1 G133

The Contractor's attention is directed to Article 105-7 of the *2012 Standard Specifications*.

Currently under construction U-2519DA (C-202829) located within the project limits of this project will not be completed prior to letting U-2519CB.

X-0002CC located on the east end of this project is scheduled to be let for construction during the contract time of U-2519CB.

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

BID DOCUMENTATION:

(1-1-02) (Rev. 9-18-12)

103

SP1 G142

General

The successful Bidder (Contractor) shall submit the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation used to prepare the bid for this contract to the Department within 10 days after receipt of notice of award of contract. Such documentation shall be placed in escrow with a banking institution or other bonded document storage facility selected by the Department.

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

Terms

Bid Documentation - Bid Documentation shall mean all written information, working papers, computer printouts, electronic media, charts, and all other data compilations which contain or reflect information, data, and calculations used by the Bidder in the preparation of the bid. The term *bid documentation* includes, but is not limited to, contractor equipment rates, contractor overhead rates, labor rates, efficiency or productivity factors, arithmetical calculations, and quotations from subcontractors and material suppliers to the extent that such rates and quotations were used by the Bidder in formulating and determining the bid. The term *bid documentation* also includes any manuals, which are standard to the industry used by the Bidder in determining the bid. Such manuals may be included in the bid documentation by reference. Such reference shall include the name and date of the publication and the publisher. *Bid Documentation* does not include bid documents provided by the Department for use by the Bidder in bidding on this project.

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

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

Escrow Agreement Information

A copy of the Escrow Agreement will be mailed to the Bidder with the notice of award for informational purposes. The Bidder and Department will sign the actual Escrow Agreement at the time the bid documentation is delivered to the escrow agent.

Failure to Provide Bid Documentation

The Bidder's failure to provide the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation within 10 days after the notice of award is received by him may be just cause for rescinding the award of the contract and may result in the removal of the Bidder from the Department's list of qualified bidders for a period of up to 180 days. Award may then be made to the next lowest responsible bidder or the work may be readvertised and constructed under the contract or otherwise, as the Department may decide.

Submittal of Bid Documentation

- (A) Appointment – Email specs@ncdot.gov or call 919.707.6900 to schedule an appointment.
- (B) Delivery - A representative of the Bidder shall deliver the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation to the Department, in a container suitable for sealing, within 10 days after the notice of award is received by him. Bid documentation will be considered a certified copy if the Bidder includes a letter to the Department from a chief officer of the company stating that the enclosed documentation is an *EXACT* copy of the original documentation. The letter shall be signed by a chief officer of the company, have the person's name and title typed below the signature, and the signature shall be notarized at the bottom of the letter.
- (C) Packaging – The container shall be no larger than 15.5 inches in length by 12 inches wide by 11 inches high and shall be water resistant. The container shall be clearly marked on the face and the back of the container with the following information: Bid Documentation, Bidder's Name, Bidder's Address, Date of Escrow Submittal, Contract Number, TIP Number if applicable, and County.

Affidavit

In addition to the bid documentation, an affidavit signed under oath by an individual authorized by the Bidder to execute the bid shall be included. The affidavit shall list each bid document with sufficient specificity so a comparison may be made between the list and the bid documentation to ensure that all of the bid documentation listed in the affidavit has been enclosed. The affidavit shall attest that the affiant has personally examined the bid documentation, that the affidavit lists all of the documents used by the Bidder to determine the bid for this project, and that all such bid documentation has been included.

Verification

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

Confidentiality of Bid Documentation

The bid documentation and affidavit in escrow are, and will remain, the property of the Bidder. The Department has no interest in, or right to, the bid documentation and affidavit other than to verify the contents and legibility of the bid documentation unless the Contractor gives written notice of intent to file a claim, files a written claim, files a written and verified claim, or initiates litigation against the Department. In the event of such written notice of intent to file a claim, filing of a written claim, filing a written and verified claim, or initiation of litigation against the Department, or receipt of a letter from the Contractor authorizing release, the bid documentation and affidavit may become the property of the Department for use in considering any claim or in litigation as the Department may deem appropriate.

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

Duration and Use

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

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

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

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

Release of Bid Documentation to the Contractor

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

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

Payment

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

TWELVE MONTH GUARANTEE:

(7-15-03)

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.

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.

EROSION AND SEDIMENT CONTROL/STORMWATER CERTIFICATION:

(1-16-07) (Rev 9-18-12)

105-16, 225-2, 16

SP1 G180

General

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

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

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

Roles and Responsibilities

- (A) *Certified Erosion and Sediment Control/Stormwater Supervisor* - The Certified Supervisor shall be Level II and responsible for ensuring the erosion and sediment control/stormwater plan is adequately implemented and maintained on the project and for conducting the quality control program. The Certified Supervisor shall be on the project within 24 hours notice from initial exposure of an erodible surface to the project's final acceptance. Perform the following duties:
 - (1) *Manage Operations* - Coordinate and schedule the work of subcontractors so that erosion and sediment control/stormwater measures are fully executed for each operation and in a timely manner over the duration of the contract.
 - (a) Oversee the work of subcontractors so that appropriate erosion and sediment control/stormwater preventive measures are conformed to at each stage of the work.
 - (b) Prepare the required National Pollutant Discharge Elimination System (NPDES) Inspection Record and submit to the Engineer.
 - (c) Attend all weekly or monthly construction meetings to discuss the findings of the NPDES inspection and other related issues.
 - (d) Implement the erosion and sediment control/stormwater site plans requested.
 - (e) Provide any needed erosion and sediment control/stormwater practices for the Contractor's temporary work not shown on the plans, such as, but not limited to work platforms, temporary construction, pumping operations, plant and storage yards, and cofferdams.

- (f) Acquire applicable permits and comply with requirements for borrow pits, dewatering, and any temporary work conducted by the Contractor in jurisdictional areas.
 - (g) Conduct all erosion and sediment control/stormwater work in a timely and workmanlike manner.
 - (h) Fully perform and install erosion and sediment control/stormwater work prior to any suspension of the work.
 - (i) Coordinate with Department, Federal, State and Local Regulatory agencies on resolution of erosion and sediment control/stormwater issues due to the Contractor's operations.
 - (j) Ensure that proper cleanup occurs from vehicle tracking on paved surfaces or any location where sediment leaves the Right-of-Way.
 - (k) Have available a set of erosion and sediment control/stormwater plans that are initialed and include the installation date of Best Management Practices. These practices shall include temporary and permanent groundcover and be properly updated to reflect necessary plan and field changes for use and review by Department personnel as well as regulatory agencies.
- (2) Requirements set forth under the NPDES Permit - The Department's NPDES Stormwater permit (NCS000250) outlines certain objectives and management measures pertaining to construction activities. The permit references *NCG010000, General Permit to Discharge Stormwater* under the NPDES, and states that the Department shall incorporate the applicable requirements into its delegated Erosion and Sediment Control Program for construction activities disturbing one or more acres of land. The Department further incorporates these requirements on all contracted bridge and culvert work at jurisdictional waters, regardless of size. Some of the requirements are, but are not limited to:
- (a) Control project site waste to prevent contamination of surface or ground waters of the state, i.e. from equipment operation/maintenance, construction materials, concrete washout, chemicals, litter, fuels, lubricants, coolants, hydraulic fluids, any other petroleum products, and sanitary waste.
 - (b) Inspect erosion and sediment control/stormwater devices and stormwater discharge outfalls at least once every 7 calendar days, twice weekly for construction related *Federal Clean Water Act, Section 303(d)* impaired streams with turbidity violations, and within 24 hours after a significant rainfall event of 0.5 inch that occurs within a 24 hour period.
 - (c) Maintain an onsite rain gauge or use the Department's Multi-Sensor Precipitation Estimate website to maintain a daily record of rainfall amounts and dates.
 - (d) Maintain erosion and sediment control/stormwater inspection records for review by Department and Regulatory personnel upon request.
 - (e) Implement approved reclamation plans on all borrow pits, waste sites and staging areas.

- (f) Maintain a log of turbidity test results as outlined in the Department's Procedure for Monitoring Borrow Pit Discharge.
 - (g) Provide secondary containment for bulk storage of liquid materials.
 - (h) Provide training for employees concerning general erosion and sediment control/stormwater awareness, the Department's NPDES Stormwater Permit NCS000250 requirements, and the applicable requirements of the *General Permit, NCG010000*.
 - (i) Report violations of the NPDES permit to the Engineer immediately who will notify the Division of Water Quality Regional Office within 24 hours of becoming aware of the violation.
- (3) Quality Control Program - Maintain a quality control program to control erosion, prevent sedimentation and follow provisions/conditions of permits. The quality control program shall:
- (a) Follow permit requirements related to the Contractor and subcontractors' construction activities.
 - (b) Ensure that all operators and subcontractors on site have the proper erosion and sediment control/stormwater certification.
 - (c) Notify the Engineer when the required certified erosion and sediment control/stormwater personnel are not available on the job site when needed.
 - (d) Conduct the inspections required by the NPDES permit.
 - (e) Take corrective actions in the proper timeframe as required by the NPDES permit for problem areas identified during the NPDES inspections.
 - (f) Incorporate erosion control into the work in a timely manner and stabilize disturbed areas with mulch/seed or vegetative cover on a section-by-section basis.
 - (g) Use flocculants approved by state regulatory authorities where appropriate and where required for turbidity and sedimentation reduction.
 - (h) Ensure proper installation and maintenance of temporary erosion and sediment control devices.
 - (i) Remove temporary erosion or sediment control devices when they are no longer necessary as agreed upon by the Engineer.
 - (j) The Contractor's quality control and inspection procedures shall be subject to review by the Engineer. Maintain NPDES inspection records and make records available at all times for verification by the Engineer.
- (B) *Certified Foreman* - At least one Certified Foreman shall be onsite for each type of work listed herein during the respective construction activities to control erosion, prevent sedimentation and follow permit provisions:
- (1) Foreman in charge of grading activities
 - (2) Foreman in charge of bridge or culvert construction over jurisdictional areas
 - (3) Foreman in charge of utility activities

The Contractor may request to use the same person as the Level II Supervisor and Level II Foreman. This person shall be onsite whenever construction activities as

described above are taking place. This request shall be approved by the Engineer prior to work beginning.

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

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

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

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

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

Preconstruction Meeting

Furnish the names of the *Certified Erosion and Sediment Control/Stormwater Supervisor*, *Certified Foremen*, *Certified Installers* and *Certified Designer* and notify the Engineer of changes in certified personnel over the life of the contract within 2 days of change.

Ethical Responsibility

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

Revocation or Suspension of Certification

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

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

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

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

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

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

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

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

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

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

Measurement and Payment

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

PROCEDURE FOR MONITORING BORROW PIT DISCHARGE:

(2-20-07) (Rev. 3-19-13)

105-16, 230, 801

SP1 G181

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

If during any operating day, the downstream water quality exceeds the standard, the Contractor shall do all of the following:

- (A) Either cease discharge or modify the discharge volume or turbidity levels to bring the downstream turbidity levels into compliance, or
- (B) Evaluate the upstream conditions to determine if the exceedance of the standard is due to natural background conditions. If the background turbidity measurements exceed the standard, operation of the pit and discharge can continue as long as the stream turbidity levels are not increased due to the discharge.
- (C) Measure and record the turbidity test results (time, date and sampler) at all defined sampling locations 30 minutes after startup and at a minimum, one additional sampling of all sampling locations during that 24-hour period in which the borrow pit is discharging.
- (D) Notify DWQ within 24 hours of any stream turbidity standard exceedances that are not brought into compliance.

During the Environmental Assessment required by Article 230-4 of the *2012 Standard Specifications*, the Contractor shall define the point at which the discharge enters into the State's surface waters and the appropriate sampling locations. Sampling locations shall include points upstream and downstream from the point at which the discharge enters these waters. Upstream sampling location shall be located so that it is not influenced by backwater conditions and represents natural background conditions. Downstream sampling location shall be located at the point where complete mixing of the discharge and receiving water has occurred.

The discharge shall be closely monitored when water from the dewatering activities is introduced into jurisdictional wetlands. Any time visible sedimentation (deposition of sediment) on the wetland surface is observed, the dewatering activity will be suspended until turbidity levels in the stilling basin can be reduced to a level where sediment deposition does not occur. Staining of wetland surfaces from suspended clay particles, occurring after evaporation or infiltration, does not constitute sedimentation. No activities shall occur in wetlands that adversely affect the functioning of a wetland. Visible sedimentation will be considered an indication of possible adverse impacts on wetland use.

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

The Contractor shall use the *NCDOT Turbidity Reduction Options for Borrow Pits Matrix*, available at http://www.ncdot.gov/doh/operations/dp_chief_eng/roadside/fieldops/downloads/Files/TurbidityReductionOptionSheet.pdf to plan, design, construct, and maintain BMPs to address water quality standards. Tier I Methods include stilling basins which are standard compensatory BMPs. Other Tier I methods are noncompensatory and shall be used when needed to meet the stream turbidity standards. Tier II Methods are also noncompensatory and are options that may be needed for protection of rare or unique resources or where special environmental conditions exist at the site which have led to additional requirements being placed in the DWQ's 401 Certifications and approval letters, Isolated Wetland Permits, Riparian Buffer Authorization or a DOT Reclamation Plan's Environmental Assessment for the specific site. Should the Contractor exhaust all Tier I Methods on a site exclusive of rare or unique resources or special environmental conditions, Tier II Methods may be required by regulators on a case by case basis per supplemental agreement.

The Contractor may use cation exchange capacity (CEC) values from proposed site borings to plan and develop the bid for the project. CEC values exceeding 15 milliequivalents per 100 grams of soil may indicate a high potential for turbidity and should be avoided when dewatering into surface water is proposed.

No additional compensation for monitoring borrow pit discharge will be paid.

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".

E-VERIFY COMPLIANCE:

(2-18-14)

SP1 G200

Contractors and subcontractors shall comply with the E-Verify requirements of N.C.G.S. Chapter 64, Article 2. Contractors are directed to review the foregoing laws. By signing this bid, any awarded Contractor certifies its compliance with the E-Verify requirements and will do so on a periodic basis thereafter as may be required by the Department.

PROJECT SPECIAL PROVISIONS**ROADWAY****CLEARING AND GRUBBING :**

(4-6-06) (Rev. 1-17-12)

200

SP2 R02B(Revised)

Perform clearing on this project to the limits established by Method "III" shown on Standard Drawing No. 200.03 of the *2012 Roadway Standard Drawings*, except for the areas noted in the plans to be cleared to be to the limits established by Method "II" shown on Standard Drawing No. 200.02 of the *2012 Roadway Standard Drawings*.

Hand clearing will be required where called for on the permits included elsewhere in this proposal.

NOTES TO CONTRACTOR:

1) All useable timber to be cleared from Fort Bragg property will be cleared by Fort Bragg base personnel prior to date of availability. Grubbing and any additional clearing in these areas remain the responsibility of the Contractor.

2) Remove Quick Kurb located at the existing intersection of Reilly Road and Canopy Lane in accordance with the Temporary Installation instructions provided on this website:

<http://www.qwickkurb.com/>

Stockpile location:

Contacts: Mr. Rick Akers, (910)309-7688 or Mr. Ben Tripp, (910)309-7760

3) All personnel working within the secured section of Fort Bragg are subject to the Automated Installation Entry process:

<http://www.fortbraggpresscenter.com/go/doc/5287/1890437/Automated-Installation-Entry-system-information>

This process includes a 10 year background check for all individuals prior to them being granted access onto Fort Bragg.

4) Current Base policy is that all deliveries must go through the Knox Street ACP. The awarded Contractor will work directly with Fort Bragg to have materials such as concrete, steel, girders, etc. delivered directly to the secured area of the base (area between Canopy Lane to Yadkin Road).

5) Upon completion of the new Reilly Road and Canopy Lane ACP's, disassemble/remove **from the existing Reilly Road ACP** the following and transport as indicated:

Backup Generator
Sprung Structure/lights/cameras
Road Blades and control panels
Jersey Barriers
CCTV
Office equipment
Fencing and Gates
HVAC (to be removed by Fort Bragg)

Demolish existing Guard Building (brick structure).

Deliver salvaged equipment and materials to the Directorate Emergency Services (DES) storage area located on Logistics Road, just past the Honeycutt Road ACP. Contact: Mr. Tom Faucette, (910)-237-2580

No separate measurement or payment will be made for this work as the cost of such is considered to be incidental to the various items in the contract.

6) At the proper stage of construction, remove the existing traffic signal equipment listed below and salvage for Fort Bragg-DPW.

Traffic Signal Salvage and delivery to DPW Location:

1. Intersection of Canopy Lane at Chicken Road
2. Intersection of Canopy Lane at Hefner Drive (South PX, Commissary Entrance)
3. Intersection of Canopy Lane at Reilly Road

Equipment list

1. Steel poles and Mast arms.
2. Wood poles.
3. Traffic signal and pedestrian signal heads.
4. Traffic signal Controllers and all internal equipment.
5. If attached, area lighting.
6. Messenger and span wire.
7. Any attached signs.

DPW contacts: (Please contact these individuals to coordinate deliver of the material to the DPW compound)

Mr. Robert Mullen, 910-432-9760

Mr. Aaron Brown, 910-432-6010

Secondary contacts:

Mr. Ray Goff, 910-907-1759

Mr. Sey Nam, 910-907-1760

No separate payment will be made for delivering the salvaged material to the Department of Public Works compound as the cost of such is considered incidental to the various Signal items in the contract.

BURNING RESTRICTIONS:

(7-1-95)

200, 210, 215

SP2 R05

Open burning is not permitted on any portion of the right-of-way limits established for this project. Do not burn the clearing, grubbing or demolition debris designated for disposal and generated from the project at locations within the project limits, off the project limits or at any waste or borrow sites in this county. Dispose of the clearing, grubbing and demolition debris by means other than burning, according to state or local rules and regulations.

DEMOLITION OF BUILDINGS AND APPURTENANCES:

(1-1-02) (Rev. 1-17-12)

210

SP2 R10

Demolish the buildings and appurtenances listed below in accordance with Section 210 of the *2012 Standard Specifications*:

Building Removal
Parcel 002 – Right of Survey Station 989+05.00, Survey Line -L-
One-Story Brick Business

Building Removal
Parcel 002 – Left of Survey Station 992+20.00, Survey Line -L-
Unidentified Structure and Concrete Island

TEMPORARY DETOURS:

(7-1-95) (Rev. 11-19-13)

1101

SP2 R30B

Construct temporary detours required on this project in accordance with the typical sections in the plans or as directed.

After the detours have served their purpose, remove the portions deemed unsuitable for use as a permanent part of the project as directed by the Engineer. Salvage and stockpile the aggregate base course removed from the detours at locations within the right of way, as directed by the

Engineer, for removal by State Forces. Place pavement and earth material removed from the detour in embankments or dispose of in waste areas furnished by the Contractor.

Aggregate base course and earth material that is removed will be measured and will be paid at the contract unit price per cubic yard for *Unclassified Excavation*. Pavement that is removed will be measured and will be paid at the contract unit price per square yard for *Removal of Existing Pavement*. Pipe culverts removed from the detours remain the property of the Contractor. Pipe culverts that are removed will be measured and will be paid at the contract unit price per linear foot for *Pipe Removal*. Payment for the construction of the detours will be made at the contract unit prices for the various items involved.

Such prices and payments will be full compensation for constructing the detours and for the work of removing, salvaging, and stockpiling aggregate base course; removing pipe culverts; and for placing earth material and pavement in embankments or disposing of earth material and pavement in waste areas.

SHOULDER AND FILL SLOPE MATERIAL:

(5-21-02)

235, 560

SP2 R45 B

Description

Perform the required shoulder and slope construction for this project in accordance with the applicable requirements of Section 560 and Section 235 of the *2012 Standard Specifications*.

Measurement and Payment

When the Contractor elects to obtain material from an area located beneath a proposed fill sections which does not require excavation for any reason other than to generate acceptable shoulder and fill slope material, the work of performing the excavation will be considered incidental to the item of *Borrow Excavation* or *Shoulder Borrow*. If there is no pay item for *Borrow* or *Shoulder Borrow* in the contract, this work will be considered incidental to *Unclassified Excavation*. Stockpile the excavated material in a manner to facilitate measurement by the Engineer. Fill the void created by the excavation of the shoulder and fill slope material with suitable material. Payment for material used from the stockpile will be made at the contract unit price for *Borrow Excavation* or *Shoulder Borrow*. If there is no pay item for *Borrow Excavation* or *Shoulder Borrow*, then the material will be paid for at the contract unit price for *Unclassified Excavation*. The material used to fill the void created by the excavation of the shoulder and fill slope material will be made at the contract unit price for *Unclassified Excavation*, *Borrow Excavation*, or *Shoulder Borrow*, depending on the source of the material.

Material generated from undercut excavation, unclassified excavation or clearing and grubbing operations that is placed directly on shoulders or slope areas, will not be measured separately for payment, as payment for the work requiring the excavation will be considered adequate compensation for depositing and grading the material on the shoulders or slopes.

When undercut excavation is performed at the direction of the Engineer and the material excavated is found to be suitable for use as shoulder and fill slope material, and there is no area on the project currently prepared to receive the material generated by the undercut operation, the Contractor may construct a stockpile for use as borrow at a later date. Payment for the material used from the stockpile will be made at the contract unit price for *Borrow Excavation* or *Shoulder Borrow*.

When shoulder material is obtained from borrow sources or from stockpiled material, payment for the work of shoulder construction will be made at the contract unit price per cubic yard for *Borrow Excavation* or *Shoulder Borrow* in accordance with the applicable provisions of Section 230 or Section 560 of the *2012 Standard Specifications*.

SURCHARGES AND WAITING PERIODS:

(2-17-04) (Rev. 2-19-13)

235

SP2 R65

Revise the *2012 Standard Specifications* as follows:

Page 2-22, Article 235-1 DESCRIPTION, add the following:

Surcharges and waiting periods may be required for embankments and retaining walls to minimize and control the effects of settlement on structures, approach slabs, pavements, pipes, utilities, etc.

Page 2-24, Article 235-3 CONSTRUCTION METHODS, add the following:

(E) Surcharges and Waiting Periods

Place surcharges at locations shown in the plans. Unless required otherwise in the contract, surcharge embankments after embankments are constructed to the grade and cross section shown in the plans. Construct surcharges with side slopes as directed, 2:1 (H:V) end slopes outside of surcharge limits and surcharge heights shown in the plans. Place and compact surcharge material in accordance with Subarticles 235-3(B) and 235-3(C). Construct and maintain adequate drainage of surface runoff to prevent erosion of surcharge material.

Waiting period durations are in accordance with the contract and as directed. Surcharge waiting periods apply to surcharge locations shown in the plans and begin after surcharges are constructed to the height shown in the plans.

Unless required otherwise in the contract, bridge waiting periods are required in accordance with the following:

- (1) Apply to bridge embankments and retaining walls within 100 ft of end bent and bent locations shown in the plans and
- (2) Begin after bridge embankments and retaining walls are constructed to the elevations noted in the plans.

Unless required otherwise in the contract, embankment waiting periods are required in accordance with the following:

- (1) Apply to embankment locations shown in the plans and retaining walls for embankments with waiting periods and
- (2) Begin after embankments and retaining walls are constructed to the elevations, grade and cross section shown in the plans.

Except for maintaining embankments, do not perform any work on embankments or structures with waiting periods until waiting periods end unless otherwise approved. Place and compact additional material in accordance with Subarticles 235-3(B) and 235-3(C) to maintain embankment grade elevations during waiting periods. Remove

surcharges to the grade and cross section shown in the plans after surcharge waiting periods end.

Page 2-24, Article 235-5 MEASUREMENT AND PAYMENT, add the following:

Borrow Excavation for surcharge material and additional material for maintaining embankment grade elevations will be measured and paid in accordance with Article 230-5. *Unclassified Excavation* for surcharge material, additional material for maintaining embankment grade elevations and removing surcharges will be measured and paid in accordance with Article 225-7. When there is no pay item for *Borrow Excavation* or *Unclassified Excavation* in the contract, surcharge and additional material and removing surcharges will be paid as extra work in accordance with Article 104-7.

PIPE INSTALLATION:

(11-20-12)

300

SP3 R01

Revise the *2012 Standard Specifications* as follows:

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

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

FLOWABLE FILL:

(9-17-02) (Rev 1-17-12)

300, 340, 450, 1000, 1530, 1540, 1550

SP3 R30

Description

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

Materials

Refer to Division 10 of the *2012 Standard Specifications*.

Item

Flowable Fill

Section

1000-6

Construction Methods

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

Measurement and Payment

At locations where flowable fill is called for on the plans and a pay item for flowable fill is included in the contract, *Flowable Fill* will be measured in cubic yards and paid as the actual number of cubic yards that have been satisfactorily placed and accepted. Such price and payment will be full compensation for all work covered by this provision including, but not limited to, the mix design, furnishing, hauling, placing and containing the flowable fill.

Payment will be made under:

Pay Item
Flowable Fill

Pay Unit
Cubic Yard

BRIDGE APPROACH FILLS:

(10-19-10) (Rev. 1-17-12)

422

SP4 R02

Description

Bridge approach fills include bridge approach fills for sub regional tier bridges and reinforced bridge approach fills. Construct bridge approach fills in accordance with the contract and Standard Drawing No. 422.10 or 422.11 of the *2012 Roadway Standard Drawings*. Define "geosynthetics" as geotextiles or geomembranes.

Materials

Refer to Division 10 of the *2012 Standard Specifications*.

Item	Section
Anchor Pins	1056-2
Geotextiles	1056
Portland Cement Concrete	1000
Select Material	1016
Subsurface Drainage Materials	1044
Wire Staples	1060-8(D)

For bridge approach fills for sub regional tier bridges, provide Type 1 geotextile for filtration geotextiles. For reinforced bridge approach fills, provide Type 5 geotextile for geotextile reinforcement and Type 1 geotextile and No. 78M stone for drains. Use Class B concrete for concrete pads.

Use Class III or V select material for reinforced bridge approach fills and only Class V select material (standard size No. 78M stone) for bridge approach fills for sub regional tier bridges. Provide PVC pipes, fittings and outlet pipes for subsurface drainage materials. For drains and PVC pipes behind end bents, use pipes with perforations that meet AASHTO M 278.

Use PVC, HDPE or linear low density polyethylene (LLDPE) geomembranes for reinforced bridge approach fills. For PVC geomembranes, provide grade PVC30 geomembranes that meet ASTM D7176. For HDPE and LLDPE geomembranes, use geomembranes with a nominal thickness of at least 30 mils that meet Geosynthetic Research Institute Standard Specifications

GM13 or GM17, respectively. Handle and store geomembranes in accordance with Article 1056-2 of the *2012 Standard Specifications*. Provide material certifications for geomembranes in accordance with Article 1056-3 of the *2012 Standard Specifications*.

Construction Methods

Excavate as necessary for bridge approach fills in accordance with the contract. Notify the Engineer when foundation excavation is complete. Do not place geomembranes or filtration geotextiles until excavation dimensions and foundation material are approved. Attach geomembranes and filtration geotextiles to end bent cap back and wing walls with adhesives, tapes or other approved methods. Glue or weld geomembrane seams to prevent leakage.

For reinforced bridge approach fills, place geotextile reinforcement within 3" of locations shown in Standard Drawing No. 422.10 of the *2012 Roadway Standard Drawings* and in slight tension free of kinks, folds, wrinkles or creases. Install geotextile reinforcement with the orientation, dimensions and number of layers shown in Standard Drawing No. 422.10 of the *2012 Roadway Standard Drawings*. Place first layer of geotextile reinforcement directly on geomembranes with no void or material in between. Install geotextile reinforcement with the machine direction (MD) parallel to the roadway centerline. The MD is the direction of the length or long dimension of the geotextile roll. Do not splice or overlap geotextile reinforcement in the MD so seams are perpendicular to the roadway centerline. Wrap geotextile reinforcement at end bent cap back and wing walls as shown in Standard Drawing No. 422.10 of the *2012 Roadway Standard Drawings* and directed by the Engineer. Extend geotextile reinforcement at least 4 ft back behind end bent cap back and wing walls into select material.

Overlap adjacent geotextiles at least 18" with seams oriented parallel to the roadway centerline. Hold geotextiles in place with wire staples or anchor pins as needed. Contact the Engineer when existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with geosynthetics.

For reinforced bridge approach fills, construct one foot square drains consisting of 4" diameter continuous perforated PVC pipes surrounded by No. 78M stone wrapped in Type 1 geotextiles. Install drains in accordance with Standard Drawing No. 422.10 of the *2012 Roadway Standard Drawings*. For bridge approach fills for sub regional tier bridges, install 4" diameter continuous perforated PVC drain pipes in accordance with Standard Drawing No. 422.11 of the *2012 Roadway Standard Drawings*.

Use solvent cement to connect PVC pipes so joints do not leak. Connect perforated pipes to outlet pipes just behind wing walls. Provide drain pipes and drains with positive drainage towards outlets. Place pipe sleeves in or under wing walls for outlet pipes so positive drainage is maintained. Use sleeves that can withstand wing wall loads.

Place select material in 8" to 10" thick lifts. Use only hand operated compaction equipment to compact select material for bridge approach fills. Compact Class III select material in accordance with Subarticle 235-3(C) of the *2012 Standard Specifications*. Compact No. 78M stone with a vibratory compactor to the satisfaction of the Engineer. Do not displace or damage geosynthetics, drain pipes or drains when placing and compacting select material. End dumping

directly on geosynthetics is not permitted. Do not operate heavy equipment on geosynthetics, drain pipes or drains until they are covered with at least 8" of select material. Replace any damaged geosynthetics, drain pipes or drains to the satisfaction of the Engineer.

Cover open ends of outlet pipes with rodent screens as shown in Standard Drawing No. 815.03 of the *2012 Roadway Standard Drawings*. Connect ends of outlet pipes to concrete pads or existing drainage structures as directed by the Engineer. Construct concrete pads with an Ordinary surface finish that meets Subarticle 825-6(B) of the *2012 Standard Specifications*.

Measurement and Payment

Reinforced Bridge Approach Fill, Station _____ will be paid at the contract lump sum price. The contract lump sum price for *Reinforced Bridge Approach Fill, Station _____* will be full compensation for labor, tools, equipment and reinforced bridge approach fill materials, excavating, backfilling, hauling and removing excavated materials, compacting select material, connecting outlet pipes to existing drainage structures and supplying select materials, geosynthetics, drains, pipe sleeves and outlet components and any incidentals necessary to construct all reinforced bridge approach fills at each bridge.

Bridge Approach Fill - Sub Regional Tier, Station _____ will be paid at the contract lump sum price. The contract lump sum price for *Bridge Approach Fill - Sub Regional Tier, Station _____* will be full compensation for labor, tools, equipment and bridge approach fill materials, excavating, backfilling, hauling and removing excavated materials, compacting No. 78M stone, connecting outlet pipes to existing drainage structures and supplying No. 78M stone, filtration geotextiles, drain pipes, pipe sleeves and outlet components and any incidentals necessary to construct all bridge approach fills at each sub regional tier bridge.

Payment will be made under:

Pay Item	Pay Unit
Reinforced Bridge Approach Fill, Station _____	Lump Sum
Bridge Approach Fill - Sub Regional Tier, Station _____	Lump Sum

PREPARATION OF SUBGRADE AND BASE:

(1-16-96)

610

SP5 R05

On mainline portions and ramps of this project, prepare the subgrade and base beneath the pavement structure in accordance with the applicable sections of the *2012 Standard Specifications* except use an automatically controlled fine grading machine using string lines, laser controls or other approved methods to produce final subgrade and base surfaces meeting the lines, grades and cross sections required by the plans or established by the Engineer.

No direct payment will be made for the work required by this provision as it will be considered incidental to other work being paid for by the various items in the contract.

AUTOMATED MACHINE GUIDANCE:

(1-2-11)

SPI 5-5

General

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

All equipment using AMG shall be able to generate end results that meet the *Standard Specifications*. Perform test sections for each type of work to be completed with AMG to demonstrate that the system has the capability to achieve acceptable results. If acceptable results can not be achieved, conform to the requirements for conventional stakeout.

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

Submittals

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

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

Inspection

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

The Contractor shall provide the Engineer with one GPS rover unit for use during the duration of the contract. The rover will be loaded with the same model that is used with the AMG and have the same capability as rover units used by the Contractor. The rover will be kept in the possession of the Engineer and will be returned to the Contractor upon completion of the contract. Any maintenance or repairs required for the rover will be the responsibility of the Contractor. Formal training of at least 8 hours shall be provided to the Engineer by the Contractor on the use of the proposed AMG system.

Subgrade and Base Controls

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

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

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

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

Measurement and Payment

No direct payment will be made for work required to utilize this provision. All work will be considered incidental to various grading operations.

ASPHALT PAVEMENTS - SUPERPAVE:

(6-19-12) (Rev. 2-18-14)

605, 609, 610, 650, 660

SP6 R01

Revise the 2012 *Standard Specifications* as follows:

Page 6-3, Article 605-7 APPLICATION RATES AND TEMPERATURES, replace this article, including Table 601-1, with the following:

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

TABLE 605-1 APPLICATION RATES FOR TACK COAT	
Existing Surface	Target Rate (gal/sy)
	Emulsified Asphalt
New Asphalt	0.04 ± 0.01
Oxidized or Milled Asphalt	0.06 ± 0.01
Concrete	0.08 ± 0.01

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

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 6-7, 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 6-21, Subarticle 610-3(C) Job Mix Formula (JMF), replace Table 610-1 with the following:

TABLE 610-1 DESIGN MIXING TEMPERATURE AT THE ASPHALT PLANT^A		
Binder Grade	HMA JMF Temperature	WMA JMF Temperature Range
PG 64-22	300°F	225 - 275°F
PG 70-22	315°F	240 - 290°F
PG 76-22	335°F	260 - 310°F

A. The mix temperature, when checked in the truck at the roadway, shall be within plus 15° and minus 25° of the temperature specified on the JMF.

Page 6-21, Subarticle 610-3(C) Job Mix Formula (JMF), lines 4-6, delete first sentence of the second paragraph. Line 7, in the second sentence of the second paragraph, replace "275°F" with "275°F or greater."

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

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

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

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
S9.5C, S12.5C	45°F
S9.5D, S12.5D	50°F

Page 6-26, Article 610-7 HAULING OF ASPHALT MIXTURE, lines 22-23, in the fourth sentence of the first paragraph replace “so as to overlap the top of the truck bed and” with “to”.

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

TABLE 650-1 OGAFC GRADATION CRITERIA			
Grading Requirements	Total Percent Passing		
<i>Sieve Size (mm)</i>	<i>Type FC-1</i>	<i>Type FC-1 Modified</i>	<i>Type FC-2 Modified</i>
19.0	-	-	100
12.5	100	100	80 - 100
9.50	75 - 100	75 - 100	55 - 80
4.75	25 - 45	25 - 45	15 - 30
2.36	5 - 15	5 - 15	5 - 15
0.075	1.0 - 3.0	1.0 - 3.0	2.0 - 4.0

Page 6-50, Table 660-1 MATERIAL APPLICATION RATES AND TEMPERATURES, lines 1-2, replace Note A in Table 660-1 with the following:

- A. Use No. 6M, No. 67, No. 5 and No. 78M aggregate for retreatment before an asphalt overlay on existing pavement based on the width of the cracks in the existing pavement. Choose No. 78M for sections of roadway where the average width of existing cracks is 1/4" or less in width, No. 67 for sections of roadway where the average width of existing cracks are 1/4" to 5/8" in width and choose No. 5 for sections of roadway where the existing crack widths are greater than 5/8".

ASPHALT PAVER-FIXED STRING LINE:

A fixed string line is required on this project for paving on Line -L-.

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*.

ASPHALT PLANT MIXTURES:

(7-1-95)

609

SP6 R20

Place asphalt concrete base course material in trench sections with asphalt pavement spreaders made for the purpose or with other equipment approved by the Engineer.

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 **\$580.67** per ton.

This base price index represents an average of F.O.B. selling prices of asphalt binder at supplier's terminals on **June 1, 2014**.

SPEED MODULATOR:**Description**

Construct Speed Modulator as shown on the plans and details, in accordance with the applicable requirements of Section 610 of the *Standards Specifications*, and as directed by the Engineer.

Measurement and Payment

Speed Modulator will be measured and paid for in Linear Feet. Such price and payment will include all materials, tools, labor, equipment and incidentals necessary to complete the work.

Payment will be made under:

Pay Item**Pay Unit**

Speed Modulator

LF

MODIFIED CONCRETE FLUME WITH CONCRETE OUTLET:

(3-19-96)(Rev. 6-17-08)

825

SP8 R10

At locations shown in the plans, construct concrete flumes, concrete curb, and apron in accordance with the details in the plans. Use materials meeting the requirements of Section 825 of the *2012 Standard Specifications* except that the concrete must be Class B or of higher compressive strength.

Each concrete flume, concrete curb, and apron completed and accepted will be paid at the contract unit price per each for *Modified Concrete Flume*. Such price and payment will be full compensation for all materials, labor, equipment, tools, removing and disposing of the temporary slope drains, and any other incidentals necessary to complete the work satisfactorily.

The concrete curb and ditch outside the pay limits of the apron will be measured and paid in accordance with Section 846 and 850 of the *2012 Standard Specifications*.

Payment will be made under:

Pay Item	Pay Unit
Modified Concrete Flume	Each

GUARDRAIL ANCHOR UNITS, TYPE M-350:

(4-20-04) (Rev. 1-17-12)

862

SP8 R60

Description

Furnish and install guardrail anchor units in accordance with the details in the plans, the applicable requirements of Section 862 of the *2012 Standard Specifications*, and at locations shown in the plans.

Materials

The Contractor may, at his option, furnish any one of the following guardrail anchor units or approved equal.

The guardrail anchor unit (SRT-350) as manufactured by:

Trinity Industries, Inc.
2525 N. Stemmons Freeway
Dallas, Texas 75207
Telephone: 800-644-7976

The guardrail anchor unit (FLEAT) as manufactured by:

Road Systems, Inc.
3616 Old Howard County Airport
Big Springs, Texas 79720
Telephone: 915-263-2435

The guardrail anchor unit (REGENT) as manufactured by:

Energy Absorption Systems, Inc.
One East Wacker Drive
Chicago, Illinois 60601-2076
Telephone: 888-32-ENERGY

Prior to installation the Contractor shall submit to the Engineer:

- (A) FHWA acceptance letter for each guardrail anchor unit certifying it meets the requirements of NCHRP Report 350, Test Level 3, in accordance with Article 106-2 of the *2012 Standard Specifications*.

- (B) Certified working drawings and assembling instructions from the manufacturer for each guardrail anchor unit in accordance with Article 105-2 of the *2012 Standard Specifications*.

No modifications shall be made to the guardrail anchor unit without the express written permission from the manufacturer. Perform installation in accordance with the details in the plans, and details and assembling instructions furnished by the manufacturer.

Construction Methods

Guardrail end delineation shall be required on all approach and trailing end sections for both temporary and permanent installations. Guardrail end delineation consists of yellow reflective sheeting applied to the entire end section of the guardrail in accordance with Article 1088-3 of the *2012 Standard Specifications* and is incidental to the cost of the guardrail anchor unit.

Measurement and Payment

Measurement and payment will be made in accordance with Article 862-6 of the *2012 Standard Specifications*.

Payment will be made under:

Pay Item	Pay Unit
Guardrail Anchor Units, Type M-350	Each

GUARDRAIL ANCHOR UNITS, TYPE 350:

(4-20-04) (Rev. 8-16-11)

862

SP8 R65

Description

Furnish and install guardrail anchor units in accordance with the details in the plans, the applicable requirements of Section 862 of the *2012 Standard Specifications*, and at locations shown in the plans.

Materials

The Contractor may at his option, furnish any one of the guardrail anchor units or approved equal.

Guardrail anchor unit (ET-Plus) as manufactured by:

Trinity Industries, Inc.
2525 N. Stemmons Freeway
Dallas, Texas 75207
Telephone: 800-644-7976

The guardrail anchor unit (SKT 350) as manufactured by:

Road Systems, Inc.
3616 Old Howard County Airport
Big Spring, Texas 79720
Telephone: 915-263-2435

Prior to installation the Contractor shall submit to the Engineer:

- (A) FHWA acceptance letter for each guardrail anchor unit certifying it meets the requirements of NCHRP Report 350, Test Level 3, in accordance with Article 106-2 of the *2012 Standard Specifications*.
- (B) Certified working drawings and assembling instructions from the manufacturer for each guardrail anchor unit in accordance with Article 105-2 of the *2012 Standard Specifications*.

No modifications shall be made to the guardrail anchor unit without the express written permission from the manufacturer. Perform installation in accordance with the details in the plans, and details and assembling instructions furnished by the manufacturer.

Construction Methods

Guardrail end delineation is required on all approach and trailing end sections for both temporary and permanent installations. Guardrail end delineation consists of yellow reflective sheeting applied to the entire end section of the guardrail in accordance with Article 1088-3 of the *2012 Standard Specifications* and is incidental to the cost of the guardrail anchor unit.

Measurement and Payment

Measurement and payment will be made in accordance with Article 862-6 of the *2012 Standard Specifications*.

Payment will be made under:

Pay Item	Pay Unit
Guardrail Anchor Units, Type 350	Each

IMPACT ATTENUATOR UNITS, TYPE 350:

(4-20-04) (Rev. 1-17-12)

SP8 R75

Description

Furnish and install impact attenuator units and any components necessary to connect the impact attenuator units in accordance with the manufacturer's requirement, the details in the plans and at locations shown in the plans.

Materials

The Contractor may at his option, furnish any one of the **NON-GATING** impact attenuator units or approved equal:

The impact attenuator unit (QUADGUARD) as manufactured by:

Energy Absorption Systems, Inc.
One East Wacker Drive
Chicago, Illinois 60601-2076
Telephone: 312-467-6750

The impact attenuator unit (TRACC) as manufactured by:

Trinity Industries, Inc.
2525 N. Stemmons Freeway
Dallas, Texas 75207
Telephone: 800-644-7976

The Contractor may at his option, furnish any one of the **GATING** impact attenuator units or approved equal:

The impact attenuator unit (BRAKEMASTER) as manufactured by:

Energy Absorption Systems, Inc.
One East Wacker Drive
Chicago, Illinois 60601-2076
Telephone: 312-467-6750

The impact attenuator unit (CAT) as manufactured by:

Trinity Industries, Inc.
2525 N. Stemmons Freeway
Dallas, Texas 75207
Telephone: 800-644-7976

Prior to installation the Contractor shall submit to the Engineer:

- (A) FHWA acceptance letter for each impact attenuator unit certifying it meets the requirements of NCHRP Report 350, Test Level 3, in accordance with Article 106-2 of the *2012 Standard Specifications*.
- (B) Certified working drawings and assembling instructions from the manufacturer for each impact attenuator unit in accordance with Article 105-2 of the *2012 Standard Specifications*.

No modifications shall be made to the impact attenuator unit without the express written permission from the manufacturer. Perform installation in accordance with the details in the plans, and details and assembling instructions furnished by the manufacturer.

Construction Methods

If the median width is 40 feet or less, the Contractor shall supply one of the NON-GATING Impact Attenuator Units listed in the Materials Section herein.

If the median width is greater than 40 feet, the Contractor may use any of the GATING or NON-GATING Impact Attenuator Units listed in the Materials Section herein.

Measurement and Payment

Impact Attenuator Unit, Type 350 will be measured and paid at the contract unit price per each. Such prices and payment will be full compensation for all work covered by this provision including, but not limited to, furnishing, installing and all incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Impact Attenuator Units, Type 350	Each

84" CHAIN LINK SECURITY FENCING WITH BARBED WIRE ON EXTENSION ARMS:

1.0 POLYVINYL CHLORIDE-COATED FENCE MATERIALS.

Provide 84" chain link security fencing with barbed wire on extension arms in accordance with the plans, Section 866 of the 2012 Standard Specifications, and the provisions herein.

The Contractor shall thoroughly inspect Polyvinyl chloride-coated fence materials for cracking, peeling, and conformance with the specifications prior to installation. The contractor shall replace any fence materials rejected by the Engineer with approved materials at no additional cost to the Department.

2.0 PRODUCTS.

2.1 FENCE FABRIC. Fence fabric shall conform to the following:

2.1.1. Chain Link Fence Fabric. ASTM A 392, Class 1, zinc-coated steel wire with minimum coating weight of 1.2 ounces of zinc per square foot of coated surface, or ASTM A 491, Type I, aluminum-coated steel wire. Fabric shall be fabricated of 9-gauge wire woven in 2-inch mesh. Fabric height shall be 7 feet. Fabric shall be twisted and barbed on the top selvage and knuckled on the bottom selvage.

2.2 GATES.

ASTM F 900 and/or ASTM F 1184. Gate shall be the type and swing existing, Gate frames shall conform to strength and coating requirements of ASTM F 1083 for Group IA, steel pipe, with external coating Type A, nominal pipe size (NPS) 1-1/2. Gate frames shall conform to strength and coating requirements of ASTM F 1043, for Group IC, steel pipe with external coating Type A, nominal pipe size (NPS) 1-1/2. Gate fabric shall be as specified for chain link fabric, Gate leaves more than 8 feet wide shall have either intermediate members and diagonal truss rods or shall have tubular members as necessary to provide rigid construction, free from sag or twist. Gate leaves less than 8 feet wide shall have truss rods or intermediate braces. Intermediate braces shall be provided on all gate frames with an electro-mechanical lock. Gate fabric shall be attached to the gate frame by method standard with the manufacturer except that welding will not be permitted. Latches, hinges, stops, keepers, rollers, and other hardware items shall be furnished as required for the operation of the gate. Latches shall be arranged for padlocking so that the padlock will be accessible from both sides of the gate. Stops shall be provided for holding the gates in the open position. For high security applications, each end member of gate frames shall be extended sufficiently above the top member to carry three strands of barbed wire in horizontal alignment with Cantonment Fence.

2.3 POSTS.

2.3.1 Metal Posts for Chain Link Fence. ASTM F 1083, zinc-coated. Group IA, with external coating Type A steel pipe. Group IC steel pipe, zinc-coated with external coating Type A and Group II, roll-formed steel sections, shall meet the strength and coating requirements of ASTM F 1043. Group III, ASTM F 1043. Steel H-section may be used for line posts in lieu of line post shapes specified for the other classes. Sizes shall be as shown on the fence detail drawings. Line posts and terminal (corner, gate, and pull) posts selected shall be of the same designation as the existing fence. Gate post shall be for the gate type being replaced or repaired, subject to the limitation specified in ASTM F 900 and/or ASTM F 1184.

2.4 BRACES AND RAILS.

ASTM F 1083, zinc-coated, Group IA, steel pipe, size NPS 1-1/4. Group IC steel pipe, zinc-coated, shall meet the strength and coating requirements of ASTM F 1043. Braces and rails shall be Group IA, steel pipe, size NPS 1-1/4 or Group II, formed steel sections, size 1-21/32 inch and shall be zinc coated (Type A) and polyvinyl chloride-coated conforming to the requirements of ASTM F 1043. Group II, formed steel sections, size 1-21/32 inch, conforming to ASTM F 1043, may be used as braces and rails if Group II line posts are in place.

2.5 WIRE.

2.5.1 Tension Wire. Tension wire shall be Type I or Type II, Class 2 coating, in accordance with ASTM A 824.

2.6 ACCESSORIES.

ASTM F 626. Ferrous accessories shall be zinc or aluminum coated. Ferrous accessories shall also be polyvinyl chloride-coated, minimum thickness of 0.006 inch, maximum thickness of 0.015 inch. Color coating of fittings shall match the color coating of the fabric. Truss rods shall be furnished for each terminal post. Truss rods shall be provided with turnbuckles or other equivalent provisions for adjustment. Barbed wire shall be 2 strand, 12-1/2-gauge wire, zinc-coated; Class 3 in accordance with ASTM A 121 or aluminum coated Type I in accordance with ASTM A 585. Barbed wire shall be four-point barbed type steel wire. Barbed wire support arms shall be the single arm type and of the design required for the existing post. Tie wire for attaching fabric to rails, braces, and posts shall be 9 gauge steel wire and match the coating of the fence fabric. Tie wires for attaching fabric to tension wire on high security fences shall be 16-gage stainless steel. The tie wires shall be a double loop and 6.5 inches in length. Miscellaneous hardware coatings shall conform to ASTM A 153/A 153M unless modified. Threaded hardware shall be painted to match polyvinyl chloride coatings.

3.1 INSTALLATION.

Fence shall be installed to the lines and grades indicated in the plans. Terminal (corner, gate, and pull) posts are set at abrupt changes in vertical and horizontal alignment, replacement shall conform to existing post locations. Fabric shall be continuous between terminal posts; however, runs between terminal posts shall not exceed 500 feet. Any damage to galvanized surfaces, including welding, shall be repaired with paint containing zinc dust in accordance with ASTM A 780.

3.2 POST INSTALLATION.

3.2.1 Posts for Chain Link Fence. Posts shall be set plumb and in alignment. Except where solid rock is encountered, posts shall be set in concrete. Where solid rock is encountered with no overburden, posts shall be set to a minimum depth of 18 inches in rock. Where solid rock is covered with an overburden of soil or loose rock, posts shall be set to the minimum depth indicated on the drawings unless a penetration of 18 inches in solid rock is achieved before reaching the indicated depth, in which case depth of penetration shall terminate. All portions of posts set in rock shall be grouted. Portions of posts not set in rock shall be set in concrete from the rock to ground level. Posts set in concrete shall be set in holes not less than the diameter shown on the drawings. Diameters of holes in solid rock shall be at least 1 inch greater than the largest cross section of the post. Concrete and grout shall be thoroughly consolidated around each post, shall be free of voids and finished to form a dome. Concrete and grout shall be allowed to cure for 72 hours prior to attachment of any item to the posts.

3.4 RAILS.

3.4.1 Bottom Rail. The bottom rail shall be bolted to double rail ends and double rail ends shall be securely fastened to the posts. Bolts shall be peened to prevent easy removal. Bottom rail shall be installed before chain link fabric.

3.5 BRACES AND TRUSS RODS.

Braces and truss rods shall be installed in conformance with the standard practice for the fence furnished. Horizontal (compression) braces and diagonal truss (tension) rods shall be installed on fences over 6 feet in height. A center brace or 2 diagonal truss rods shall be installed on 12-foot fences. Braces and truss rods shall extend from terminal posts to line posts. Diagonal braces shall form an angle of approximately 40 to 50 degrees with the horizontal. No bracing is required on fences 6 feet high or less if a top rail is installed.

3.6 TENSION WIRES.

Tension wires shall be installed along the top of the fence line and attached to the terminal posts of each stretch of the fence. Top tension wires shall be installed within the top 4 inches of the installed fabric. Tension wire shall be pulled taut and shall be free of sag.

3.7 CHAIN LINK FABRIC.

Chain link fabric shall be installed on the same side of the post as existing fabric to be replaced. Fabric shall be attached to terminal posts with stretcher bars and tension bands. Bands shall be spaced at approximately 15-inch intervals. The fabric shall be installed and pulled taut to provide a smooth and uniform appearance free from sag, without permanently distorting the fabric diamond or reducing the fabric height. Fabric shall be fastened to line posts at approximately 15-inch intervals and fastened to all rails and tension wires at approximately 24-inch intervals. Fabric shall be cut by untwisting and removing pickets. Splicing shall be accomplished by weaving a single picket into the ends of the rolls to be joined. The bottom of the installed fabric shall be 2 inches above the ground.

3.8 BARBED WIRE SUPPORTING ARMS AND BARBED WIRE.

3.8.1 General Requirements. Barbed wire supporting arms and barbed wire shall be installed as existing and as recommended by the manufacturer. Supporting arms shall be anchored to the posts in a manner to prevent easy removal with hand tools. Barbed wire shall be pulled taut and attached to the arms with clips or other means that prevents easy removal.

3.9 GATE INSTALLATION.

Gates shall be re-installed or replaced at the existing locations. Hinged gates shall be mounted to swing exactly as the existing gate to be replaced. Latches, stops, and keepers shall be installed as required. Swing gates shall be installed as recommended by the manufacturer. Hinge pins, and hardware shall be welded or otherwise secured to prevent removal.

3.10 GROUNDING.

Fences shall be grounded on each side of all gates, at each corner, at the closest approach to each building located within 50 feet of the fence, and where the fence alignment changes more than 15 degrees. Grounding locations shall not exceed 650 feet. Each gate panel shall be bonded with

a flexible bond strap to its gatepost. Fences crossed by power lines of 600 volts or more shall be grounded at or near the point of crossing and at distances not exceeding 150 feet on each side of crossing. Ground conductor shall consist of No. 8 AWG solid copper wire. Grounding electrodes shall be 3/4 inch by 10-foot long copper-clad steel rod. Electrodes shall be driven into the earth so that the top of the electrode is at least 12 inches below the grade. Where driving is impracticable, electrodes shall be buried a minimum of 12 inches deep and radically from the fence. The top of the electrode shall be no less than 2 feet or more than 8 feet from the fence. Ground conductor shall be clamped to the fence and electrodes with bronze grounding clamps to create electrical continuity between fence posts, fence fabric, and ground rods. After installation, the total resistance of fence to ground shall not be greater than 25 ohms.

4.0 MEASUREMENT AND PAYMENT

No direct payment will be made for furnishing and installing the barbed wire and extension arms as such work will be considered incidental to other work being paid by the various fencing items in the contract.

Payment for the security fence will be made at the contract unit price per linear foot for "Chain Link Fence, 84" Fabric". Such payment will be full compensation for all work described in this special provision.

PREFORMED SCOUR HOLE WITH LEVEL SPREADER APRON:

(10-15-02) (Rev. 10-20-09)

410

SP8 R105

Description

Construct and maintain preformed scour holes with spreader aprons at the locations shown on the plans and in accordance with the details in the plans. Work includes excavation, shaping and maintaining the hole and apron, furnishing and placing filter fabric, rip rap (class as specified in the plans) and permanent soil reinforcement matting.

Materials

Item	Section
Plain Rip Rap	1042
Filter Fabric	1056

The permanent soil reinforcement matting shall be permanent erosion control reinforcement mat and shall be constructed of synthetic or a combination of coconut and synthetic fibers evenly distributed throughout the mat between a bottom UV stabilized netting and a heavy duty UV stabilized top net. The matting shall be stitched together with UV stabilized polypropylene thread to form a permanent three dimensional structure. The mat shall have the following minimum physical properties:

Property	Test Method	Value Unit
Light Penetration	ASTM D6567	9 %
Thickness	ASTM D6525	0.40 in
Mass Per Unit Area	ASTM D6566	0.55 lb/sy
Tensile Strength	ASTM D6818	385 lb/ft
Elongation (Maximum)	ASTM D6818	49 %
Resiliency	ASTM D1777	>70 %
UV Stability *	ASTM 4355	≥80 %
Porosity (Permanent Net)	ECTC Guidelines	≥85 %
Maximum Permissible Shear Stress (Vegetated)	Performance Bench Test	≥8.0 lb/ft ²
Maximum Allowable Velocity (Vegetated)	Performance Bench Test	≥16.0 ft/s

*ASTM D1682 Tensile Strength and % strength retention of material after 1,000 hours of exposure.

Submit a certification (Type 1, 2, or 3) from the manufacturer showing:

- (A) The chemical and physical properties of the mat used, and
- (B) Conformance of the mat with this specification.

Construction Methods

All areas to be protected with the mat shall be brought to final grade and seeded in accordance with Section 1660 of the *2012 Standard Specifications*. The surface of the soil shall be smooth, firm, stable and free of rocks, clods, roots or other obstructions that would prevent the mat from lying in direct contact with the soil surface. Areas where the mat is to be placed will not need to be mulched.

Measurement and Payment

Preformed Scour Holes with Level Spreader Aprons will be measured and paid as the actual number incorporated into the completed and accepted work. Such price and payment will be full compensation for all work covered by this provision.

Payment will be made under:

Pay Item	Pay Unit
Preformed Scour Hole with Level Spreader Aprons	Each

DETECTABLE WARNINGS FOR PROPOSED CURB RAMPS:

(6-15-10) (Rev. 8-16-11)

848

SP8 R126

Description

Construct detectable warnings consisting of integrated raised truncated domes on proposed concrete curb ramps in accordance with the *2012 Standard Specifications*, plan details, the requirements of the *28 CFR Part 36 ADA Standards for Accessible Design* and this provision.

Materials

Detectable warning for proposed curb ramps shall consist of integrated raised truncated domes. The description, size and spacing shall conform to Section 848 of the *2012 Standard Specifications*.

Use material for detectable warning systems as shown herein. Material and coating specifications must be stated in the Manufacturers Type 3 Certification and all Detectable Warning systems must be on the NCDOT Approved Products List.

Install detectable warnings created from one of the following materials: precast concrete blocks or bricks, clay paving brick, gray or ductile iron castings, mild steel, stainless steel, and

engineered plastics, rubber or composite tile. Only one material type for detectable warning will be permitted per project, unless otherwise approved by the Engineer.

- (A) Detectable Warnings shall consist of a base with integrated raised truncated domes, and when constructed of precast concrete they shall conform to the material requirements of Article 848-2 of the *2012 Standard Specifications*.
- (B) Detectable Warnings shall consist of a base with integrated raised truncated domes, and may be comprised of other materials including, but not limited, to clay paving brick, gray iron or ductile iron castings, mild steel, stainless steel, and engineered plastics, rubber or composite tile, which are cast into the concrete of the curb ramps. The material shall have an integral color throughout the thickness of the material. The detectable warning shall include fasteners or anchors for attachment in the concrete and shall be furnished as a system from the manufacturer.

Prior to installation, the Contractor shall submit to the Engineer assembling instructions from the manufacturer for each type of system used in accordance with Article 105-2 of the *2012 Standard Specifications*. The system shall be furnished as a kit containing all consumable materials and consumable tools, required for the application. They shall be capable of being affixed to or anchored in the concrete curb ramp, including green concrete (concrete that has set but not appreciably hardened). The system shall be solvent free and contain no volatile organic compounds (VOC). The static coefficient of friction shall be 0.8 or greater when measured on top of the truncated domes and when measured between the domes in accordance with ASTM C1028 (dry and wet). The system shall be resistant to deterioration due to exposure to sunlight, water, salt or adverse weather conditions and impervious to degradation by motor fuels, lubricants and antifreeze.

- (C) When steel or gray iron or ductile iron casting products are provided, only products that meet the requirements of Subarticle 106-1(B) of the *2012 Standard Specifications* may be used. Submit to the Engineer a Type 6 Certification, catalog cuts and installation procedures at least 30 days prior to installation for all.

Construction Methods

- (A) Prior to placing detectable warnings in proposed concrete curb ramps, adjust the existing subgrade to the proper grade and in accordance with Article 848-3 of the *2012 Standard Specifications*.
- (B) Install all detectable warning in proposed concrete curb ramps in accordance with the manufacturer's recommendations.

Measurement and Payment

Detectable Warnings installed for construction of proposed curb ramps will not be paid for separately. Such payment will be included in the price bid for *Concrete Curb Ramps*.

6" CONCRETE CURB:**Description**

Construct 6" Concrete Curb as shown on the plans and details, in accordance with the applicable requirements of Section 846 of the *Standards Specifications*, and as directed by the Engineer.

Measurement and Payment

6" Concrete Curb will be measured and paid for in Linear Feet. Such price and payment will include all materials, tools, labor, equipment and incidentals necessary to complete the work.

Payment will be made under:

Pay Item**Pay Unit**

6" Concrete Curb

LF

1'-6" MODIFIED CONCRETE CURB AND GUTTER:**Description**

Construct 1'-6" Modified Concrete Curb and Gutter as shown on the plans and details, in accordance with the applicable requirements of Section 846 of the *Standards Specifications*, and as directed by the Engineer.

Measurement and Payment

1'-6" Modified Concrete Curb and Gutter will be measured and paid for in Linear Feet. Such price and payment will include all materials, tools, labor, equipment and incidentals necessary to complete the work.

Payment will be made under:

Pay Item**Pay Unit**

1'-6" Modified Concrete Curb and Gutter

LF

FOUNDATIONS AND ANCHOR ROD ASSEMBLIES FOR METAL POLES:

(1-17-12) (Rev. 5-21-13)

9, 14, 17

SP9 R05

Description

Foundations for metal poles include foundations for signals, cameras, overhead and dynamic message signs (DMS) and high mount and low level light standards supported by metal poles or upright trusses. Foundations consist of footings with pedestals and drilled piers with or without grade beams or wings. Anchor rod assemblies consist of anchor rods (also called anchor bolts) with nuts and washers on the exposed ends of rods and nuts and a plate or washers on the other ends of rods embedded in the foundation.

Construct concrete foundations with the required resistances and dimensions and install anchor rod assemblies in accordance with the contract and accepted submittals. Construct drilled piers consisting of cast-in-place reinforced concrete cylindrical sections in excavated holes. Provide temporary casings or polymer slurry as needed to stabilize drilled pier excavations. Use a prequalified Drilled Pier Contractor to construct drilled piers for metal poles. Define "excavation" and "hole" as a drilled pier excavation and "pier" as a drilled pier.

This provision does not apply to materials and anchor rod assemblies for standard foundations for low level light standards. See Section 1405 of the *2012 Standard Specifications* and Standard Drawing No. 1405.01 of the *2012 Roadway Standard Drawings* for materials and anchor rod assemblies for standard foundations. For construction of standard foundations for low level light standards, standard foundations are considered footings in this provision.

This provision does not apply to foundations for signal pedestals; see Section 1743 of the *2012 Standard Specifications* and Standard Drawing No. 1743.01 of the *2012 Roadway Standard Drawings*.

Materials

Refer to the *2012 Standard Specifications*.

Item	Section
Conduit	1091-3
Grout, Nonshrink	1003
Polymer Slurry	411-2(B)
Portland Cement Concrete	1000
Reinforcing Steel	1070
Rollers and Chairs	411-2(C)
Temporary Casings	411-2(A)

Provide Type 3 material certifications in accordance with Article 106-3 of the *2012 Standard Specifications* for conduit, rollers, chairs and anchor rod assemblies. Store steel materials on blocking at least 12" above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Load, transport, unload and store foundation and anchor rod assembly materials so materials are kept clean and free of damage. Bent, damaged or defective materials will be rejected.

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

connect.ncdot.gov/resources/Geological/Pages/Products.aspx

Provide anchor rod assemblies in accordance with the contract consisting of the following:

- (A) Straight anchor rods,
- (B) Heavy hex top and leveling nuts and flat washers on exposed ends of rods, and
- (C) Nuts and either flat plates or washers on the other ends of anchor rods embedded in foundations.

Do not use lock washers. Use steel anchor rods, nuts and washers that meet ASTM F1554 for Grade 55 rods and Grade A nuts. Use steel plates and washers embedded in concrete with a thickness of at least 1/4". Galvanize anchor rods and exposed nuts and washers in accordance with Article 1076-4 of the *2012 Standard Specifications*. It is not necessary to galvanize nuts, plates and washers embedded in concrete.

Construction Methods

Install the required size and number of conduits in foundations in accordance with the plans and accepted submittals. Construct top of piers, footings, pedestals, grade beams and wings flat, level and within 1" of elevations shown in the plans or approved by the Engineer. Provide an Ordinary Surface finish in accordance with Subarticle 825-6(B) of the *2012 Standard Specifications* for portions of foundations exposed above finished grade. Do not remove anchor bolt templates or pedestal or grade beam forms or erect metal poles or upright trusses onto foundations until concrete attains a compressive strength of at least 3,000 psi.

(A) Drilled Piers

Before starting drilled pier construction, hold a predrill meeting to discuss the installation, monitoring and inspection of the drilled piers. Schedule this meeting after the Drilled Pier Contractor has mobilized to the site. The Resident or Division Traffic Engineer, Contractor and Drilled Pier Contractor Superintendent will attend this predrill meeting.

Do not excavate holes, install piles or allow equipment wheel loads or vibrations within 20 ft of completed piers until 16 hours after Drilled Pier concrete reaches initial set.

Check for correct drilled pier alignment and location before beginning drilling. Check plumbness of holes frequently during drilling.

Construct drilled piers with the minimum required diameters shown in the plans. Install piers with tip elevations no higher than shown in the plans or approved by the Engineer.

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

Contain and dispose of drilling spoils and waste concrete as directed and in accordance with Section 802 of the *2012 Standard Specifications*. Drilling spoils consist of all materials and fluids removed from excavations.

If unstable, caving or sloughing materials are anticipated or encountered, stabilize holes with temporary casings and/or polymer slurry. Do not use telescoping temporary casings. If it becomes necessary to replace a temporary casing during drilling, backfill the excavation, insert a larger casing around the casing to be replaced or stabilize the excavation with polymer slurry before removing the temporary casing.

If temporary casings become stuck or the Contractor proposes leaving casings in place, temporary casings should be installed against undisturbed material. Unless otherwise approved, do not leave temporary casings in place for mast arm poles and cantilever signs. The Engineer will determine if casings may remain in place. If the Contractor proposes leaving temporary casings in place, do not begin drilling until a casing installation method is approved.

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

Define a "sample set" as slurry samples collected from mid-height and within 2 ft of the bottom of holes. Take sample sets from excavations to test polymer slurry immediately after filling holes with slurry, at least every 4 hours thereafter and immediately before placing concrete. Do not place Drilled Pier concrete until both slurry samples from an excavation meet the required polymer slurry properties. If any slurry test results do not meet the requirements, the Engineer may suspend drilling until both samples from a sample set meet the required slurry properties.

Remove soft and loose material from bottom of holes using augers to the satisfaction of the Engineer. Assemble rebar cages and place cages and Drilled Pier concrete in accordance with Subarticle 411-4(E) of the *2012 Standard Specifications* except for the following:

- (1) Inspections for tip resistance and bottom cleanliness are not required,
- (2) Temporary casings may remain in place if approved, and
- (3) Concrete placement may be paused near the top of pier elevations for anchor rod assembly installation and conduit placement or
- (4) If applicable, concrete placement may be stopped at bottom of grade beam or wings elevations for grade beam or wing construction.

If wet placement of concrete is anticipated or encountered, do not place Drilled Pier concrete until a concrete placement procedure is approved. If applicable, temporary casings and fluids may be removed when concrete placement is paused or stopped in accordance with the exceptions above provided holes are stable. Remove contaminated

concrete from exposed Drilled Pier concrete after removing casings and fluids. If holes are unstable, do not remove temporary casings until a procedure for placing anchor rod assemblies and conduit or constructing grade beams or wings is approved.

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

If drilled piers are questionable, pile integrity testing (PIT) and further investigation may be required in accordance with Article 411-5 of the *2012 Standard Specifications*. A drilled pier will be considered defective in accordance with Subarticle 411-5(D) of the *2012 Standard Specifications* and drilled pier acceptance is based in part on the criteria in Article 411-6 of the *2012 Standard Specifications* except for the top of pier tolerances in Subarticle 411-6(C) of the *2012 Standard Specifications*.

If a drilled pier is under further investigation, do not grout core holes, backfill around the pier or perform any work on the drilled pier until the Engineer accepts the pier. If the drilled pier is accepted, dewater and grout core holes and backfill around the pier with approved material to finished grade. If the Engineer determines a pier is unacceptable, remediation is required in accordance with Article 411-6 of the *2012 Standard Specifications*. No extension of completion date or time will be allowed for remediation of unacceptable drilled piers or post repair testing.

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

(B) Footings, Pedestals, Grade Beams and Wings

Excavate as necessary for footings, grade beams and wings in accordance with the plans, accepted submittals and Section 410 of the *2012 Standard Specifications*. If unstable, caving or sloughing materials are anticipated or encountered, shore foundation excavations as needed with an approved method. Notify the Engineer when foundation excavation is complete. Do not place concrete or reinforcing steel until excavation dimensions and foundation material are approved.

Construct cast-in-place reinforced concrete footings, pedestals, grade beams and wings with the dimensions shown in the plans and in accordance with Section 825 of the *2012 Standard Specifications*. Use forms to construct portions of pedestals and grade beams protruding above finished grade. Provide a chamfer with a 3/4" horizontal width for pedestal and grade beam edges exposed above finished grade. Backfill and fill in accordance with Article 410-8 of the *2012 Standard Specifications*. Proper compaction around footings and wings is critical for foundations to resist uplift and torsion forces. Place concrete against undisturbed soil and do not use forms for standard foundations for low level light standards.

(C) Anchor Rod Assemblies

Size anchor rods for design and the required projection above top of foundations. Determine required anchor rod projections from nut, washer and base plate thicknesses, the protrusion of 3 to 5 anchor rod threads above top nuts after tightening and the distance of one nut thickness between top of foundations and bottom of leveling nuts.

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

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

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

- (1) Turn leveling nuts onto anchor rods to a distance of one nut thickness between the top of foundation and bottom of leveling nuts. Place washers over anchor rods on top of leveling nuts.
- (2) Determine if nuts are level using a flat rigid template on top of washers. If necessary, lower leveling nuts to level the template in all directions or if applicable, lower nuts to tilt the template so the metal pole or upright truss will lean as shown in the plans. If leveling nuts and washers are not in full contact with the template, replace washers with galvanized beveled washers.
- (3) Verify the distance between the foundation and leveling nuts is no more than one nut thickness.
- (4) Place base plate with metal pole or upright truss over anchor rods on top of washers. High mount luminaires may be attached before erecting metal poles but do not attach cables, mast arms or trusses to metal poles or upright trusses at this time.
- (5) Place washers over anchor rods on top of base plate. Lubricate top nut bearing surfaces and exposed anchor rod threads above washers with beeswax, paraffin or other approved lubricant.
- (6) Turn top nuts onto anchor rods. If nuts are not in full contact with washers or washers are not in full contact with the base plate, replace washers with galvanized beveled washers.
- (7) Tighten top nuts to snug-tight with the full effort of one workman using a 12" wrench. Do not tighten any nut all at once. Turn top nuts in increments. Follow a star pattern cycling through each nut at least twice.
- (8) Repeat (7) for leveling nuts.
- (9) Replace washers above and below the base plate with galvanized beveled washers if the slope of any base plate face exceeds 1:20 (5%), any washer is not in firm contact with the base plate or any nut is not in firm contact with a washer. If any washers are replaced, repeat (7) and (8).

- (10) With top and leveling nuts snug-tight, mark each top nut on a corner at the intersection of 2 flats and a corresponding reference mark on the base plate. Mark top nuts and base plate with ink or paint that is not water-soluble. Use the turn-of-nut method for pretensioning. Do not pretension any nut all at once. Turn top nuts in increments for a total turn that meets the following nut rotation requirements:

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

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

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

TORQUE REQUIREMENTS	
Anchor Rod Diameter, inch	Requirement, ft-lb
7/8	180
1	270
1 1/8	380
1 1/4	420
$\geq 1 \frac{1}{2}$	600

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

- (13) Do not grout under base plate.

Measurement and Payment

Foundations and anchor rod assemblies for metal poles and upright trusses will be measured and paid for elsewhere in the contract.

No payment will be made for temporary casings that remain in drilled pier excavations. No payment will be made for PIT. No payment will be made for further investigation of defective piers. Further investigation of piers that are not defective will be paid as extra work in accordance with Article 104-7 of the *2012 Standard Specifications*. No payment will be made for remediation of unacceptable drilled piers or post repair testing.

MATERIALS:

(2-21-12) (Rev. 5-20-14)

1000, 1002, 1005, 1024, 1050, 1056, 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:

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

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

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	2.5	4	508	-	545	-
B Slip Formed	2,500	0.488	0.567	-	-	1.5	-	508	-	-	-
Sand Light-weight	4,500	-	0.420	-	-	4	-	715	-	-	-
Latex Modified	3,000 7 day	0.400	0.400	-	-	6	-	658	-	-	-
Flowable Fill excavatable	150 max. at 56 days	as needed	as needed	as needed	as needed	-	Flow-able	-	-	40	100
Flowable Fill non-excavatable	125	as needed	as needed	as needed	as needed	-	Flow-able	-	-	100	as needed
Pavement	4,500 design, field 650 flexural, design only	0.559	0.559	-	-	1.5 slip form 3.0 hand place	-	526	-	-	-
Precast	See Table 1077-1	as needed	as needed	-	-	6	as needed	as needed	as needed	as needed	as needed
Prestress	per contract	See Table 1078-1	See Table 1078-1	-	-	8	-	564	as needed	-	-

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

Item	Section
Type IL Blended Cement	1024-1

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

TABLE 1005-1 AGGREGATE GRADATION - COARSE AGGREGATE													
Percentage of Total by Weight Passing													
Std. Size #	2"	1 1/2"	1"	3/4"	1/2"	3/8"	#4	#8	#10	#16	#40	#200	Remarks
4	100	90-100	20-55	0-15	-	0-5	-	-	-	-	-	A	Asphalt Plant Mix
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, Str. Concrete, Shoulder Drain, Sediment Control Stone
57M	-	100	95-100	-	25-45	-	0-10	0-5	-	-	-	A	AST, Concrete Pavement
6M	-	-	100	90-100	20-55	0-20	0-8	-	-	-	-	A	AST
67	-	-	100	90-100	-	20-55	0-10	0-5	-	-	-	A	AST, Str. Concrete, Asphalt Plant Mix
78M	-	-	-	100	98-100	75-100	20-45	0-15	-	-	-	A	Asphalt Plant Mix, AST, Str. Conc, Weep Hole Drains
14M	-	-	-	-	-	100	35-70	5-20	-	0-8	-	A	Asphalt Plant Mix, AST, Weep Hole Drains, Str. Concrete
9	-	-	-	-	-	100	85-100	10-40	-	0-10	-	A	AST
ABC	-	100	75-97	-	55-80	-	35-55	-	25-45	-	14-30	4-12 ^B	Aggregate Base Course, Aggregate Stabilization
ABC (M)	-	100	75-100	-	45-79	-	20-40	-	0-25	-	-	0-12 ^B	Maintenance Stabilization
Lightweight 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 10-46, 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 10-65, Article 1050-1, GENERAL, line 41, replace the first sentence with the following:

All fencing material and accessories shall meet Section 106.

Page 10-73, Article 1056-1 DESCRIPTION, lines 7-8, delete the first sentence of the second paragraph and replace with the following:

Use geotextile fabrics that are on the NCDOT Approved Products List.

Page 10-73, Article 1056-2 HANDLING AND STORING, line 17, replace “mechanically stabilized earth (MSE) wall faces” with “temporary wall faces”.

Page 10-74, TABLE 1056-1 GEOTEXTILE REQUIREMENTS, replace table with the following:

TABLE 1056-1 GEOTEXTILE REQUIREMENTS						
Property	Requirement (MARV^A)					Test Method
	Type 1	Type 2	Type 3^B	Type 4	Type 5^C	
<i>Typical Application</i>	<i>Shoulder Drains</i>	<i>Under Rip Rap</i>	<i>Temporary Silt Fence</i>	<i>Soil Stabilization</i>	<i>Temporary Walls</i>	
Elongation (MD & CD)	≥ 50%	≥ 50%	≤ 25%	< 50%	< 50%	ASTM D4632
Grab Strength (MD & CD)	Table 1 ^D , Class 3	Table 1 ^D , Class 1	100 lb	Table 1 ^D , Class 3	-	ASTM D4632
Tear Strength (MD & CD)			-		-	ASTM D4533
Puncture Strength			-		-	ASTM D6241
Ultimate Tensile Strength (MD & CD)	-	-	-	-	2,400 lb/ft (unless required otherwise in the contract)	ASTM D4595
Permittivity	Table 2 ^D , 15% to 50% in Situ Soil Passing No. 200 ^E		Table 7 ^D	Table 5 ^D	0.20 sec ⁻¹	ASTM D4491
Apparent Opening Size					No. 30 ^E	ASTM D4751
UV Stability (Retained Strength)					70%	ASTM D4355

- A.** MARV does not apply to elongation
B. Minimum roll width of 36" required
C. Minimum roll width of 13 ft required
D. AASHTO M 288
E. US Sieve No. per AASHTO M 92

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

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

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 table 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 this subarticle with the following:

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

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

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

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

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

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

1081-4 EPOXY RESIN ADHESIVE FOR BONDING TRAFFIC MARKINGS

(A) General

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

(B) Classification

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

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

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

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

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

(C) Requirements

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

(D) Prequalification

Refer to Subarticle 1081-1(E).

(E) Acceptance

Refer to Subarticle 1081-1(F).

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

Steel sheet piles detailed for permanent applications shall be hot rolled and meet ASTM A572 or ASTM A690 unless otherwise required by the plans. 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 this subarticle with the following:

The epoxy shall meet Article 1081-4.

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

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

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

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

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

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

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

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

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

Page 10-204, Subarticle 1092-2(A) Performance and Test Requirements, replace Table 1092-3 Minimum Coefficient of Retroreflection for NC Grade A with the following:

TABLE 1092-3 MINIMUM COEFFICIENT OF RETROREFLECTION FOR NC GRADE A (Candelas Per Lux Per Square Meter)								
Observation Angle, degrees	Entrance Angle, degrees	White	Yellow	Green	Red	Blue	Fluorescent Yellow Green	Fluorescent Yellow
0.2	-4.0	525	395	52	95	30	420	315
0.2	30.0	215	162	22	43	10	170	130
0.5	-4.0	310	230	31	56	18	245	185
0.5	30.0	135	100	14	27	6	110	81
1.0	-4.0	120	60	8	16	3.6	64	48
1.0	30.0	45	34	4.5	9	2	36	27

HIGH STRENGTH CONCRETE FOR DRIVEWAYS:

(11-21-00) (Rev. 1-17-12)

848

SP10 R02

Use high early strength concrete for all driveways shown in the plans and as directed by the Engineer. Provide high early strength concrete that meets the requirements of Article 1000-5 of the *2012 Standard Specifications*.

Measurement and payment will be in accordance with Section 848 of the *2012 Standard Specifications*.

SELECT MATERIAL, CLASS III, TYPE 3:

(1-17-12)

1016, 1044

SP10 R05

Revise the *2012 Standard Specifications* as follows:

Page 10-39, Article 1016-3, CLASS III, add the following after line 14:

Type 3 Select Material

Type 3 select material is a natural or manufactured fine aggregate material meeting the following gradation requirements and as described in Sections 1005 and 1006:

Percentage of Total by Weight Passing							
3/8"	#4	#8	#16	#30	#50	#100	#200
100	95-100	65-100	35-95	15-75	5-35	0-25	0-8

Page 10-39, Article 1016-3, CLASS III, line 15, replace “either type” with “Type 1, Type 2 or Type 3”.

Page 10-62, Article 1044-1, line 36, delete the sentence and replace with the following:

Subdrain fine aggregate shall meet Class III select material, Type 1 or Type 3.

Page 10-63, Article 1044-2, line 2, delete the sentence and replace with the following:

Subdrain coarse aggregate shall meet Class V select material.

SHOULDER AND SLOPE BORROW:

(3-19-13)

1019

SP10 R10

Use soil in accordance with Section 1019 of the *2012 Standard Specifications*. Use soil consisting of loose, friable, sandy material with a PI greater than 6 and less than 25 and a pH ranging from 5.5 to 7.0.

Soil with a pH ranging from 4.0 to 5.5 will be accepted without further testing if additional limestone is provided in accordance with the application rates shown in Table 1019-1A. Soil type is identified during the soil analysis. Soils with a pH above 7.0 require acidic amendments to be added. Submit proposed acidic amendments to the Engineer for review and approval. Soils with a pH below 4.0 or that do not meet the PI requirements shall not be used.

TABLE 1019-1A ADDITIONAL LIMESTONE APPLICATION RATE TO RAISE pH			
pH TEST RESULT	Sandy Soils Additional Rate (lbs. / Acre)	Silt Loam Soils Additional Rate (lbs. / Acre)	Clay Loam Soils Additional Rate (lbs. / Acre)
4.0 - 4.4	1,000	4,000	6,000
4.5 - 4.9	500	3,000	5,000
5.0 - 5.4	NA	2,000	4,000

Note: Limestone application rates shown in this table are in addition to the standard rate of 4000 lbs. / acre required for seeding and mulching.

No direct payment will be made for providing additional lime or acidic amendments for Ph adjustment.

TEMPORARY SHORING:

(2-20-07) (Rev. 5-21-13)

SP11 R02

Description

Temporary shoring includes cantilever, braced and anchored shoring and temporary mechanically stabilized earth (MSE) walls. Temporary shoring does not include trench boxes. At the Contractor's option, use any type of temporary shoring unless noted otherwise in the plans or as directed. Design and construct temporary shoring based on actual elevations and shoring dimensions in accordance with the contract and accepted submittals. Construct temporary

shoring at locations shown in the plans and as directed. Temporary shoring is required to maintain traffic when a 2:1 (H:V) slope from the top of an embankment or bottom of an excavation will intersect the existing ground line less than 5 ft from the edge of pavement of an open travelway. This provision does not apply to pipe, inlet or utility installation unless noted otherwise in the plans.

Positive protection includes concrete barrier and temporary guardrail. Provide positive protection for temporary shoring at locations shown in the plans and as directed. Positive protection is required if temporary shoring is located in the clear zone in accordance with the *AASHTO Roadside Design Guide*.

(A) Cantilever and Braced Shoring

Cantilever shoring consists of steel sheet piles or H-piles with timber lagging. Braced shoring consists of sheet piles or H-piles with timber lagging and bracing such as beams, plates, walers, struts, rakers, etc. Define "piles" as sheet piles or H-piles.

(B) Anchored Shoring

Anchored shoring consists of sheet piles with walers or H-piles with timber lagging anchored with ground or helical anchors. Driven anchors may be accepted at the discretion of the Engineer. A ground anchor consists of a grouted steel bar or multi-strand tendon with an anchorage. A helical anchor consists of a lead section with a central steel shaft and at least one helix steel plate followed by extensions with only central shafts (no helixes) and an anchorage. Anchorages consist of steel bearing plates with washers and hex nuts for bars or steel wedge plates and wedges for strands. Use a prequalified Anchored Wall Contractor to install ground anchors. Define "anchors" as ground, helical or driven anchors.

(C) Temporary MSE Walls

Temporary MSE walls include temporary geosynthetic and wire walls. Define "temporary wall" as a temporary MSE wall. Define "reinforcement" as geotextile, geogrid, welded wire grid or metallic strip reinforcement.

Temporary geosynthetic walls consist of geotextile or geogrid reinforcement wrapped behind welded wire facing. Define "temporary geotextile wall" as a temporary geosynthetic wall with geotextile reinforcement and "temporary geogrid wall" as a temporary geosynthetic wall with geogrid reinforcement.

Temporary wire walls consist of welded wire grid or metallic strip reinforcement connected to welded wire facing. Define "Wire Wall Vendor" as the vendor supplying the temporary wire wall.

(D) Embedment

Define “embedment” for cantilever, braced and anchored shoring as the pile depth below the grade in front of shoring. Define “embedment” for temporary walls as the wall height below the grade in front of walls.

(E) Positive Protection

Define “unanchored or anchored portable concrete barrier” as portable concrete barrier (PCB) that meets Standard Drawing No. 1170.01 of the *2012 Roadway Standard Drawings*. Define “concrete barrier” as unanchored or anchored PCB or an approved equal. Define “temporary guardrail” as temporary steel beam guardrail that meets Standard Drawing No. 862.02 of the *2012 Roadway Standard Drawings*.

Materials

Refer to the *2012 Standard Specifications*.

Item	Section
Anchor Pins	1056-2
Concrete Barrier Materials	1170-2
Flowable Fill, Excavatable	1000-6
Geotextiles	1056
Neat Cement Grout	1003
Portland Cement Concrete	1000
Select Material	1016
Steel Beam Guardrail Materials	862-2
Steel Plates	1072-2
Steel Sheet Piles and H-Piles	1084
Untreated Timber	1082-2
Welded Wire Reinforcement	1070-3
Wire Staples	1060-8(D)

Provide Type 6 material certifications for shoring materials in accordance with Article 106-3 of the *2012 Standard Specifications*. Use Class IV select material (standard size No. ABC) for temporary guardrail. Use nonshrink neat cement grout or Class A concrete that meets Article 450-2 of the *2012 Standard Specifications* for drilled-in piles. Use untreated timber with a thickness of at least 3" and a bending stress of at least 1,000 psi for timber lagging. Provide steel bracing that meets ASTM A36.

(A) Shoring Backfill

Use Class II, Type 1, Class III, Class V or Class VI select material or material that meets AASHTO M 145 for soil classification A-2-4 with a maximum PI of 6 for shoring backfill except do not use A-2-4 soil for backfill around culverts.

(B) Anchors

Store anchor materials on blocking a minimum of 12" above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Load, transport, unload and store anchor materials so materials are kept clean and free of damage. Bent, damaged or defective materials will be rejected.

(1) Ground Anchors

Use high-strength deformed steel bars that meet AASHTO M 275 or seven-wire strands that meet ASTM A886 or Article 1070-5 of the *2012 Standard Specifications*. Splice bars in accordance with Article 1070-9 of the *2012 Standard Specifications*. Do not splice strands. Use bondbreakers, spacers and centralizers that meet Article 6.3.5 of the *AASHTO LRFD Bridge Construction Specifications*.

(2) Helical Anchors

Use helical anchors with an ICC Evaluation Service, Inc. (ICC-ES) report. Helical anchors without an ICC-ES report may be approved at the discretion of the Engineer. Provide couplers, thread bar adapters and bolts recommended by the Anchor Manufacturer to connect helical anchors together and to piles.

(3) Anchorages

Provide steel plates for bearing plates and steel washers, hex nuts, wedge plates and wedges recommended by the Anchor Manufacturer.

(C) Temporary Walls

(1) Welded Wire Facing

Use welded wire reinforcement for welded wire facing, struts and wires. For temporary wire walls, provide welded wire facing supplied by the Wire Wall Vendor or a manufacturer approved or licensed by the vendor. For temporary wire walls with separate reinforcement and facing components, provide connectors (e.g., bars, clamps, plates, etc.) and fasteners (e.g., bolts, nuts, washers, etc.) required by the Wire Wall Vendor.

(2) Geotextiles

Provide Type 2 geotextile for separation and retention geotextiles. Provide Type 5 geotextile for geotextile reinforcement with ultimate tensile strengths in accordance with the accepted submittals.

(3) Geogrid Reinforcement

Handle and store geogrids in accordance with Article 1056-2 of the *2012 Standard Specifications*. Define “machine direction” (MD) and “cross-machine direction” (CD) for geogrids in accordance with ASTM D4439.

Use geogrids with a roll width of at least 4 ft and an “approved” or “approved for provisional use” status code. The list of approved geogrids is available from: connect.ncdot.gov/resources/Materials/Pages/SoilsLaboratory.aspx

Provide geogrids for geogrid reinforcement with design strengths in accordance with the accepted submittals. Geogrids are typically approved for ultimate tensile strengths in the MD and CD or short-term design strengths for a 3-year design life in the MD based on material type. Define material type from the website above for shoring backfill as follows:

Material Type	Shoring Backfill
Borrow	A-2-4 Soil
Fine Aggregate	Class II, Type 1 or Class III Select Material
Coarse Aggregate	Class V or VI Select Material

(4) Welded Wire Grid and Metallic Strip Reinforcement

Provide welded wire grid and metallic strip reinforcement supplied by the Wire Wall Vendor or a manufacturer approved or licensed by the vendor. Use welded wire grid reinforcement (“mesh”, “mats” and “ladders”) that meet Article 1070-3 of the *2012 Standard Specifications* and metallic strip reinforcement (“straps”) that meet ASTM A572 or A1011.

Preconstruction Requirements

(A) Concrete Barrier

Define “clear distance” behind concrete barrier as the horizontal distance between the barrier and edge of pavement. The minimum required clear distance for concrete barrier is shown in the plans. At the Contractor’s option or if the minimum required clear distance is not available, set concrete barrier next to and up against traffic side of temporary shoring except for barrier above temporary walls. Concrete barrier with the minimum required clear distance is required above temporary walls.

(B) Temporary Guardrail

Define “clear distance” behind temporary guardrail as the horizontal distance between guardrail posts and temporary shoring. At the Contractor’s option or if clear distance for cantilever, braced and anchored shoring is less than 4 ft, attach guardrail to traffic side of shoring as shown in the plans. Place ABC in clear distance and around guardrail posts instead of pavement. Do not use temporary guardrail above temporary walls.

(C) Temporary Shoring Designs

Before beginning temporary shoring design, survey existing ground elevations in the vicinity of shoring locations to determine actual design heights (H). Submit 8 copies of working drawings and 3 copies of design calculations and a PDF copy of each for temporary shoring designs in accordance with Article 105-2 of the *2012 Standard Specifications*. Submit working drawings showing plan views, shoring profiles, typical sections and details of temporary shoring design and construction sequence. Do not begin shoring construction until a design submittal is accepted.

Have cantilever and braced shoring designed, detailed and sealed by an engineer licensed in the state of North Carolina. Use a prequalified Anchored Wall Design Consultant to design anchored shoring. Provide anchored shoring designs sealed by a Design Engineer approved as a Geotechnical Engineer (key person) for an Anchored Wall Design Consultant. Include details in anchored shoring working drawings of anchor locations and lock-off loads, unit grout/ground bond strengths for ground anchors or minimum installation torque and torsional strength rating for helical anchors and if necessary, obstructions extending through shoring or interfering with anchors. Include details in the anchored shoring construction sequence of pile and anchor installation, excavation and anchor testing.

Use a prequalified MSE Wall Design Consultant to design temporary walls. Provide temporary wall designs sealed by a Design Engineer approved as a Geotechnical Engineer (key person) for the MSE Wall Design Consultant. Include details in temporary wall working drawings of geotextile and reinforcement types, locations and directions and obstructions extending through walls or interfering with reinforcement.

(1) Soil Parameters

Design temporary shoring for the assumed soil parameters and groundwater elevations shown in the plans. Assume the following soil parameters for shoring backfill:

(a) Unit weight (γ) = 120 lb/cf;

(b)	Friction Angle (ϕ)	Shoring Backfill
	30°	A-2-4 Soil
	34°	Class II, Type 1 or Class III Select Material
	38°	Class V or VI Select Material

(c) Cohesion (c) = 0 lb/sf.

(2) Traffic Surcharge

Design temporary shoring for a traffic surcharge of 250 lb/sf if traffic will be above and within H of shoring. This traffic surcharge does not apply to construction traffic. Design temporary shoring for any construction surcharge if construction traffic will be above and within H of shoring. For LRFD shoring designs, apply traffic (live load) surcharge in accordance with Figure C11.5.5-3 of the *AASHTO LRFD Bridge Design Specifications*.

(3) Cantilever, Braced and Anchored Shoring Designs

Use shoring backfill for fill sections and voids between cantilever, braced and anchored shoring and the critical failure surface. Use concrete or grout for embedded portions of drilled-in H-piles. Do not use drilled-in sheet piles.

Define "top of shoring" for cantilever, braced and anchored shoring as where the grade intersects the back of sheet piles or H-piles and timber lagging. Design cantilever, braced and anchored shoring for a traffic impact load of 2,000 lb/ft applied 18" above top of shoring if concrete barrier is above and next to shoring or temporary guardrail is above and attached to shoring. For anchored shoring designs, apply traffic impact load as horizontal load (P_{HI}) in accordance with Figure 3.11.6.3-2(a) of the AASHTO LRFD specifications.

Extend cantilever, braced and anchored shoring at least 32" above top of shoring if shoring is designed for traffic impact. Otherwise, extend shoring at least 6" above top of shoring.

Design cantilever, braced and anchored shoring for a maximum deflection of 3" if the horizontal distance to the closest edge of pavement or structure is less than H. Otherwise, design shoring for a maximum deflection of 6". Design cantilever and braced shoring in accordance with the plans and *AASHTO Guide Design Specifications for Bridge Temporary Works*.

Design anchored shoring in accordance with the plans and Article 11.9 of the *AASHTO LRFD Bridge Design Specifications*. Use a resistance factor of 0.80 for tensile resistance of anchors with bars, strands or shafts. Extend the unbonded length for ground anchors and the shallowest helix for helical anchors at least 5 ft behind the critical failure surface. Do not extend anchors beyond right-of-way or easement limits. If existing or future obstructions such as foundations, guardrail posts, pavements, pipes, inlets or utilities will interfere with anchors, maintain a clearance of at least 6" between obstructions and anchors.

(4) Temporary Wall Designs

Use shoring backfill in the reinforced zone of temporary walls. Separation geotextiles are required between shoring backfill and backfill, natural ground or culverts along the sides of the reinforced zone perpendicular to the wall face. For Class V or VI select material in the reinforced zone, separation geotextiles are also required between shoring backfill and backfill or natural ground on top of and at the back of the reinforced zone.

Design temporary walls in accordance with the plans and Article 11.10 of the *AASHTO LRFD Bridge Design Specifications*. Embed temporary walls at least 18" except for walls on structures or rock as determined by the Engineer. Use a uniform reinforcement length throughout the wall height of at least 0.7H or 6 ft,

whichever is greater. Extend the reinforced zone at least 6" beyond end of reinforcement. Do not locate the reinforced zone outside right-of-way or easement limits.

Use the simplified method for determining maximum reinforcement loads in accordance with the AASHTO LRFD specifications. For geotextile reinforcement, use geotextile properties approved by the Department or default values in accordance with the AASHTO LRFD specifications. For geogrid reinforcement, use approved geogrid properties available from the website shown elsewhere in this provision. If the website does not list a short-term design strength for an approved geogrid, use a short-term design strength equal to the ultimate tensile strength divided by 3.5 for the geogrid reinforcement. Use geosynthetic properties for the direction reinforcement will be installed, a 3-year design life and shoring backfill to be used in the reinforced zone.

Do not use more than 4 different reinforcement strengths for each temporary geosynthetic wall. Design temporary geotextile walls for a reinforcement coverage ratio (R_c) of 1.0 and temporary geogrid walls for an R_c of at least 0.8. For geogrid reinforcement with an R_c of less than 1.0, use a maximum horizontal clearance between geogrids of 3 ft and stagger reinforcement so geogrids are centered over gaps in the reinforcement layer below.

For temporary geosynthetic walls, use "L" shaped welded wire facing with 18" to 24" long legs. Locate geotextile or geogrid reinforcement so reinforcement layers are at the same level as the horizontal legs of welded wire facing. Use vertical reinforcement spacing equal to facing height. Wrap geotextile or geogrid reinforcement behind welded wire facing and extend reinforcement at least 3 ft back behind facing into shoring backfill.

For temporary wire walls with separate reinforcement and facing components, attach welded wire grid or metallic strip reinforcement to welded wire facing with a connection approved by the Department. For temporary geogrid and wire walls, retain shoring backfill at welded wire facing with retention geotextiles and extend geotextiles at least 3 ft back behind facing into backfill.

(D) Preconstruction Meeting

The Engineer may require a shoring preconstruction meeting to discuss the construction, inspection and testing of the temporary shoring. If required, schedule this meeting after all shoring submittals have been accepted. The Resident, District or Bridge Maintenance Engineer, Bridge or Roadway Construction Engineer, Geotechnical Operations Engineer, Contractor and Shoring Contractor Superintendent will attend this preconstruction meeting.

Construction Methods

Control drainage during construction in the vicinity of shoring. Direct run off away from shoring and shoring backfill. Contain and maintain backfill and protect material from erosion.

Install positive protection in accordance with the contract and accepted submittals. Use PCB in accordance with Section 1170 of the *2012 Standard Specifications* and Standard Drawing No. 1170.01 of the *2012 Roadway Standard Drawings*. Use temporary guardrail in accordance with Section 862 of the *2012 Standard Specifications* and Standard Drawing No. 862.01, 862.02 and 862.03 of the *2012 Roadway Standard Drawings*.

(A) Tolerances

Construct shoring with the following tolerances:

- (1) Horizontal wires of welded wire facing are level in all directions,
- (2) Shoring location is within 6" of horizontal and vertical alignment shown in the accepted submittals, and
- (3) Shoring plumbness (batter) is not negative and within 2° of vertical.

(B) Cantilever, Braced and Anchored Shoring Installation

If overexcavation behind cantilever, braced or anchored shoring is shown in the accepted submittals, excavate before installing piles. Otherwise, install piles before excavating for shoring. Install cantilever, braced or anchored shoring in accordance with the construction sequence shown in the accepted submittals. Remove piles and if applicable, timber lagging when shoring is no longer needed.

(1) Pile Installation

Install piles with the minimum required embedment and extension in accordance with Subarticles 450-3(D) and 450-3(E) of the *2012 Standard Specifications* except that a pile driving equipment data form is not required. Piles may be installed with a vibratory hammer as approved by the Engineer.

Do not splice sheet piles. Use pile excavation to install drilled-in H-piles. After filling holes with concrete or grout to the elevations shown in the accepted submittals, remove any fluids and fill remaining portions of holes with flowable fill. Cure concrete or grout at least 7 days before excavating.

Notify the Engineer if refusal is reached before pile excavation or driven piles attain the minimum required embedment. When this occurs, a revised design submittal may be required.

(2) Excavation

Excavate in front of piles from the top down in accordance with the accepted submittals. For H-piles with timber lagging and braced and anchored shoring, excavate in staged horizontal lifts with a maximum height of 5 ft. Remove flowable fill and material in between H-piles as needed to install timber lagging. Position lagging with at least 3" of contact in the horizontal direction between the lagging and pile flanges. Do not excavate the next lift until timber lagging for the current lift is installed and if applicable, bracing and anchors for the current lift are accepted. Backfill behind cantilever, braced or anchored shoring with shoring backfill.

(3) Anchor Installation

If applicable, install foundations located behind anchored shoring before installing anchors. Fabricate and install ground anchors in accordance with the accepted submittals, Articles 6.4 and 6.5 of the *AASHTO LRFD Bridge Construction Specifications* and the following unless otherwise approved:

- (a) Materials in accordance with this provision are required instead of materials conforming to Articles 6.4 and 6.5.3 of the AASHTO LRFD Specifications,
- (b) Encapsulation-protected ground anchors in accordance with Article 6.4.1.2 of the AASHTO LRFD specifications are not required, and
- (c) Corrosion protection for unbonded lengths of ground anchors and anchorage covers are not required.

Install helical anchors in accordance with the accepted submittals and Anchor Manufacturer's instructions. Measure torque during installation and do not exceed the torsional strength rating of the helical anchor. Attain the minimum required installation torque and penetration before terminating anchor installation. When replacing a helical anchor, embed last helix of the replacement anchor at least 3 helix plate diameters past the location of the first helix of the previous anchor.

(4) Anchor Testing

Proof test and lock-off anchors in accordance with the accepted submittals and Article 6.5.5 of the *AASHTO LRFD Bridge Construction Specifications* except for the acceptance criteria in Article 6.5.5.5. For the AASHTO LRFD specifications, "ground anchor" refers to a ground or helical anchor and "tendon" refers to a bar, strand or shaft.

(a) Anchor Acceptance

Anchor acceptance is based in part on the following criteria.

- (i) For ground and helical anchors, total movement is less than 0.04" between the 1 and 10 minute readings or less than 0.08" between the 6 and 60 minute readings.

- (ii) For ground anchors, total movement at maximum test load exceeds 80% of the theoretical elastic elongation of the unbonded length.

(b) Anchor Test Results

Submit 2 copies of anchor test records including movement versus load plots for each load increment within 24 hours of completing each row of anchors. The Engineer will review the test records to determine if the anchors are acceptable.

If the Engineer determines an anchor is unacceptable, revise the anchor design or installation methods. Submit a revised anchored shoring design for acceptance and provide an acceptable anchor with the revised design or installation methods. If required, replace the anchor or provide additional anchors with the revised design or installation methods.

(C) Temporary Wall Installation

Excavate as necessary for temporary walls in accordance with the plans and accepted submittals. If applicable, install foundations located in the reinforced zone before placing shoring backfill or reinforcement unless otherwise approved. Notify the Engineer when foundation excavation is complete. Do not place shoring backfill or reinforcement until excavation dimensions and foundation material are approved.

Erect welded wire facing so the wall position is as shown in the plans and accepted submittals. Set welded wire facing adjacent to each other in the horizontal and vertical direction to completely cover the wall face with facing. Stagger welded wire facing to create a running bond by centering facing over joints in the row below.

Wrap geotextile reinforcement and retention geotextiles behind welded wire facing as shown in the plans and accepted submittals and cover geotextiles with at least 3" of shoring backfill. Overlap adjacent geotextile reinforcement and retention and separation geotextiles at least 18" with seams oriented perpendicular to the wall face. Hold geotextiles in place with wire staples or anchor pins as needed.

Place reinforcement within 3" of locations shown in the plans and accepted submittals and in slight tension free of kinks, folds, wrinkles or creases. Install reinforcement with the direction shown in the plans and accepted submittals. For temporary wire walls with separate reinforcement and facing components, attach welded wire grid or metallic strip reinforcement to welded wire facing as shown in the accepted submittals. Do not splice or overlap reinforcement so seams are parallel to the wall face. Contact the Engineer when unanticipated existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with reinforcement.

Place shoring backfill in the reinforced zone in 8" to 10" thick lifts. Compact A-2-4 soil and Class II, Type 1 and Class III select material in accordance with Subarticle 235-3(C) of the *2012 Standard Specifications*. Use only hand operated compaction equipment to compact backfill within 3 ft of welded wire facing. At a distance greater than 3 ft, compact shoring backfill with at least 4 passes of an 8 ton to 10 ton vibratory roller in

a direction parallel to the wall face. Smooth wheeled or rubber tired rollers are also acceptable for compacting backfill. Do not use sheepsfoot, grid rollers or other types of compaction equipment with feet. Do not displace or damage reinforcement when placing and compacting shoring backfill. End dumping directly on geotextile or geogrid reinforcement is not permitted. Do not operate heavy equipment on reinforcement until it is covered with at least 8" of shoring backfill. Replace any damaged reinforcement to the satisfaction of the Engineer.

Backfill for temporary walls outside the reinforced zone in accordance with Article 410-8 of the *2012 Standard Specifications*. Bench temporary walls into the sides of excavations where applicable. For temporary geosynthetic walls with top of wall within 5 ft of finished grade, remove top facing and incorporate top reinforcement layer into fill when placing fill in front of wall. Temporary walls remain in place permanently unless otherwise required.

Measurement and Payment

Temporary Shoring will be measured and paid in square feet. Temporary walls will be measured as the square feet of exposed wall face area. Cantilever, braced or anchored shoring will be measured as the square feet of exposed shoring face area with the shoring height equal to the difference between the top and bottom of shoring elevations. Define "top of shoring" as where the grade intersects the back of sheet piles or H-piles and timber lagging. Define "bottom of shoring" as where the grade intersects front of sheet piles or H-piles and timber lagging. No measurement will be made for any embedment, shoring extension above top of shoring or pavement thickness above temporary walls.

The contract unit price for *Temporary Shoring* will be full compensation for providing shoring designs, submittals and materials, excavating, backfilling, hauling and removing excavated materials and supplying all labor, tools, equipment and incidentals necessary to construct temporary shoring.

No payment will be made for temporary shoring not shown in the plans or required by the Engineer including shoring for OSHA reasons or the Contractor's convenience. No value engineering proposals will be accepted based solely on revising or eliminating shoring locations shown in the plans or estimated quantities shown in the bid item sheets as a result of actual field measurements or site conditions.

PCB will be measured and paid in accordance with Section 1170 of the *2012 Standard Specifications*. No additional payment will be made for anchoring PCB for temporary shoring. Costs for anchoring PCB will be incidental to temporary shoring.

Temporary guardrail will be measured and paid for in accordance with Section 862 of the *2012 Standard Specifications*.

Payment will be made under:

Pay Item
Temporary Shoring

Pay Unit
Square Foot

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.

PERMANENT SEEDING AND MULCHING:

(7-1-95)

1660

SP16 R02

The Department desires that permanent seeding and mulching be established on this project as soon as practical after slopes or portions of slopes have been graded. As an incentive to obtain an early stand of vegetation on this project, the Contractor's attention is called to the following:

For all permanent seeding and mulching that is satisfactorily completed in accordance with the requirements of Section 1660 in the *2012 Standard Specifications* and within the following percentages of elapsed contract times, an additional payment will be made to the Contractor as an incentive additive. The incentive additive will be determined by multiplying the number of

acres of seeding and mulching satisfactorily completed times the contract unit bid price per acre for Seeding and Mulching times the appropriate percentage additive.

Percentage of Elapsed Contract Time	Percentage Additive
0% - 30%	30%
30.01% - 50%	15%

Percentage of elapsed contract time is defined as the number of calendar days from the date of availability of the contract to the date the permanent seeding and mulching is acceptably completed divided by the total original contract time.

WASTE AND BORROW SOURCE REQUIREMENTS:

This project is located in a known habitat area for *Picoides borealis*, the Red Cockaded Woodpecker (RCW). The RCW is protected under the Endangered Species Act. Any federal action that is likely to affect the species requires consultation with the US Fish and Wildlife Service (USFWS). The Federal Highway Administration (FHWA) consulted with the USFWS, resulting in the USFWS issuing a Biological Opinion (28 April 2005). The U. S. Army Corps of Engineers permit, included elsewhere in this contract, also references the Biological Opinion.

In the Biological Opinion (BO), a corridor is referenced as being critical to the future survival of the RCW species. NCDOT's Biological Assessment identified the Northern Corridor which is critical to the future survival of the RCW species. Contractors should become familiar with the Biological Opinion. Copies of the BO and the figures showing the Northern Corridor locations can be obtained at the Project Letting Website.

Also posted on the Project Letting Website is a document entitled "Instructions for Selecting Borrow and Waste Sites with Potential to Impact the Red-Cockaded Woodpecker (RCW)". This document should be used as a guide to determining the possible acceptability of a potential borrow or waste site for use on this project.

The Department recognizes this "Northern Corridor" contains property which bidders may plan to utilize as borrow or waste sources. Potential indirect effects to the RCW associated with borrow or waste pits are related to timber removal or changes to the soil conditions that reduce potential timber growth. Loss of existing or future timber may reduce potential foraging and nesting habitat between RCW clusters. Sub-articles 230-4(B)(3)(d) and 802-2(F) of the *Standard Specifications* require that an environmental assessment be performed on all proposed waste and borrow sites to determine if there are conflicts with a federally protected species. If federally listed threatened or endangered species or habitat that may support such species exists on the site it may not be approved for use. In addition to the above requirements, for this project, borrow or waste sources located within the Northern Corridor will be subject to review and approval as outlined in the document referenced above entitled "Instructions for Selecting Borrow and Waste Sites with Potential to Impact the Red-Cockaded Woodpecker (RCW)".

No direct payment will be made for the work covered by the above requirements.

PROTECTION OF FORT BRAGG PROPERTY:

Ft. Bragg's property shall always be protected. A breach of the perimeter shall not be allowed at any time. Proposed Chain Link with Barbed Wire perimeter fence shall be installed prior to removing existing perimeter fence.

TWO-WAY CONCRETE DUCTBANK:**Description**

Construct Two-Way Ductbank as directed by the Engineer. Perform all work in accordance with the *2012 Standard Specifications*, plan details, and this provision.

Materials

Use material for Two-Way Ductbank as shown herein. Material and specifications must be stated in the Manufacturers Certification

- (A) Class 'A' Concrete in accordance with Section 1000.
- (B) Reinforcing Steel in accordance with Section 1070.
- (C) Four-inch PVC Conduit in accordance with Section 1091.
- (D) Pull String as approved by the Engineer.
- (E) Junction Boxes in accordance with Section 1716.

Construction Methods

- (A) Prior to construction all Ductbank locations will be located as directed by the Engineer and verified for any potential conflicts with other proposed construction or existing utilities.
- (B) Excavate as described in Section 1505
- (C) Construct Ductbank as directed by the engineer

Measurement and Payment

Junction Boxes will be paid in accordance with Article 1716-4.

Payment at the contract unit price for "Two-Way Concrete Ductbank" will be full compensation for all Concrete, PVC Conduit, Reinforcing Steel, Pull String, excavation and all incidentals necessary to complete the work as described above.

Payment will be made under:

Pay Item

Two-Way Concrete Ductbank
Junction Boxes

Pay Unit

LF
EA

TEMPORARY SPRUNG STRUCTURE:

Description: 70'wide x 60'long Temporary Sprung Structure at the Yadkin Road Detour to be used as Access control canopy for the temporary ACP.

Construction: Purchase and erect a Signature Series 70'wide x 60' long Temporary Sprung Structure at the Yadkin Road Detour to be used as a canopy for the temporary ACP.

The structure must meet the ASCE-7-2005 and the IBC-2006, use the acrylic opaque membrane, with daylight panels and meet the manufacture standards for asphalt installation.

Temporary Sprung Structure shall be an Access Control Point Shelter manufactured by Sprung Instant Structures, Inc. as described @ <http://www.sprung.com/structures/government-buildings/military-facilities>

POC, Contact information:

Kevin J. Benko
Business Development Manager
Southeastern US & Africa
Sprung Instant Structures
1355 Terrell Mill Road
Building 1472, Suite 200
Marietta, GA 30067

Office: 1-770-933-1950
Mobile: 1-678-777-4102
Fax: 1-770-933-1986
Toll Free (US): 1-800-528-9899
email: kevin.benko@sprung.com

Measurement and Payment

Temporary Sprung Structure at the Yadkin Road Detour will paid for at the lump sum price bid, shall be all inclusive. Such price and payment will include all materials, tools, labor, equipment and incidentals necessary to complete the work. Once the Temporary Sprung Structure is no longer needed, will be disassemble and transport it to the Directorate Emergency Services (DES) storage area located on Logistics Road, just past the Honeycutt Road ACP.

Contact: Mr. Tom Faucette, (910)-237-2580. No separate payment will be made for disassembly of the Temporary Sprung Structure or to transport to the DES storage area as such work will be considered incidental to the lump sum price bid for *Temporary Sprung Structure at the Yadkin Road Detour*.

Payment will be made under:

Pay Item**Pay Unit**

Temporary Sprung Structure at the Yadkin Road Detour

LS

TEMPORARY GUARD BUILDING:

(6-1-07)

SPI 8-1

Description

This work consists of furnishing, erecting, equipping, and maintaining a Guard Building (ACP field office) for the exclusive use by Fort Bragg at a location on Yadkin Road detour approved by the Directorate of Emergency Services. Provide a building(field office) that complies with the current National Electric Code, local, state, and federal regulations, and the following requirements.

Procedures

The building and equipment will remain the property of the Contractor upon completion of the contract. The building(field office) shall be erected and functional and manned by military personnel before the existing Yadkin Road Guard Building and ACP are taken out of service then temporarily fenced and gated. Failure to have the Guard Building functional before traffic is switched to the Yadkin Road detour alignment will result in withholding payment of the Contractor's monthly progress estimate and delaying the traffic switch onto the temporary detour. The building shall be operational throughout the construction of the Yadkin Road Bridge. It shall be removed upon completion, acceptance, and placement of traffic on this bridge. Upon completion of the Yadkin Road bridge, the building shall be removed, the cantonment fence reinstalled, and traffic returned to Yadkin Road.

Provide a building(ACP field office) that is weatherproof, tightly floored and roofed, constructed with an air space above the ceiling for ventilation, supported above the ground, has a width and length of at least 10 feet, windows on three sides, a 36 inch front door entry, anchored to the ground, and the floor-to-ceiling height that is at least 7 feet 6 inches. Provide inside walls and a ceiling constructed of plywood, masonite, gypsum board, or other suitable materials. Have the exterior walls, ceiling, and floor insulated. Have a minimum 100 amp, 1 Phase, 12 circuit load center with main breaker, a unisex bathroom with portable septic container, HVAC, interior lighting, and flood lights on the two front corners facing the inspection lanes.

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

<u>Number</u>	<u>Item</u>
2	Double-pedestal desk (approximately 60 by 34 inches).
2	2-drawer fire protection file, 15 inch drawer width, minimum UL rating of Class 350.
4	Office chairs with casters.
2	Wastebaskets.
1	Telephone.

Windows and Doors

Provide a facility with windows on both sides and the front with blinds, each having an area of at least (48"x48" sliders windows or comparable in size), capable of being easily opened and secured from the inside and having at least one exterior passage doors (with steps if needed). Provide doors at least 36 inches in width and 78 inches in height. Provide screens for windows and doors. Equip exterior passage doors with locks, and furnish at least two keys to Fort Bragg.

Steps

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

Lighting, Heating, and Air Conditioning

NOTE: Heat Pump with emergency heat strips preferred with thermostat located inside a locked control box.

The field office shall have satisfactory lighting, (1 ea. quad outlet at rear base of desks) and (1 ea standard electrical outlet rear desk top high) electrical outlets, heating equipment, an exhaust fan, and an air conditioner connected to an operational power source. Provide two of the light fixtures that are fluorescent lights situated over the desks. Furnish electrical current and/or fuel for heating equipment. Flood lights mounted on the front 2 corners of building facing inspection lanes on separate switches)

Fire Extinguishers

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

Toilets

Provide a toilet conforming to the requirements of the state and local boards of health or other bodies or courts having jurisdiction in the area. When separate facilities for men and women are not available, place a sign with the words "Rest Room" (with letters at least 1 inch in height) over the doorway, and provide an adequate positive locking system on the inside of the doorway. Maintain responsibility for the water and sewer connections or the installation and connection of a water well/supply and septic tank and drain field. These facilities shall conform to all local and state permits and shall be pumped as directed)

Utilities

The government will provide backup electrical power and portable lights sets, contractor will wire in a connection for the office to be powered by the government generator provided.

Except for telephone service, make necessary utility connections, with Sandhills, with meter base. Government will pay utilities. Contractor will handle final disconnection of utilities and relocation of building.

Government will provide telephone service

Miscellaneous Items

The field office shall also include the following:

1. A certification that the office is free of asbestos and other hazardous materials.
2. A broom, dust pan, mop and bucket, and general cleaning supplies.
3. Provide and maintain an all weather parking area for six vehicles, including graveled access to the paved surface.

Note: Not needed if given gated access to the closed Yadkin Road ACP

Measurement and Payment

Payment at the contract lump sum bid price for *Temporary Guard Building* will be full compensation for all work covered by this provision including but not limited to furnishing, erecting, maintaining, and removing the field office as outlined in this provision.

Installation and service fees for the telephone will be paid for by the Department.

Payment will be made under:

Pay Item	Pay Unit
Temporary Guard Building	Lump Sum

PROJECT SPECIAL PROVISIONS

GEOTECHNICAL

MECHANICALLY STABILIZED EARTH RETAINING WALLS

(11-19-13)

1.0 GENERAL

Construct mechanically stabilized earth (MSE) retaining walls consisting of steel or geosynthetic reinforcement in the reinforced zone connected to vertical facing elements. The facing elements may be precast concrete panels or segmental retaining wall (SRW) units unless required otherwise in the plans or the *NCDOT Policy for Mechanically Stabilized Earth Retaining Walls* prohibits the use of SRW units. At the Contractor's option, use coarse or fine aggregate in the reinforced zone of MSE retaining walls except do not use fine aggregate for walls subject to scour, walls that support or are adjacent to railroads or walls with design heights greater than 35 ft or internal acute corners less than 45°. Provide reinforced concrete coping as required. Design and construct MSE retaining walls based on actual elevations and wall dimensions in accordance with the contract and accepted submittals. Use a prequalified MSE Wall Installer to construct MSE retaining walls.

Define "MSE wall" as a mechanically stabilized earth retaining wall and "MSE Wall Vendor" as the vendor supplying the chosen MSE wall system. Define a "segmental retaining wall" as an MSE wall with SRW units. Define an "abutment wall" as an MSE wall with bridge foundations in any portion of the reinforced zone or an MSE wall connected to an abutment wall. Even if bridge foundations only penetrate a small part of the reinforced zone, the entire MSE wall is considered an abutment wall.

Define "reinforcement" as steel or geosynthetic reinforcement and "geosynthetics" as geosynthetic grids (geogrids) or strips (geostrips). Define "aggregate" as coarse or fine aggregate. Define "panel" as a precast concrete panel and "coping" as precast or cast-in-place concrete coping.

Use an approved MSE wall system in accordance with the plans, NCDOT MSE wall policy and any NCDOT restrictions for the chosen system. Value engineering proposals for other MSE wall systems will not be considered. Do not use segmental retaining walls or MSE wall systems with an "approved for provisional use" status code for critical walls or MSE walls connected to critical walls. Critical walls are defined in the NCDOT MSE wall policy. The list of approved MSE wall systems and NCDOT MSE wall policy are available from:

connect.ncdot.gov/resources/Geological/Pages/Products.aspx

2.0 MATERIALS

Refer to the *Standard Specifications*.

Item
Aggregate

Section
1014

Anchor Pins	1056-2
Curing Agents	1026
Geotextiles, Type 2	1056
Joint Materials	1028
Portland Cement Concrete, Class A	1000
Precast Retaining Wall Coping	1077
Reinforcing Steel	1070
Retaining Wall Panels	1077
Segmental Retaining Wall Units	1040-4
Shoulder Drain Materials	816-2
Wire Staples	1060-8(D)

Provide Type 2 geotextile for filtration and separation geotextiles. Use Class A concrete for cast-in-place coping, leveling concrete and pads.

Use panels and SRW units from producers approved by the Department and licensed by the MSE Wall Vendor. Unless required otherwise in the contract, produce panels with a smooth flat final finish that meets Article 1077-11 of the *Standard Specifications*. Accurately locate and secure reinforcement connectors in panels and maintain required concrete cover. Produce panels within 1/4" of the panel dimensions shown in the accepted submittals.

Damaged panels or SRW units with excessive discoloration, chips or cracks as determined by the Engineer will be rejected. Do not damage reinforcement connection devices or mechanisms in handling or storing panels and SRW units.

Store steel materials on blocking at least 12" above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Handle and store geosynthetics in accordance with Article 1056-2 of the *Standard Specifications*. Load, transport, unload and store MSE wall materials so materials are kept clean and free of damage. Bent, damaged or defective materials will be rejected.

A. Aggregate

Use standard size No. 57, 57M, 67 or 78M that meets Table 1005-1 of the *Standard Specifications* for coarse aggregate except do not use No. 57 or 57M stone in the reinforced zone of MSE walls with geosynthetic reinforcement. Use the following for fine aggregate:

1. Standard size No. 1S, 2S, 2MS or 4S that meets Table 1005-2 of the *Standard Specifications* or
2. Gradation that meets Class III, Type 3 select material in accordance with Article 1016-3 of the *Standard Specifications*.

Fine aggregate is exempt from mortar strength in Subarticle 1014-1(E) of the *Standard Specifications*. Provide fine aggregate that meets the following requirements:

FINE AGGREGATE REQUIREMENTS					
Reinforcement or Connector Material	pH	Resistivity	Chlorides	Sulfates	Organics
Steel	5-10	$\geq 3,000 \Omega \cdot \text{cm}$	$\leq 100 \text{ ppm}$	$\leq 200 \text{ ppm}$	$\leq 1\%$
Polyester Type (PET) Geogrid	5-8	N/A*	N/A*	N/A*	$\leq 1\%$
Geostrip or Polyolefin Geogrid	4.5-9	N/A*	N/A*	N/A*	$\leq 1\%$

* Resistivity, chlorides and sulfates are not applicable to geosynthetics.

Use fine aggregate from a source that meets the *Mechanically Stabilized Earth Wall Fine Aggregate Sampling and Testing Manual*. Perform organic content tests in accordance with AASHTO T 267 instead of Subarticle 1014-1(D) of the *Standard Specifications*. Perform electrochemical tests in accordance with the following test procedures:

Property	Test Method
pH	AASHTO T 289
Resistivity	AASHTO T 288
Chlorides	AASHTO T 291
Sulfates	AASHTO T 290

B. Reinforcement

Provide steel or geosynthetic reinforcement supplied by the MSE Wall Vendor or a manufacturer approved or licensed by the vendor. Use approved reinforcement for the chosen MSE wall system. The list of approved reinforcement for each MSE wall system is available from the website shown elsewhere in this provision.

1. Steel Reinforcement

Provide Type 1 material certifications in accordance with Article 106-3 of the *Standard Specifications* for steel reinforcement. Use welded wire grid reinforcement ("mesh", "mats" and "ladders") that meet Article 1070-3 of the *Standard Specifications* and metallic strip reinforcement ("straps") that meet ASTM A572 or A1011. Galvanize steel reinforcement in accordance with Section 1076 of the *Standard Specifications*.

2. Geosynthetic Reinforcement

Define "machine direction" (MD) for geosynthetics in accordance with ASTM D4439. Provide Type 1 material certifications for geosynthetic strengths in the MD in accordance with Article 1056-3 of the *Standard Specifications*. Test geosynthetics in accordance with ASTM D6637.

C. Bearing Pads

For MSE walls with panels, use bearing pads that meet Section 3.6.1.a of the *FHWA Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes – Volume I* (Publication No. FHWA-NHI-10-024). Provide bearing pads that meet the following requirements:

BEARING PAD THICKNESS REQUIREMENTS	
Panel Facing Area (A)	Minimum Pad Thickness After Compression (based on 2 times panel weight above pads)
$A \leq 30 \text{ sf}$	1/2"
$30 \text{ sf} < A \leq 75 \text{ sf}$	3/4"

D. Miscellaneous Components

Miscellaneous components may include connectors (e.g., anchors, bars, clamps, pins, plates, ties, etc.), fasteners (e.g., bolts, nuts, washers, etc.) and any other MSE wall components not included above. Galvanize steel components in accordance with Section 1076 of the *Standard Specifications*. Provide approved miscellaneous components for the chosen MSE wall system. The list of approved miscellaneous components for each MSE wall system is available from the website shown elsewhere in this provision.

3.0 PRECONSTRUCTION REQUIREMENTS

A. MSE Wall Surveys

The Retaining Wall Plans show a plan view, typical sections, details, notes and an elevation or profile view (wall envelope) for each MSE wall. Before beginning MSE wall design, survey existing ground elevations shown in the plans and other elevations in the vicinity of MSE wall locations as needed. Based on these elevations, finished grades and actual MSE wall dimensions and details, submit revised wall envelopes for acceptance. Use accepted wall envelopes for design.

B. MSE Wall Designs

Submit 11 copies of working drawings and 3 copies of design calculations and a PDF copy of each for MSE wall designs at least 30 days before the preconstruction meeting. Note name and NCDOT ID number of the panel or SRW unit production facility on the working drawings. Do not begin MSE wall construction until a design submittal is accepted.

Use a prequalified MSE Wall Design Consultant to design MSE walls. Provide designs sealed by a Design Engineer approved as a Geotechnical Engineer (key person) for the MSE Wall Design Consultant.

Design MSE walls in accordance with the plans, *AASHTO LRFD Bridge Design Specifications* and any NCDOT restrictions for the chosen MSE wall system unless otherwise required. Design MSE walls for seismic if walls are located in seismic zone

2 based on Figure 2-1 of the *Structure Design Manual*. Use a uniform reinforcement length throughout the wall height of at least 0.7H with H as defined for the embedment requirements in this provision or 6 ft, whichever is greater, unless shown otherwise in the plans. Extend the reinforced zone at least 6" beyond end of reinforcement. Do not locate drains, the reinforced zone or leveling pads outside right-of-way or easement limits.

Use the simplified method for determining maximum reinforcement loads and approved design parameters for the chosen MSE wall system or default values in accordance with the AASHTO LRFD specifications. Design steel components including reinforcement and connectors for the design life noted in the plans and aggregate type in the reinforced zone. Use corrosion loss rates for galvanizing in accordance with the AASHTO LRFD specifications for nonaggressive backfill and carbon steel corrosion rates in accordance with the following:

CARBON STEEL CORROSION RATES	
Aggregate Type (in the reinforced zone)	Corrosion Loss Rate (after zinc depletion)
Coarse	0.47 mil/year
Fine (except abutment walls)	0.58 mil/year
Fine (abutment walls)	0.70 mil/year

For geosynthetic reinforcement and connectors, use approved geosynthetic properties for the design life noted in the plans and aggregate type in the reinforced zone.

When noted in the plans, design MSE walls for a live load (traffic) surcharge of 250 lb/sf in accordance with Figure C11.5.6-3(b) of the AASHTO LRFD specifications. For steel beam guardrail with 8 ft posts or concrete barrier rail above MSE walls, analyze top 2 reinforcement layers for traffic impact loads in accordance with Section 7.2 of the FHWA MSE wall manual shown elsewhere in this provision except use the following for geosynthetic reinforcement rupture:

$$\phi T_{al} R_c \geq T_{max} + (T_I / RF_{CR})$$

Where,

- ϕ = resistance factor for tensile resistance in accordance with Section 7.2.1 of the FHWA MSE wall manual,
- T_{al} = long-term geosynthetic design strength approved for chosen MSE wall system,
- R_c = reinforcement coverage ratio = 1 for continuous geosynthetic reinforcement,
- T_{max} = factored static load in accordance with Section 7.2 of the FHWA MSE wall manual,
- T_I = factored impact load in accordance with Section 7.2 of the FHWA MSE wall manual and
- RF_{CR} = creep reduction factor approved for chosen MSE wall system.

If existing or future obstructions such as foundations, guardrail, fence or handrail posts,

moment slabs, pavements, pipes, inlets or utilities will interfere with reinforcement, maintain a clearance of at least 3" between obstructions and reinforcement unless otherwise approved. Locate reinforcement layers so all of reinforcement length is within 3" of corresponding connection elevations.

Use 6" thick cast-in-place unreinforced concrete leveling pads beneath panels and SRW units that are continuous at steps and extend at least 6" in front of and behind bottom row of panels or SRW units. Unless required otherwise in the plans, embed top of leveling pads in accordance with the following requirements:

EMBEDMENT REQUIREMENTS		
Front Slope¹ (H:V)	Minimum Embedment Depth² (whichever is greater)	
6:1 or flatter (except abutment walls)	H/20	1 ft for $H \leq 10$ ft 2 ft for $H > 10$ ft
6:1 or flatter (abutment walls)	H/10	2 ft
> 6:1 to < 3:1	H/10	2 ft
3:1 to 2:1	H/7	2 ft

1. Front slope is as shown in the plans.
2. Define "H" as the maximum design height plus embedment per wall with the design height and embedment as shown in the plans.

When noted in the plans, locate a continuous aggregate shoulder drain along base of reinforced zone behind aggregate. Provide wall drainage systems consisting of drains and outlet components in accordance with Standard Drawing No. 816.02 of the *Roadway Standard Drawings*.

For MSE walls with panels, place at least 2 bearing pads in each horizontal panel joint so the final horizontal joint opening is between 5/8" and 7/8". Additional bearing pads may be required for panels wider than 5 ft as determined by the Engineer. Cover joints at back of panels with filtration geotextiles at least 12" wide.

For segmental retaining walls, fill SRW unit core spaces with coarse aggregate and between and behind SRW units with coarse aggregate for a horizontal distance of at least 18".

Separation geotextiles are required between aggregate and overlying fill or pavement sections except when concrete pavement, full depth asphalt or cement treated base is placed directly on aggregate. Separation geotextiles may also be required between coarse aggregate and backfill or natural ground as determined by the Engineer.

Unless required otherwise in the plans, use reinforced concrete coping at top of walls. Use coping dimensions shown in the plans and cast-in-place concrete coping for segmental retaining walls and when noted in the plans. When shown in the plans and at the Contractor's option, connect cast-in-place concrete coping to panels and SRW units with dowels or extend coping down back of MSE walls. Also, connect cast-in-place

leveling concrete for precast concrete coping to panels with dowels. When concrete barrier rail is required above MSE walls, use concrete barrier rail with moment slab as shown in the plans.

Submit working drawings and design calculations for acceptance in accordance with Article 105-2 of the *Standard Specifications*. Submit working drawings showing plan views, wall profiles with required resistances, typical sections with reinforcement and connection details, aggregate locations and types, geotextile locations and details of leveling pads, panels or SRW units, coping, bin walls, slip joints, etc. If necessary, include details on working drawings for concrete barrier rail with moment slab, reinforcement splices if allowed for the chosen MSE wall system, reinforcement connected to end bent caps and obstructions extending through walls or interfering with reinforcement, leveling pads, barriers or moment slabs. Submit design calculations for each wall section with different surcharge loads, geometry or material parameters. At least one analysis is required for each wall section with different reinforcement lengths. When designing MSE walls with computer software other than MSEW, use MSEW version 3.0 with update 14.93 or later, manufactured by ADAMA Engineering, Inc. to verify the design. At least one MSEW analysis is required per 100 ft of wall length with at least one MSEW analysis for the wall section with the longest reinforcement. Submit electronic MSEW input files and PDF output files with design calculations.

C. Preconstruction Meeting

Before starting MSE wall construction, hold a preconstruction meeting to discuss the construction and inspection of the MSE walls. Schedule this meeting after all MSE wall submittals have been accepted. The Resident or Bridge Maintenance Engineer, Bridge Construction Engineer, Geotechnical Operations Engineer, Contractor and MSE Wall Installer Superintendent will attend this preconstruction meeting.

4.0 CORROSION MONITORING

Corrosion monitoring is required for MSE walls with steel reinforcement. The Engineer will determine the number of monitoring locations and where to install the instrumentation. Contact the Materials and Tests (M&T) Unit before beginning wall construction. M&T will provide the corrosion monitoring instrumentation kits and if necessary, assistance with installation.

5.0 SITE ASSISTANCE

Unless otherwise approved, provide an MSE Wall Vendor representative to assist and guide the MSE Wall Installer on-site for at least 8 hours when the first panels or SRW units and reinforcement layer are placed. If problems are encountered during construction, the Engineer may require the vendor representative to return to the site for a time period determined by the Engineer.

6.0 CONSTRUCTION METHODS

Control drainage during construction in the vicinity of MSE walls. Direct run off away

from MSE walls, aggregate and backfill. Contain and maintain aggregate and backfill and protect material from erosion.

Excavate as necessary for MSE walls in accordance with the accepted submittals. If applicable and at the Contractor's option, use temporary shoring for wall construction instead of temporary slopes to construct MSE walls. Define "temporary shoring for wall construction" as temporary shoring not shown in the plans or required by the Engineer including shoring for OSHA reasons or the Contractor's convenience.

Unless required otherwise in the plans, install foundations located in the reinforced zone before placing aggregate or reinforcement. Notify the Engineer when foundation excavation is complete. Do not place leveling pad concrete, aggregate or reinforcement until excavation dimensions and foundation material are approved.

Construct cast-in-place concrete leveling pads at elevations and with dimensions shown in the accepted submittals and in accordance with Section 420 of the *Standard Specifications*. Cure leveling pads at least 24 hours before placing panels or SRW units.

Erect and support panels and stack SRW units so the final wall position is as shown in the accepted submittals. Place SRW units with a maximum vertical joint width of 3/8".

Set panels with a vertical joint width of 3/4". Place bearing pads in horizontal panel joints and cover all panel joints with filtration geotextiles as shown in the accepted submittals. Attach filtration geotextiles to back of panels with adhesives, tapes or other approved methods.

Stagger panels and SRW units to create a running bond by centering panels or SRW units over joints in the row below as shown in the accepted submittals. Construct MSE walls with the following tolerances:

- A. SRW units are level from front to back and between units when checked with a 3 ft long level,
- B. Final wall face is within 3/4" of horizontal and vertical alignment shown in the accepted submittals when measured along a 10 ft straightedge and
- C. Final wall plumbness (batter) is not negative and within 0.5° of vertical unless otherwise approved.

Place reinforcement at locations and elevations shown in the accepted submittals and within 3" of corresponding connection elevations. Install reinforcement with the direction shown in the accepted submittals. Place reinforcement in slight tension free of kinks, folds, wrinkles or creases. Reinforcement may be spliced once per reinforcement length if shown in the accepted submittals. Use reinforcement pieces at least 6 ft long. Contact the Engineer when unanticipated existing or future obstructions such as foundations, guardrail, fence or handrail posts, pavements, pipes, inlets or utilities will interfere with reinforcement. To avoid obstructions, deflect, skew or modify reinforcement as shown in the accepted submittals.

Place aggregate in the reinforced zone in 8" to 10" thick lifts. Compact fine aggregate in accordance with Subarticle 235-3(C) of the *Standard Specifications*. Use only hand operated compaction equipment to compact aggregate within 3 ft of panels or SRW units. At a distance greater than 3 ft, compact aggregate with at least 4 passes of an 8 ton to 10 ton vibratory roller in a direction parallel to the wall face. Smooth wheeled or rubber tired rollers are also acceptable for compacting aggregate. Do not use sheepsfoot, grid rollers or other types of compaction equipment with feet. Do not displace or damage reinforcement when placing and compacting aggregate. End dumping directly on geosynthetics is not permitted. Do not operate heavy equipment on reinforcement until it is covered with at least 8" of aggregate. Replace any damaged reinforcement to the satisfaction of the Engineer.

Backfill for MSE walls outside the reinforced zone in accordance with Article 410-8 of the *Standard Specifications*. If a drain is required, install wall drainage systems as shown in the accepted submittals and in accordance with Section 816 of the *Standard Specifications*.

Place and construct coping and leveling concrete as shown in the accepted submittals. Construct leveling concrete in accordance with Section 420 of the *Standard Specifications*. Construct cast-in-place concrete coping in accordance with Subarticle 452-3(C) of the *Standard Specifications*. When single faced precast concrete barrier is required in front of and against MSE walls, stop coping just above barrier so coping does not interfere with placing barrier up against wall faces.

When separation geotextiles are required, overlap adjacent geotextiles at least 18" and hold separation geotextiles in place with wire staples or anchor pins as needed. Seal joints above and behind MSE walls between coping and concrete slope protection with silicone sealant.

7.0 MEASUREMENT AND PAYMENT

MSE Retaining Wall No. ____ will be measured and paid in square feet. MSE walls will be measured as the square feet of exposed wall face area with the height equal to the difference between top and bottom of wall elevations. Define "top of wall" as top of coping or top of panels or SRW units for MSE walls without coping. Define "bottom of wall" as shown in the plans and no measurement will be made for portions of MSE walls embedded below bottom of wall elevations.

The contract unit price for *MSE Retaining Wall No. ____* will be full compensation for providing designs, submittals, labor, tools, equipment and MSE wall materials, excavating, backfilling, hauling and removing excavated materials and supplying site assistance, leveling pads, panels, SRW units, reinforcement, aggregate, wall drainage systems, geotextiles, bearing pads, coping, miscellaneous components and any incidentals necessary to construct MSE walls. The contract unit price for *MSE Retaining Wall No. ____* will also be full compensation for reinforcement connected to and aggregate behind end bent caps in the reinforced zone, if required.

No separate payment will be made for temporary shoring for wall construction. Temporary

shoring for wall construction will be incidental to the contract unit price for *MSE Retaining Wall No. ____*.

The contract unit price for *MSE Retaining Wall No. ____* does not include the cost for ditches, fences, handrails, barrier or guardrail associated with MSE walls as these items will be paid for elsewhere in the contract.

Where it is necessary to provide backfill material behind the reinforced zone from sources other than excavated areas or borrow sources used in connection with other work in the contract, payment for furnishing and hauling such backfill material will be paid as extra work in accordance with Article 104-7 of the *Standard Specifications*. Placing and compacting such backfill material is not considered extra work but is incidental to the work being performed.

Payment will be made under:

Pay Item

MSE Retaining Wall No. ____

Pay Unit

Square Foot

SOLDIER PILE RETAINING WALLS**(11-19-13)****1.0 GENERAL**

Construct soldier pile retaining walls consisting of driven or drilled-in steel H-piles with either precast concrete panels in between piles or a cast-in-place reinforced concrete face attached to front of piles unless required otherwise in the plans. Timber lagging is typically used for temporary support of excavations during construction. Provide cast-in-place reinforced concrete coping as required. Design and construct soldier pile retaining walls based on actual elevations and wall dimensions in accordance with the contract and accepted submittals. Use a prequalified Cantilever Wall Contractor to construct soldier pile retaining walls. Define "soldier pile wall" as a soldier pile retaining wall. Define "panel" as a precast concrete panel and "concrete facing" as a cast-in-place reinforced concrete face. Define "pile" as a steel H-pile and "coping" as cast-in-place concrete coping.

2.0 MATERIALS

Refer to the *Standard Specifications*.

Item	Section
Anchor Pins	1056-2
Curing Agents	1026
Flowable Fill, Excavatable	1000-6
Geosynthetics	1056
Joint Materials	1028
Masonry	1040
Neat Cement Grout, Nonshrink	1003
Portland Cement Concrete	1000
Reinforcing Steel	1070
Retaining Wall Panels	1077
Select Material, Class VI	1016
Shoulder Drain Materials	816-2
Steel H-Piles	1084-1
Untreated Timber	1082-2
Welded Stud Shear Connectors	1072-6
Wire Staples	1060-8(D)

Provide Type 2 geotextile for separation geotextiles and Class VI select material (standard size No. 57 stone) for leveling pads and backfilling. Use Class A concrete for concrete facing and coping and Class A concrete that meets Article 450-2 of the *Standard Specifications* for drilled-in piles. Use untreated timber with a thickness of at least 3" and a bending stress of at least 1,000 psi for timber lagging.

Unless required otherwise in the contract, produce panels with a smooth flat final finish that meets Article 1077-11 of the *Standard Specifications*. When noted in the plans, produce panels with an exposed aggregate finish that meets Article 1077-12 of the *Standard Specifications*. Produce panels within 1/4" of the panel dimensions shown in the accepted submittals. Damaged panels with excessive discoloration, chips or cracks as

determined by the Engineer will be rejected.

For soldier pile walls with panels, galvanize piles in accordance with Section 1076 of the *Standard Specifications*. When noted in the plans, paint galvanized piles in accordance with Article 442-12 of the *Standard Specifications*. Apply the following system to paint galvanized piles gray with waterborne paints that meet Article 1080-11 of the *Standard Specifications*. For painting galvanized piles other colors, contact the Materials and Tests (M&T) Unit for an appropriate paint system.

GRAY PAINT SYSTEM FOR GALVANIZED PILES			
Coat	Color	Dry/Wet Film Thickness (Mils)	
		Min.	Max.
Intermediate	Brown	3.0 DFT	5.0 DFT
Stripe	White	4.0 WFT	7.0 WFT
Topcoat	Gray	2.0 DFT	4.0 DFT
Total		5.0 DFT	9.0 DFT

Store steel materials on blocking at least 12" above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Load, transport, unload and store soldier pile wall materials so materials are kept clean and free of damage. Bent, damaged or defective materials will be rejected.

3.0 PRECONSTRUCTION REQUIREMENTS

A. Soldier Pile Wall Surveys

The Retaining Wall Plans show a plan view, typical sections, details, notes and an elevation or profile view (wall envelope) for each soldier pile wall. Before beginning soldier pile wall design, survey existing ground elevations shown in the plans and other elevations in the vicinity of soldier pile wall locations as needed. Based on these elevations, finished grades and actual soldier pile wall dimensions and details, submit revised wall envelopes for acceptance. Use accepted wall envelopes for design.

B. Soldier Pile Wall Designs

Submit 11 copies of working drawings and 3 copies of design calculations and a PDF copy of each for soldier pile wall designs at least 30 days before the preconstruction meeting. Do not begin soldier pile wall construction until a design submittal is accepted.

Use a prequalified Cantilever Wall Design Consultant to design soldier pile walls. Provide designs sealed by a Design Engineer approved as a Geotechnical Engineer (key person) for the Cantilever Wall Design Consultant.

Design soldier pile walls in accordance with the plans and Article 11.8 of the *AASHTO LRFD Bridge Design Specifications* unless otherwise required. Design soldier pile

walls for seismic if walls are located in seismic zone 2 based on Figure 2-1 of the *Structure Design Manual*. Design soldier pile walls for a maximum deflection of 2" or 1.5% of H, whichever is less, with H as shown in the plans.

When noted in the plans, design soldier pile walls for a live load (traffic) surcharge of 250 lb/sf in accordance with Article 11.5.6 of the AASHTO LRFD specifications. For steel beam guardrail with 8 ft posts above soldier pile walls, analyze walls for a horizontal load (P_{H1}) of 300 lb/ft of wall in accordance with Figure 3.11.6.3-2(a) of the AASHTO LRFD specifications. For concrete barrier rail above soldier pile walls, analyze walls for a P_{H1} of 500 lb/ft of wall in accordance with Figure 3.11.6.3-2(a).

Use a maximum H-pile spacing of 10 ft. At the Contractor's option, use driven or drilled-in piles for soldier pile walls with concrete facing unless otherwise required. For soldier pile walls with panels, use drilled-in piles unless noted otherwise in the plans. Use concrete or grout for embedded portions of drilled-in piles. Install drilled-in piles by excavating holes with diameters that will result in at least 3" of clearance all around piles.

Provide temporary support of excavations for excavations more than 4 ft deep and timber lagging in accordance with the *AASHTO Guide Design Specifications for Bridge Temporary Works*. At the Contractor's option and when noted in the plans, provide temporary slopes instead of temporary support of excavations. Do not extend temporary slopes outside right-of-way or easement limits. Except for fill sections or when using temporary slopes, backfill voids behind panels, lagging and piles with No. 57 stone. Place separation geotextile between No. 57 stone and overlying fill or pavement sections except when concrete pavement, full depth asphalt or cement treated base is placed directly on stone.

At the Contractor's option, use panels or concrete facing unless required otherwise in the plans. Design panels and concrete facing in accordance with the plans and Section 5 of the *AASHTO LRFD Bridge Design Specifications*. Provide reinforcing steel of sufficient density to satisfy Article 5.7.3.4 of the AASHTO LRFD specifications. Use panels or concrete facing with the dimensions shown in the plans and attach facing to front of H-piles with welded stud shear connectors.

Use No. 57 stone for aggregate leveling pads. Use 6" thick leveling pads beneath panels and concrete facing. Unless required otherwise in the plans, embed top of leveling pads at least 12" below bottom of walls shown in the plans.

Provide wall drainage systems consisting of geocomposite drain strips, drains and outlet components. Place drain strips with a horizontal spacing of no more than 10 ft and center strips between adjacent piles. Attach drain strips to front of timber lagging or back of panels or concrete facing and connect strips to leveling pads. Locate a continuous aggregate shoulder drain along the base of panels or concrete facing in front of piles and leveling pads. Provide drains and outlet components in accordance with Standard Drawing No. 816.02 of the *Roadway Standard Drawings*.

Unless required otherwise in the plans, use cast-in-place reinforced concrete coping at top of soldier pile walls with panels. Use coping dimensions shown in the plans and at the Contractor's option, connect coping to panels with dowels or extend coping down back of panels. When concrete barrier rail is required above soldier pile walls, use concrete barrier rail with moment slab as shown in the plans.

Submit working drawings and design calculations for acceptance in accordance with Article 105-2 of the *Standard Specifications*. Submit working drawings showing plan views, wall profiles with pile locations, typical sections and details of piles, drainage, temporary support, leveling pads, panels and concrete facing. If necessary, include details on working drawings for coping, concrete barrier rail with moment slab and obstructions extending through walls or interfering with piles, barriers or moment slabs. Submit design calculations including deflection calculations for each wall section with different surcharge loads, geometry or material parameters. Include analysis of temporary conditions in design calculations. When designing soldier pile walls with computer software, a hand calculation is required for the tallest wall section.

C. Soldier Pile Wall Construction Plan

Submit 4 copies and a PDF copy of a soldier pile wall construction plan at least 30 days before the preconstruction meeting. Do not begin soldier pile wall construction until the construction plan submittal is accepted. Provide project specific information in the soldier pile wall construction plan including a detailed construction sequence. For driven piles, submit proposed pile driving methods and equipment in accordance with Subarticle 450-3(D)(2) of the *Standard Specifications*. For drilled-in piles, submit installation details including drilling equipment and methods for stabilizing and filling holes. Provide details in the construction plan of excavations including temporary support and any other information shown in the plans or requested by the Engineer.

If alternate construction procedures are proposed or necessary, a revised soldier pile wall construction plan submittal may be required. If the work deviates from the accepted submittal without prior approval, the Engineer may suspend soldier pile wall construction until a revised plan is accepted.

D. Preconstruction Meeting

Before starting soldier pile wall construction, hold a preconstruction meeting to discuss the construction and inspection of the soldier pile walls. Schedule this meeting after all soldier pile wall submittals have been accepted. The Resident or Bridge Maintenance Engineer, Bridge Construction Engineer, Geotechnical Operations Engineer, Contractor and Cantilever Wall Contractor Superintendent will attend this preconstruction meeting.

4.0 CONSTRUCTION METHODS

Control drainage during construction in the vicinity of soldier pile walls. Direct run off away from soldier pile walls and areas above and behind walls. Contain and maintain No. 57 stone and backfill and protect material from erosion.

Notify the Engineer before blasting in the vicinity of soldier pile walls. Perform blasting in accordance with the contract. Unless required otherwise in the plans, install foundations located behind soldier pile walls before beginning wall construction if the horizontal distance to the closest foundation is less than the height of the tallest wall section.

Install soldier pile walls in accordance with the accepted submittals and as directed. Do not excavate behind soldier pile walls unless a temporary slope is shown in the accepted submittals. If overexcavation occurs and is not approved, repair walls with an approved method and a revised soldier pile wall design or construction plan may be required.

A. Piles

If a temporary slope is shown in the accepted submittals, excavate the slope before installing piles. Otherwise, install piles before excavating for soldier pile walls. Weld stud shear connectors to piles in accordance with Article 1072-6 of the *Standard Specifications*.

Install piles within 1" of horizontal and vertical alignment shown in the accepted submittals and with no negative batter (piles leaning forward). Minimize alignment variations between piles for soldier pile walls with concrete facing since variations can result in thicker concrete facing in some locations in order to provide the minimum required facing thickness elsewhere. Locate piles so the minimum required concrete facing thickness, if applicable, and roadway clearances are maintained for variable pile alignments.

Install piles with the minimum required embedment in accordance with Subarticles 450-3(D) and 450-3(E) of the *Standard Specifications*. Piles may be installed with a vibratory hammer as approved by the Engineer. Do not splice piles. If necessary, cut off piles at elevations shown in the accepted submittals along a plane normal to the pile axis.

Use pile excavation to install drilled-in piles. If overexcavation occurs, fill to required elevations with No. 57 stone before setting piles. After filling holes with concrete or grout to the elevations shown in the accepted submittals, remove any fluids and fill remaining portions of holes with flowable fill. Cure concrete or grout at least 7 days before excavating.

Notify the Engineer if refusal is reached before pile excavation or driven piles attain the minimum required embedment. When this occurs, a revised soldier pile wall design or construction plan submittal may be required.

B. Excavation

If a temporary slope is shown in the accepted submittals, excavate the slope as shown. Otherwise, excavate in front of piles from the top down in accordance with the accepted submittals. Excavate in staged horizontal lifts with a maximum height of 5 ft. Use timber lagging or an alternate approved method for temporary support of excavations in accordance with the accepted submittals.

Install temporary support within 24 hours of excavating each lift unless otherwise approved. The installation may be delayed if it can be demonstrated that delays will not adversely affect excavation stability. If excavation faces will be exposed for more than 24 hours, use polyethylene sheets anchored at top and bottom of lifts to protect excavation faces from changes in moisture content.

If an excavation becomes unstable at any time, suspend soldier pile wall construction and temporarily stabilize the excavation by immediately placing an earth berm up against the unstable excavation face. When this occurs, repair walls with an approved method and a revised soldier pile wall design or construction plan may be required.

Remove flowable fill and material in between piles as necessary to install timber lagging. Position lagging with at least 3" of contact in the horizontal direction between the lagging and pile flanges. Do not excavate the next lift until temporary support for the current lift is accepted.

C. Wall Drainage Systems

Install wall drainage systems as shown in the accepted submittals and in accordance with Section 816 of the *Standard Specifications*. Place geocomposite drain strips with the geotextile side facing away from wall faces. Secure drain strips so strips are in continuous contact with surfaces to which they are attached and allow for full flow the entire height of soldier pile walls. Discontinuous drain strips are not allowed. If splices are needed, overlap drain strips at least 12" so flow is not impeded. Connect drain strips to leveling pads by embedding strip ends at least 4" into No. 57 stone.

D. Leveling Pads, Panels, Coping and Concrete Facing

Construct aggregate leveling pads at elevations and with dimensions shown in the accepted submittals. Compact leveling pads with a vibratory compactor to the satisfaction of the Engineer.

Set panels against pile flanges as shown in the accepted submittals. Position panels with at least 2" of contact in the horizontal direction between the panels and pile flanges. If contact cannot be maintained, remove panels, fill gaps with joint fillers and reset panels. Securely support panels until enough No. 57 stone or backfill is placed to hold panels in place.

Construct coping as shown in the accepted submittals and Subarticle 452-3(C) of the *Standard Specifications*. When single faced precast concrete barrier is required in front of and against soldier pile walls, stop coping just above barrier so coping does not interfere with placing barrier up against wall faces.

Construct concrete facing in accordance with the accepted submittals and Section 420 of the *Standard Specifications*. Do not remove forms until concrete attains a compressive strength of at least 2,400 psi. Unless required otherwise in the plans, provide a Class 2 surface finish for concrete facing that meets Subarticle 420-17(F) of the *Standard Specifications*. Construct concrete facing joints at a spacing of 10 ft to 12

ft unless required otherwise in the plans. Make 1/2" thick expansion joints that meet Article 420-10 of the *Standard Specifications* for every third joint and 1/2" deep grooved contraction or sawed joints that meet Subarticle 825-10(B) or 825-10(E) respectively for the remaining joints. Stop reinforcing steel for concrete facing 2" on either side of expansion joints.

If a brick veneer is required, construct brick masonry in accordance with Section 830 of the *Standard Specifications*. Anchor brick veneers to soldier pile walls with approved brick to concrete type anchors in accordance with the manufacturer's instructions. Space anchors no more than 16" apart in the vertical direction and no more than 32" apart in the horizontal direction with each row of anchors staggered 16" from the row above and below.

Seal joints above and behind soldier pile walls between coping or concrete facing and concrete slope protection with silicone sealant.

E. Backfill

For fill sections or if a temporary slope is shown in the accepted submittals, backfill behind piles, panels and concrete facing in accordance with Article 410-8 of the *Standard Specifications*. Otherwise, backfill voids behind panels, lagging and piles with No. 57 stone as shown in the accepted submittals. Ensure all voids between panels and lagging and between piles, lagging and excavation faces are filled with No. 57 stone. Compact stone to the satisfaction of the Engineer. When separation geotextiles are required, overlap adjacent geotextiles at least 18" and hold separation geotextiles in place with wire staples or anchor pins as needed.

F. Pile Coatings

For soldier pile walls with panels, clean exposed galvanized or painted surfaces of piles with a 2,500 psi pressure washer after wall construction is complete. Repair galvanized surfaces that are exposed and damaged in accordance with Article 1076-7 of the *Standard Specifications*. Repair painted surfaces that are exposed and damaged by applying 4.0 to 7.0 mils wet film thickness of a topcoat to damaged areas with brushes or rollers. Use the same paint for damaged areas that was used for the topcoat when painting piles initially. Feather or taper topcoats in damaged areas to be level with surrounding areas.

5.0 MEASUREMENT AND PAYMENT

Soldier Pile Retaining Walls will be measured and paid in square feet. Soldier pile walls will be measured as the square feet of exposed wall face area with the height equal to the difference between top and bottom of wall elevations. Define "top of wall" as top of coping or top of panels or concrete facing for soldier pile walls without coping. Define "bottom of wall" as shown in the plans and no measurement will be made for portions of soldier pile walls embedded below bottom of wall elevations.

The contract unit price for *Soldier Pile Retaining Walls* will be full compensation for

providing designs, submittals, labor, tools, equipment and soldier pile wall materials, installing piles, excavating, backfilling, hauling and removing excavated materials and supplying temporary support of excavations, wall drainage systems, leveling pads, panels, concrete facing, No. 57 stone, geotextiles and any incidentals necessary to construct soldier pile walls. The contract unit price for *Soldier Pile Retaining Walls* will also be full compensation for coping, pile coatings and brick veneers, if required. No additional payment will be made and no extension of completion date or time will be allowed for repairing overexcavations or unstable excavations or thicker concrete facing.

The contract unit price for *Soldier Pile Retaining Walls* does not include the cost for ditches, fences, handrails, barrier or guardrail associated with soldier pile walls as these items will be paid for elsewhere in the contract.

Where it is necessary to provide backfill material behind soldier pile walls from sources other than excavated areas or borrow sources used in connection with other work in the contract, payment for furnishing and hauling such backfill material will be paid as extra work in accordance with Article 104-7 of the *Standard Specifications*. Placing and compacting such backfill material is not considered extra work but is incidental to the work being performed.

Payment will be made under:

Pay Item

Soldier Pile Retaining Walls

Pay Unit

Square Foot

CONTINUOUS FLIGHT AUGER PILES FOR SOUND BARRIER WALLS (SPECIAL)**1.0 GENERAL**

Continuous flight auger (CFA) piles are constructed by drilling a borehole with a continuous flight hollow stem auger and filling the borehole by pumping grout through the auger as it is withdrawn. After completing grout placement, reinforcement is inserted into the column of fluid grout. At the Contractor's option, construct CFA piles for sound barrier walls instead of pile excavation. Install CFA piles with the required depth in accordance with the contract and accepted submittals. Use a prequalified CFA Pile Subcontractor for CFA pile work. Define "pile" as a CFA pile and "reinforcement" as pile extending out of CFA pile.

2.0 INSTALLATION PLAN SUBMITTAL

Provide 4 copies and a PDF copy of the CFA pile installation plan submittal. Submit the installation plan at least 15 days before starting CFA pile construction. Do not begin pile construction until the CFA pile installation plan is accepted.

Provide detailed project specific information in the installation plan that includes the following:

1. List and sizes of proposed equipment including CFA drilling rigs, augers and other drilling tools and grouting equipment;
2. Step-by-step description of CFA pile installation and sequence of pile construction;
3. Methods for placing reinforcement with procedures for supporting and positioning the reinforcement;
4. Minimum grout volume factor;
5. Equipment and procedures for monitoring and recording grout volume;
6. Examples of construction records to be provided that meet Section 6.0 of this provision;
7. Procedures for containment and disposal of drilling spoils and waste grout;
8. Grout mix design including laboratory test results that meets Section 1003 of the *Standard Specifications*; and
9. Other information shown in the plans or requested by the Engineer.

If alternate installation procedures are proposed or necessary, a revised CFA pile installation plan submittal may be required. If the work deviates from the accepted submittal without prior approval, the Engineer may suspend CFA pile construction until a revised plan is accepted.

3.0 MATERIALS

Use nonshrink grout that meets Section 1003 of the *Standard Specifications*.

Use piles extending out of CFA piles that meet the *Sound Barrier Wall* provision.

4.0 PRECONSTRUCTION MEETING

Before starting CFA pile construction, hold a preconstruction meeting to discuss the installation and monitoring of the piles. Schedule this meeting after all CFA pile submittals have been accepted and the CFA Pile Subcontractor has mobilized to the site. The Resident or Bridge Maintenance Engineer, Bridge Construction Engineer, Geotechnical Operations Engineer, Contractor and CFA Pile Subcontractor Superintendent and Project Manager will attend this preconstruction meeting.

5.0 CONSTRUCTION METHODS

Use equipment and methods accepted in the CFA pile installation plan or approved by the Engineer. Inform the Engineer of any deviations from the accepted plan.

Dispose of drilling spoils and waste grout as directed and in accordance with Section 802 of the *Standard Specifications*. Drilling spoils consist of all excavated material and fluids removed from boreholes.

A. Drilling

Use CFA piling rigs capable of drilling to the dimensions and depths shown in the plans or required otherwise by the Engineer. Install CFA piles with tip elevations no higher than shown in the plans or approved by the Engineer.

Use single helix hollow stem augers with uniform diameters and continuous flights from the top of the auger to the bottom tip of the cutting face. Provide augers with flights and teeth that cut the bottom of the borehole flat. Augers with outside diameters at least 97% of the pile design diameter are required. Augers capable of installing piles to a depth 20% greater than plan depth are also required.

Unless piles are installed with a hydraulic fixed mast installation platform and the stem to which the auger is fixed has an outside diameter 10" (250 mm) or greater, at least one guide connected to the leads of the CFA piling rig is required. Prevent the leads from rotating during drilling and grouting.

Seal the grout injection port to prevent entry during drilling. Keep the hollow stem of augers clean when drilling. Clearly mark augers or leads every foot (0.3 m) along their length with markings visible to the unaided eye from the ground. Check for correct pile location and alignment before beginning drilling. Do not begin drilling until enough grout to complete the pile is on the project site.

Advance the auger into the ground at a continuous rate. Do not raise the auger until beginning grout placement. Control the auger rotation speed to prevent excess spoil from being transported to the ground surface and surrounding soil being drawn laterally into the borehole.

If muck, organics, soft soil or other unsuitable materials are encountered within 5 ft (1.5 m) of the ground surface, contact the Engineer as these materials can cause problems

with top of pile construction. If auger refusal is encountered before reaching plan depth, stop the auger rotation and inform the Engineer. Unless it is determined otherwise, define refusal as less than 1 ft (0.3 m) of auger penetration per minute.

B. Grouting

Remove oil, rust inhibitors, residual drilling slurries and similar foreign materials from holding tanks/hoppers, stirring devices, pumps and lines and all other equipment in contact with grout before use.

Place a screen between the ready mix truck and the grout pump to remove large particles or cement balls using a mesh that has openings no larger than $\frac{3}{4}$ " (19 mm).

Use a positive displacement piston type pump with a known volume per stroke that can develop peak pressures at the pump of at least 350 psi (2.4 MPa). Size the pump to maintain a smooth continuous delivery of grout while limiting pressure variations (particularly pressure drops) due to pump strokes. At the beginning of construction, provide the grout volume delivered by each pump stroke and verify this value is within 3% of the actual volume. Recalibrate the grout volume per pump stroke during construction as necessary or directed.

Place grout in accordance with the contract and accepted submittals. Pump grout without difficulty to fill any soft or porous zones and with sufficient pressure to ensure a continuous monolithic pile with at least the plan cross section from the maximum borehole depth to the top of the grout column. Provide grout free of segregation, intrusions, contamination, structural damage or inadequate consolidation (honeycombing).

Begin placing grout within 5 minutes after the auger has reached plan depth. At the beginning of grout placement, lift the auger 6" to 12" (150 mm to 300 mm) and remove the sealing device by applying grout pressure or with a steel bar. Do not lift the auger beyond this range in order to minimize soil movement. After initiating grout flow, reinsert the auger to the original depth.

Pump grout continuously while extracting the auger at a smooth steady rate. Maintain a positive grout pressure at the auger injection point at all times. If rotation occurs while removing the auger, rotate the auger in the same direction as during drilling. If grout placement is suspended for any reason, inform the Engineer and redrill the CFA pile.

Monitor the depth of the auger injection point while counting pump strokes during grouting. Record the grout volume and factor versus depth of the auger injection point in increments of 5 ft (1.5 m) or less. The grout volume factor is the grout volume placed divided by the theoretical grout volume for each depth increment. A grout volume factor of at least 1.15 is required.

C. Top of Pile Finishing and Protection

After placing grout, remove all excess grout and spoil from and place a temporary form

within the top of the grout column. Use a form 3 ft to 5 ft (1 m to 1.5 m) long with a diameter equal to or larger than the pile diameter. Place the form with equal lengths above and below the ground surface. Recheck the top of the grout and remove any foreign material. After the Engineer determines that grout reaches initial set, remove the form without disturbing the ground surface around the pile.

After inserting reinforcement, square the top of the CFA pile with the pile axis while grout is still fluid or by cutting off hardened grout. Construct the top of CFA pile to the elevation shown in the plans.

D. Reinforcement

Provide reinforcement for CFA piles consisting of piles shown in the plans and accepted submittals. Insert reinforcement as a unit while the grout is still fluid. Lower or gently push reinforcement into the grout. Do not vibrate or drive the reinforcement. Support the reinforcement at the ground surface until the grout strength reaches 2,500 psi (17.2 MPa). Contact the Engineer if reinforcement cannot be properly inserted to the required depth.

6.0 CONSTRUCTION RECORDS

Provide 2 copies of CFA pile construction records after completing each pile. Include the following in construction records:

1. Names of CFA Pile Subcontractor, Superintendent, Drill Rig Operator and Project Manager;
2. Project description, county, Department's contract, TIP and WBS element number;
3. Wall station and number and pile location and identifier;
4. The grout volume and factor versus depth of the auger injection point in increments of 5 ft (1.5 m) or less;
5. CFA pile diameter, length and tip elevation, top of pile and ground surface elevations;
6. Auger diameter and theoretical volume of the borehole;
7. Grout temperature and flow for each ready mix truck;
8. Size, length, top elevation and grade of reinforcement;
9. Date and time drilling begins and ends, grout is mixed and arrives on-site, pumping grout begins and ends and reinforcement is placed;
10. Weather conditions including air temperature at time of grout placement; and
11. All other pertinent details related to CFA pile construction.

After completing CFA piles for each sound barrier wall, provide a PDF copy of all corresponding construction records.

7.0 CFA PILE ACCEPTANCE

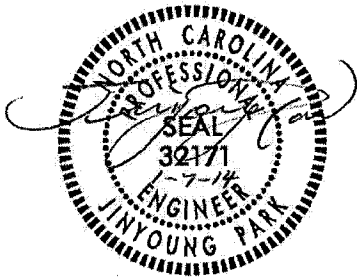
CFA pile acceptance is based in part on the following criteria.

1. Grout volume factor is greater than the minimum required for any 5 ft (1.5 m) depth increment.
2. Grout is properly placed and does not have any evidence of segregation, intrusions, contamination, structural damage or inadequate consolidation (honeycombing).
3. CFA pile and reinforcement location, alignment and elevations are within tolerances for sound barrier walls for pile excavation and reinforcement is in accordance with the contract and accepted submittals.

If the Engineer determines a CFA pile is unacceptable, additional testing, remedial measures or replacement piles are required at no additional cost to the Department. Do not begin remediation work until remediation plans are approved.

8.0 MEASUREMENT AND PAYMENT

CFA piles for sound barrier walls will be paid at the contract unit price for *Sound Barrier Wall*. No separate payment will be made for CFA piles. The contract unit price for *Sound Barrier Wall* will be full compensation for all costs for submittals, monitoring and recording, labor, tools, equipment, reinforcement and grout complete and in place and all incidentals necessary to drill and construct CFA piles in accordance with this provision. No payment will be made for any costs associated with unacceptable CFA piles.



CONTINUOUS FLIGHT AUGER PILES FOR VISUAL BARRIER WALLS (SPECIAL)**1.0 GENERAL**

This special provision governs the construction of continuous flight auger (CFA) piles. CFA piles are constructed by drilling a borehole with a continuous flight hollow stem auger and filling the borehole by pumping grout through the auger as it is withdrawn. After completing grout placement, reinforcement is inserted into the column of fluid grout. At the Contractor's option, construct CFA piles for visual barrier walls in lieu of pile excavation. Install CFA piles with the required depth in accordance with the Contract. Use a CFA Pile Subcontractor prequalified by the Contractual Services Unit of the Department for CFA pile work (work code 3110). For this provision, "pile" refers to a CFA pile and "reinforcement" refers to steel piles.

2.0 CFA PILE INSTALLATION PLAN SUBMITTAL

Provide 4 hard copies and an electronic copy (pdf or jpg format on CD or DVD) of the CFA pile installation plan submittal. Submit the installation plan at least 20 working days before starting CFA pile construction. Do not begin pile construction until the CFA pile installation plan is accepted.

Submit detailed project specific information including the following.

1. List and sizes of proposed equipment including CFA drilling rigs, augers and other drilling tools and grouting equipment.
2. Step-by-step description of CFA pile installation and sequence of pile construction.
3. Methods for placing reinforcement with procedures for supporting and positioning the reinforcement.
4. Minimum grout volume factor. The grout volume factor is equal to the grout volume placed divided by the theoretical grout volume for each depth increment. A grout volume factor of at least 1.15 is required.
5. Equipment and procedures for monitoring and recording grout volume.
6. Examples of construction records to be provided in accordance with Section 6.0.
7. Procedures for containment and disposal of drilling spoils in accordance with Section 802 of the *Standard Specifications*.
8. Grout mix design including laboratory test results in accordance with the Grout for Structures Special Provision.
9. Other information shown on the plans or requested by the Engineer.

If alternate installation procedures are proposed or necessary, a revised CFA pile installation plan submittal may be required. If the work deviates from the accepted submittal without prior approval, the Engineer may suspend CFA pile construction until a revised plan is submitted and accepted.

3.0 MATERIALS

Use steel piles meeting the requirements of Section 1084 of the *Standard Specifications*.

Use grout in accordance with the Contract.

4.0 CFA PILE PRECONSTRUCTION MEETING

Before starting CFA pile construction, conduct a preconstruction meeting to discuss the installation and monitoring of the CFA piles. Schedule this meeting after all CFA pile submittals have been accepted and the CFA Pile Subcontractor has mobilized to the site. The Resident or Bridge Maintenance Engineer, Bridge Construction Engineer, Geotechnical Operations Engineer, General Contractor and the CFA Pile Subcontractor Superintendent, Drill Rig Operators and Project Manager will attend this preconstruction meeting.

5.0 CONSTRUCTION METHODS

Use equipment and methods reviewed and accepted in the CFA pile installation plan or approved by the Engineer. Inform the Engineer of any deviations from the accepted plan.

Dispose of drilling spoils and excess waste grout in accordance with Section 802 of the *Standard Specifications* and as directed by the Engineer. Drilling spoils consist of all excavated material including water removed from boreholes.

A. Drilling

Use CFA piling rigs capable of drilling through whatever materials are encountered to the dimensions and depths shown on the plans or otherwise required by the Engineer.

Use single helix hollow stem augers with uniform diameters and continuous flights from the top of the auger to the bottom tip of the cutting face. Provide augers with flights and teeth that cut the bottom of the borehole flat. Augers with outside diameters at least 97% of the pile design diameter are required. Augers capable of installing piles to a depth 20% greater than plan depth are also required.

Unless piles are installed with a hydraulic fixed mast installation platform and the stem to which the auger is fixed has an outside diameter 10" (250 mm) or greater, at least one guide connected to the leads of the CFA piling rig is required. Prevent the leads from rotating during drilling and grouting.

Seal the grout injection port to prevent entry during drilling. Keep the hollow stem of augers clean when drilling. Clearly mark augers or leads every foot (0.3 m) along their

length with markings visible to the unaided eye from the ground. Check for correct pile location and alignment before beginning drilling. Do not begin drilling until enough grout to complete the pile is on the project site.

Advance the auger into the ground at a continuous rate. Do not raise the auger until beginning grout placement. Control the auger rotation speed to prevent excess spoil from being transported to the ground surface and surrounding soil being drawn laterally into the borehole.

If muck, organics, soft soil or other unsuitable materials are encountered within 5 ft (1.5 m) of the ground surface, contact the Engineer as these materials can cause problems with top of pile construction. If auger refusal is encountered before reaching plan depth, stop the auger rotation and inform the Engineer. Unless it is determined otherwise, refusal is defined as less than 1 ft (0.3 m) of auger penetration per minute.

B. Grouting

Remove all oil, rust inhibitors, residual drilling slurries and similar foreign materials from holding tanks/hoppers, stirring devices, pumps and lines and all other equipment in contact with grout before use.

Place a screen between the ready mix truck and the grout pump to remove large particles or cement balls using a mesh that has openings no larger than 3/4 inch (19 mm).

Use a positive displacement piston type pump with a known volume per stroke that can develop peak pressures at the pump of at least 350 psi (2.4 MPa). Size the pump to maintain a smooth continuous delivery of grout while limiting pressure variations (particularly pressure drops) due to pump strokes. At the beginning of construction, provide the grout volume delivered by each pump stroke and verify this value is within 3% of the actual volume. Recalibrate the grout volume per pump stroke during construction as necessary or directed by the Engineer.

Place grout in accordance with the Contract and accepted submittals. Pump grout without difficulty to fill any soft or porous zones and with sufficient pressure to ensure a continuous monolithic pile with at least the plan cross section from the maximum borehole depth to the top of the grout column. Provide grout free of segregation, intrusions, contamination, structural damage or inadequate consolidation (honeycombing).

Begin placing grout within 5 minutes after the auger has reached plan depth. At the beginning of grout placement, lift the auger 6 to 12 inches (150 to 300 mm) and remove the sealing device by applying grout pressure or with a steel bar. Do not lift the auger beyond this range in order to minimize soil movement. After grout flow is initiated, reinsert the auger to the original depth.

Pump grout continuously while extracting the auger at a smooth steady rate. Maintain a positive grout pressure at the auger injection point at all times. If rotation occurs while

removing the auger, rotate the auger in the same direction as during drilling. If grout placement is suspended for any reason, inform the Engineer and redrill the CFA pile.

Monitor the depth of the auger injection point while counting pump strokes during grouting. Record the grout volume and factor versus depth of the auger injection point in increments of 5 ft (1.5 m) or less.

C. Top of Pile Finishing and Protection

After placing grout, remove all excess grout and spoil from and place a temporary form within the top of the grout column. Use a form 3 to 5 ft (1 to 1.5 m) long with a diameter equal to or larger than the pile diameter. Place the form with equal lengths above and below the ground surface. Recheck the top of the grout and remove any foreign material. After the grout has reached initial set as determined by the Engineer, remove the form without disturbing the ground surface around the pile.

After placing the reinforcement, square the top of the CFA pile with the pile axis while grout is still fluid or by cutting off hardened grout. Construct the top of CFA pile to the elevation shown on the plans.

D. Reinforcement

Provide reinforcement for CFA piles consisting of steel piles as shown on the plans and accepted submittals. Place reinforcement as a unit while the grout is still fluid. Lower or gently push reinforcement into the grout. Do not vibrate or drive the reinforcement. Support the reinforcement at the ground surface until the grout strength reaches 2,500 psi (17.2 MPa). Contact the Engineer if reinforcement can not be properly inserted to the required depth.

6.0 CONSTRUCTION RECORDS

Provide 2 original hard copies of CFA pile construction records including the following after completing each pile.

1. Names of CFA Pile Subcontractor, Superintendent, Drill Rig Operator and Project Manager
2. Project description, county, NCDOT Contract, TIP and WBS element number
3. Wall station and number and pile location and identifier
4. The grout volume and factor versus depth of the auger injection point in increments of 5 ft (1.5 m) or less
5. CFA pile diameter, length and tip elevation, top of pile and ground surface elevations
6. Auger diameter and theoretical volume of the borehole
7. Grout temperature and flow for each ready mix truck
8. Size, length, top elevation and grade of reinforcement

9. Date and time drilling begins and ends, grout is mixed and arrives on-site, pumping grout begins and ends and reinforcement is placed
10. Weather conditions including air temperature at time of grout placement
11. All other pertinent details related to CFA pile construction

After completing all CFA piles for a visual barrier wall, submit electronic copies (pdf or jpg format on CD or DVD) of all corresponding construction records.

7.0 CFA PILE ACCEPTANCE

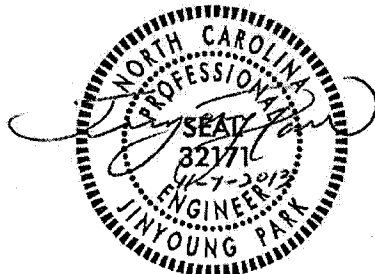
CFA pile acceptance is based on the following criteria.

1. Grout volume factor is greater than the minimum required for any 5 ft (1.5 m) depth increment.
2. Grout is in accordance with the Contract and does not have any evidence of segregation, intrusions, contamination, structural damage or inadequate consolidation (honeycombing).
3. CFA pile and reinforcement location, alignment and elevations are within tolerances for visual barrier walls for pile excavation and steel piles are in accordance with the Contract and accepted submittals.

If the Engineer determines a CFA pile is unacceptable or unsatisfactory, additional testing, remedial measures or replacement piles are required at no additional cost to the Department. Obtain approval for remediation proposals before performing work. No compensation will be made for losses or damages for remedial work or investigation of unacceptable or unsatisfactory piles.

8.0 MEASUREMENT AND PAYMENT

Include the cost of the CFA piles in the unit bid price for "Visual Barrier Wall". No separate payment will be made for the CFA piles. Include in this unit bid price all costs for submittals, monitoring and recording, labor, tools, equipment, reinforcement and grout complete and in place and all incidentals necessary to drill and construct CFA piles in accordance with this provision. No additional payment will be made for drilling through non-soil materials or any costs associated with unacceptable CFA piles.



**PROJECT SPECIAL PROVISIONS
GEOENVIRONMENTAL**

CONTAMINATED SOIL (10/23/2013)

The Contractor's attention is directed to the fact that soil contaminated with petroleum hydrocarbon compounds exist within the project area. The known areas of contamination are indicated on corresponding plans sheets. Information relating to these contaminated areas, sample locations, and investigation reports are available at the following web address by navigating to the correct letting year and month then selecting, "Plans and Proposals", "Cumberland U-2519CB", "GeoEnvironmental":

<http://dotw-xfer01.dot.state.nc.us/dsplan/>

Petroleum contaminated soil may be encountered during any earthwork activities on the project. The Contractor shall only excavate those soils that the Engineer designates necessary to complete a particular task. The Engineer shall determine if soil is contaminated based on petroleum odors and unusual soil staining. Contaminated soil not required to be excavated is to remain in place and undisturbed. Undisturbed soil shall remain in place, whether contaminated or not. The Contractor shall transport all contaminated soil excavated from the project to a facility licensed to accept contaminated soil.

In the event that the Contractor chooses to stockpile the soil temporarily, the stockpile shall be created within the property boundaries of the source material and in accordance with the Stockpile Detail found in the plans. If the volume of contaminated material exceeds available space on site, the Contractor shall obtain a permit from the NCDENR UST Section's Regional Office for off-site temporary storage. Stockpiling contaminated soil will be incidental to the project. The Contractor shall provide disposal manifests and weigh tickets to the Engineer for review and approval. The Engineer will in turn provide the GeoEnvironmental Section with a copy of the disposal manifests and weigh tickets for their records.

If groundwater is encountered and dewatering is required in areas of known contamination then the contractor shall containerize the groundwater in vessels provided by the Department. The Department will be responsible for the sampling and disposal of the water. Handling contaminated ground water will be incidental to the project.

Measurement and Payment:

The quantity of contaminated soil hauled, and disposed of shall be the actual number of tons of material, which has been acceptably transported and weighed with certified scales as documented by disposal manifests and weigh tickets. The quantity of contaminated soil, measured as provided above, shall be paid for at the contract unit price per ton for "Hauling and Disposal of Petroleum Contaminated Soil".

The above price and payment shall be full compensation for all work covered by this section, including, but not limited to loading, transportation, weighing, laboratory testing, disposal, equipment, decontamination of equipment, labor, and personal protective equipment. Excavation of petroleum contaminated soil will be incidental to the project.

Payment shall be made under:

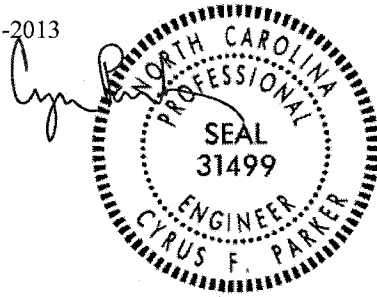
Pay Item

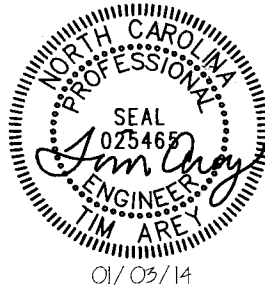
Hauling and Disposal of Petroleum Contaminated Soil

Pay Unit

Ton

10-23-2013



**OVERHEAD AND DYNAMIC MESSAGE SIGN FOUNDATIONS:****Description**

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

Materials

Use sign foundation materials that meet the *Foundations and Anchor Rod Assemblies for Metal Poles* provision.

Assumed Subsurface Conditions

Assume the following soil parameters and groundwater elevation for sign foundations unless these subsurface conditions are not applicable to sign locations:

- (A) Unit weight (γ) = 120 lb/cf,
- (B) Friction angle (ϕ) = 30°,
- (C) Cohesion (c) = 0 lb/sf and
- (D) Groundwater 7 ft below finished grade.

A subsurface investigation is required if the Engineer determines these assumed subsurface conditions do not apply to a sign location and the sign cannot be moved. Subsurface conditions requiring a subsurface investigation include but are not limited to weathered or hard rock, boulders, very soft or loose soil, muck or shallow groundwater. No extension of completion date or time will be allowed for subsurface investigations.

Subsurface Investigations

Use a prequalified geotechnical consultant to perform one standard penetration test (SPT) boring in accordance with ASTM D1586 at each sign location requiring a subsurface investigation. Rough grade sign locations to within 2 ft of finished grade before beginning drilling. Drill borings to 2 drilled pier diameters below anticipated pier tip elevations or refusal, whichever is higher.

Use the computer software gINT version V8i or later manufactured by Bentley Systems, Inc. with the current NCDOT gINT library and data template to produce SPT boring logs. Provide boring logs sealed by a geologist or engineer licensed in the state of North Carolina.

Sign Foundation Designs

Design sign foundations for the wind zone and clearances shown in the plans and the slope of finished grade at each sign location. Use the assumed soil parameters and groundwater elevation

above for sign foundation designs unless a subsurface investigation is required. For sign locations requiring a subsurface investigation, design sign foundations for the subsurface conditions at each sign location. Design footings, pedestals, drilled piers, grade beams and wings in accordance with the 6th Edition of the *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*. In some instances, conflicts with drainage structures may dictate sign foundation types.

Design footings in accordance with Section 4.4 of the *AASHTO Standard Specifications for Highway Bridges*. Do not use an allowable bearing pressure of more than 3,000 lb/sf for footings.

Design drilled piers for side resistance only in accordance with Section 4.6 of the *AASHTO Standard Specifications for Highway Bridges* except reduce ultimate side resistance by 25% for uplift. Use the computer software LPILE version 6.0 or later manufactured by Ensoft, Inc. to analyze drilled piers. Provide drilled pier designs with a horizontal deflection of less than 1" at top of piers. For cantilever signs with single drilled pier foundations supporting metal poles, use wings to resist torsion forces. Provide drilled pier designs with a factor of safety of at least 2.0 for torsion.

For drilled pier sign foundations supporting upright trusses, use dual drilled piers connected with a grade beam having a moment of inertia approximately equal to that of either pier. The Broms' method is acceptable to analyze drilled piers with grade beams instead of LPILE. Use a safety factor of at least 3.5 for the Broms' design method in accordance with C13.6.1.1 of the *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*.

Submit boring logs, if any, working drawings and design calculations for acceptance in accordance with Article 105-2 of the *2012 Standard Specifications*. Submit working drawings showing plan views, required foundation dimensions and elevations and typical sections with reinforcement, conduit and anchor rod assembly details. Include all boring logs, design calculations and LPILE output for sign foundation design submittals. Have sign foundations designed, detailed and sealed by an engineer licensed in the state of North Carolina.

Construction Methods

Construct footings, pedestals, drilled piers, grade beams and wings and install anchor rod assemblies for sign foundations in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* provision.

Measurement and Payment

Overhead Footings will be measured and paid in cubic yards. Sign foundations will be measured as the cubic yards of foundation concrete for footings, pedestals, drilled piers, grade beams and wings shown on the accepted submittals. The contract unit price for *Overhead Footings* will be full compensation for providing labor, tools, equipment and foundation materials, stabilizing or shoring excavations and supplying concrete, reinforcing steel, conduit, anchor rod assemblies and any incidentals necessary to construct sign foundations. Subsurface investigations required by the Engineer will be paid as extra work in accordance with Article 104-7 of the *2012 Standard Specifications*.

TIP #U-2519CB

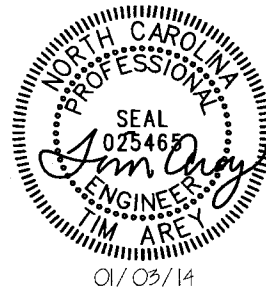
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County Cumberland

Payment will be made under:

Pay Item
Overhead Footings

Pay Unit
Cubic Yard

**OVERHEAD SIGN SUPPORTS:****Description**

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

Materials

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

Construction Methods**A. General**

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

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

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

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

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

assembled, the double nuts shall be brought tight against each other by the use of two wrenches.

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

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

B. Shop Drawings

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

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

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

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

Allow 40 days for initial working drawing review after the Engineer receives them. If revisions to working drawings are required, an additional 40 days shall be required for review and approval of the final working drawings.

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

C. Design and Fabrication

The following criteria govern the design of overhead sign assemblies:

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

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

Overhead cantilever sign structures shall include galloping loads (exclude four-chord horizontal trusses).

The natural wind gust speed in North Carolina shall be assumed to be 11.6 mph.

The fatigue importance category used in the design, for each type of structure, shall be for:

Cantilever structures with span greater than 50 feet – Fatigue Category I.

Cantilever structures with span less than or equal to 50 feet – Fatigue Category II.

Non-cantilever structures – Fatigue Category II

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

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

- Case 1 For a single upright post of cantilever or span type overhead sign structure, the effective column length factor, “K”, shall be taken as 2.0.
- Case 2 For twin post truss-type upright post with the post connected to one chord of a horizontal truss, the effective column length factor for that column shall be taken as 2.0.
- Case 3 For twin post truss-type upright post with the post connected to two truss chords of a horizontal tri-chord or box truss, the effective column length factor for that column shall be taken as 1.65

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

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

$$\frac{f_a}{F} + \frac{f_b}{F} + \frac{f_v^2}{F} = 1.0$$

$$a \quad 1 \quad \frac{0.6 f_a}{F_b} \quad v \quad F_e$$

Where f_a = Computed axial compression stress at base of post

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

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

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

- Case 2 Circular or rectangular base plate with the upright pole socketed into and attached to the base plate with two lines of fillet weld, and where no stiffeners are provided, or any base plate with a center hole that is larger in diameter than 1/5 of the upright diameter. The magnitude of bending moment induced by the anchoring force of each anchor bolt shall be calculated as $M = P \times D_2$.

M - bending moment at the critical section of the base plate induced by one anchor bolt

P - anchoring force of each anchor bolt

D_1 - horizontal distance between the center of the anchor bolt and the outer face of the upright, or the difference between the radius of the bolt circle and the outside radius of the upright

D_2 - horizontal distance between the face of the upright and the face of the anchor bolt nut

The critical section shall be located at the face of the anchor bolt and perpendicular to the radius of the bolt circle. The overlapped part of two adjacent critical sections shall be considered ineffective.

The thickness of Case 1 base plate shall not be less than that calculated based on formula for Case 2.

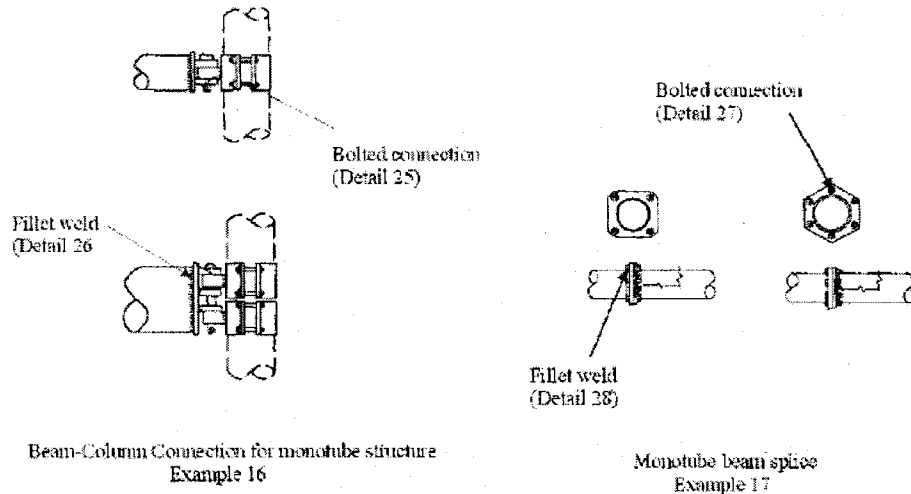
Uprights, foundations, and trusses that support overhead signs shall be designed in accordance with the Overhead and Dynamic Message Sign Foundations Project Special Provision for the effects of torsion. Torsion shall be considered from dead load eccentricity of these attachments, as well as for attachments such as walkways, supporting brackets, lights, etc., that add to the torsion in the assembly. Truss vertical and horizontal truss diagonals in particular and any other assembly members shall be appropriately sized for these loads.

Uprights, foundations, and trusses that support overhead mounted signs shall be designed for the proposed sign wind area and future wind areas. The design shall consider the effect of torsion induced by the eccentric force location of the center of wind force above (or below) the center of the supporting truss. Truss vertical and horizontal truss diagonals in particular and any other assembly members shall be appropriately sized for these loads.

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

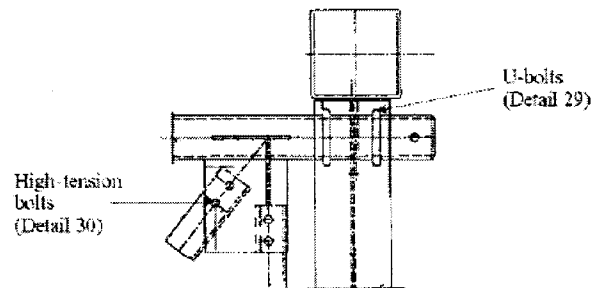
<u>Construction</u>	<u>Detail</u>	<u>Stress Category</u>	<u>Application</u>	<u>Example</u>
Mechanically Fastened Connections	25. Bolts in Tension	D	Beam column connection for monotube structures	16
Fillet Weld Connections	26. Fillet welded with one side normal to applied stress	E'	Beam column connection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

Add to the Specifications, Figure 11-1:



Beam-Column Connection for monotube structure
Example 16

Monotube beam splice
Example 17



Beam-Column Connection for Truss Structure
Example 18

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

Fabricate the span and cantilever supporting structures using tubular members of either aluminum or steel, using only one type of material throughout the project. Sign support structures that are to be attached to bridges shall be fabricated using other structural shapes.

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

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

Provide permanent camber in addition to dead load camber in accordance with the *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*. Indicate on the shop drawings the amount of camber provided and the method employed in the fabrication of the support to obtain the camber.

Use cantilever sign structures that meet the following design criteria:

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

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

Compensation

The work covered by this section will be paid for at the contract lump sum for each *Supports, Overhead Sign Structure @ (see below)*. Such price will be full compensation for all work covered by this specification includes all design, fabrication, construction, transportation, and erection of the complete overhead sign structure, supporting structure, hardware, lighting support brackets, preparing and furnishing shop drawings, and attaching the signs to the overhead assembly.

Payment will be made under:

Supports, Overhead Sign Structure @ <u>STA. 976+60 -L-</u>	Lump Sum
Supports, Overhead Sign Structure @ <u>STA. 36+60 -L-</u>	Lump Sum
Supports, Overhead Sign Structure @ <u>STA. 63+00 -L-</u>	Lump Sum
Supports, Overhead Sign Structure @ <u>STA. 81+25 -COL1-</u>	Lump Sum
Supports, Overhead Sign Structure @ <u>STA. 131+30 -COL1-</u>	Lump Sum

TIP: U-2519CB
Date: 4/1/14

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Cumberland County

WORK ZONE TRAFFIC CONTROL
Project Special Provisions

Temporary Median Crossovers For Installation of Bridge Girders over All American Freeway

(3/20/2014)

Description

The Contractor shall provide temporary median cross-overs to install the proposed bridge girders over All American Freeway. The Contractor shall be responsible for the design, construction, traffic control installation, maintenance and removal of the temporary median cross-overs.

Construction Methods

The temporary median cross-overs shall be designed for a minimum of 35 MPH and shall tie to the existing edge and elevation of All American Freeway. All alignment and pavement designs shall be sealed by a licensed Engineer and shall be approved by NCDOT prior to construction. The use of these temporary median crossovers will be subject to the time restrictions in the contract for the closure of All American Freeway. When utilizing the temporary median cross-overs, the Contractor shall use Roadway Standard Drawing 1101.03, sheet 6 of 9 found in the 2012 North Carolina Roadway Standard Drawings.

Measurement and Payment

The measurement and payment for the Temporary Median Cross-Overs shall be Lump Sum. The Lump Sum price shall include any costs associated with the design, construction, traffic control installation, maintenance and removal.

Pay Item

Pay Unit

Temporary Median Cross-OversLump Sum



WORK ZONE TRAFFIC CONTROL
Project Special Provisions

Law Enforcement:

(05/14/2013)

Description

Furnish Law Enforcement Officers and marked Law Enforcement vehicles to control traffic in lane closures and direct traffic through intersections 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.

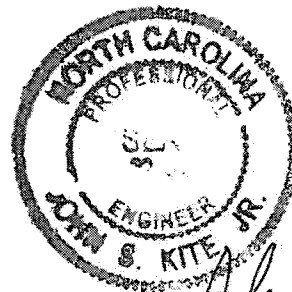
Payment will be made under:

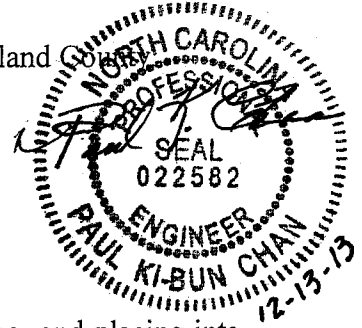
Pay Item

Law Enforcement

Pay Unit

Hour



PROJECT SPECIAL PROVISIONS
LIGHTING**1.00 DESCRIPTION**

The work covered by this Section consists of furnishing, installing, connecting, and placing into satisfactory operating condition roadway lighting at locations shown on the 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" (Standard Specifications).

Perform all work in conformance with Division 14 of the 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 Standard Specifications applicable to the work on this project are listed below.

Section 1401	High Mount Standard and Portable Drive Unit
Section 1402	High Mount Foundations
Section 1403	High Mount Luminaires
Section 1407	Electric Service Pole and Lateral
Section 1408	Light Control System
Section 1409	Electrical Duct
Section 1410	Feeder Circuits
Section 1411	Electrical Junction Boxes

2.00 HIGH MOUNT FOUNDATIONS**2.10 DESCRIPTION**

High mount foundations for high mount standards consist of drilled piers or footings with pedestals, conduit and anchor rod assemblies. Construct high mount foundations in accordance with the contract and either *Roadway Standard Drawings* No. 1402.01 or the accepted submittals. Define "high mount standard foundation" as a drilled pier including the conduit and anchor rod assembly that meets Standard Drawing No. 1402.01.

2.20 MATERIALS

Use high mount foundation materials that meet the *Foundations and Anchor Rod Assemblies for Metal Poles* provision found in the Roadway Project Special Provisions.

2.30 HIGH MOUNT STANDARD FOUNDATIONS

Construct high mount standard foundations for the wind zone and high mount heights shown in the plans unless the following assumed site conditions are not applicable to high mount locations:

- A. Soil with unit weight (γ) $\geq 1920 \text{ kg/m}^3$ (120 lb/cf) and friction angle (ϕ) $\geq 30^\circ$,
- B. Groundwater at least 2.1m (7 ft) below finished grade and
- C. Slope of finished grade 6:1 (H:V) or flatter.

A subsurface investigation and high mount foundation design are required if the Engineer determines these assumed site conditions do not apply to a high mount location and the high mount cannot be moved. Subsurface conditions requiring a high mount foundation design include but are not limited to weathered or hard rock, boulders, very soft or loose soil, muck or shallow groundwater. No extension of completion date or time will be allowed for subsurface investigations or high mount foundation designs.

2.40 SUBSURFACE INVESTIGATIONS

Use a prequalified geotechnical consultant to perform one standard penetration test (SPT) boring in accordance with ASTM D1586 at each high mount location requiring a subsurface investigation. Rough grade high mount locations to within 0.6m (2 ft) of finished grade before beginning drilling. Drill borings to 2 drilled pier diameters below anticipated pier tip elevations or refusal, whichever is higher.

Use the computer software gINT version V8i or later manufactured by Bentley Systems, Inc. with the current NCDOT gINT library and data template to produce SPT boring logs. Provide boring logs sealed by a geologist or engineer licensed in the state of North Carolina.

2.50 HIGH MOUNT FOUNDATION DESIGNS

Design high mount foundations for the wind zone and high mount heights shown in the plans and the slope of finished grade and subsurface conditions at each high mount location. Design drilled piers, footings and pedestals in accordance with the 6th Edition of the *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*.

Design drilled piers for side resistance only in accordance with Section 4.6 of the *AASHTO Standard Specifications for Highway Bridges*. Use the computer software LPILE version 6.0 or later manufactured by Ensoft, Inc. to analyze drilled piers. Provide drilled pier designs with a horizontal deflection of less than 12.7mm (0.5") at top of piers.

Design footings in accordance with Section 4.4 of the *AASHTO Standard Specifications for Highway Bridges*. Do not use an allowable bearing pressure of more than $14,640 \text{ kg/m}^2$ (3,000 lb/sf) for footings.

Submit boring logs, working drawings and design calculations for acceptance in accordance with Article 105-2 of the *Standard Specifications*. Submit working drawings showing plan views, required foundation dimensions and elevations and typical sections with reinforcement, conduit and anchor rod assembly details. Include all boring logs, design calculations and LPILE output for high mount foundation design submittals. Have high mount foundations designed, detailed and sealed by an engineer licensed in the state of North Carolina.

2.60 CONSTRUCTION METHODS

Grade a 1m (~3 ft) diameter level work area around high mount locations with cut and fill slopes as shown on Standard Drawing No. 1402.01. Construct drilled piers, footings and pedestals and install anchor rod assemblies for high mount foundations in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* provision.

2.70 MEASUREMENT AND PAYMENT

High Mount Foundations will be measured and paid in cubic yards. High mount standard foundations will be measured as the cubic yards of concrete shown on Standard Drawing No. 1402.01 for the high mount height and wind zone shown in the plans. All other high mount foundations will be measured as the cubic yards of foundation concrete for drilled piers, footings and pedestals shown on the accepted submittals. The contract unit price for *High Mount Foundations* will be full compensation for providing labor, tools, equipment and foundation materials, stabilizing or shoring excavations and supplying concrete, reinforcing steel, conduit, anchor rod assemblies and any incidentals necessary to construct high mount foundations. Subsurface investigations and high mount foundation designs required by the Engineer will be paid as extra work in accordance with Article 104-7 of the *Standard Specifications*.

Payment will be made under:

High Mount Foundations.....Cubic Yards

3.00 ELECTRICAL JUNCTION BOXES

3.10 DESCRIPTION

Same as Section 1411-1.

3.20 MATERIALS

Same as Section 1411-2, except modify referenced Section 1091-5 as follows:

- Page 10-202, revise paragraph starting on line 9 to read "Provide polymer concrete (PC) boxes which have bolted covers and open bottoms. Provide vertical extensions of 6" to 12" as required by project special provisions."
- Page 10-202, revise sentence beginning on line 14 to read "Other thermoplastic materials may be used for components which are not normally exposed to sunlight."

3.30 CONSTRUCTION METHODS

Same as Section 1411-3.

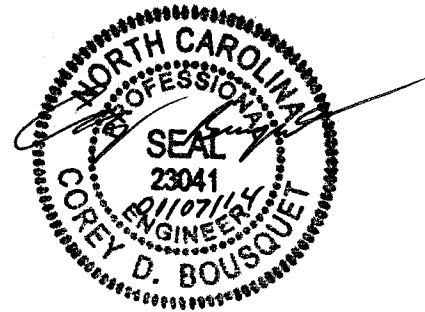
3.40 MEASUREMENT AND PAYMENT

Same as Section 1411-4.

PROJECT SPECIAL PROVISIONS
Utility Construction

NCDOT Utilities Unit
1555 MSC
Raleigh, NC 27699-1555

919.707.6690



(Seal)

Revise the 2012 Standard Specifications as follows:

Page 10-58, Sub-article 1036-1 General

add the following sentence

All materials in contact with potable water shall be in conformance with Section 1417 of the Safe Drinking Water Act.

Page 15-1, Sub-article 1500-2 Cooperation with the Utility Owner, paragraph 2:

add the following sentences:

The Contractor shall provide access for the owner's representatives during construction. A preconstruction meeting shall be held with Public Works Commission of Fayetteville-Water and Sewer, the Utility Contractor and D.O.T prior to any work beginning. The Contractor shall notify the owner two weeks before commencement of any work and three weeks before service interruption.

The 16" water line on this project belongs to Fayetteville PWC. The contact person for Fayetteville PWC is Mr. Joe Glass, PE and he can be reached by phone at (910)223-4740. Any work on these lines must be coordinated through the Engineer and the utility owner before beginning.

Page 15-2, Sub-article 1500-9 Placing Pipelines into Service

add the following sentence:

Obtain approval from the NCDENR-Public Water Supply Section prior to placing a new water line into service. Use backflow prevention assemblies for temporary connections to isolate new water lines from existing water line.

PROJECT SPECIAL PROVISIONS**Utility Construction**

Page 15-5, Sub-article 1510-2 Subarticle 1510-2 Materials, add the following sentences:

All water pipes shall be provided and installed in accordance with Articles 1036 and 1510 of the Standard Specifications. All water pipe on this project shall be ductile iron unless otherwise specified on the utility construction plans.

Ductile iron pipe fittings shall be installed in accordance with the applicable utility provisions herein, as shown on the utility plans and/or as directed by the Engineer.

Ductile iron bends and tees shall be in accordance with the applicable requirements of ANSI A21.10 (AWWA C110). All ductile iron pipe fittings shall have a minimum working pressure of 250 PSI.

Restrained Joint Ductile Iron Water Line shall be installed in accordance with the applicable utility provisions herein, as shown on the utility plans and/or as directed by the Engineer.

Restrained Joint Ductile Iron Water Pipe shall be the thickness class shown on the utility plans and shall conform to ANSI A21.51 (AWWA C151). All joints for such pipe shall be in accordance with ANSI A21.11 (AWWA C111). Pipe thickness shall be in accordance with ANSI A21.50 (AWWA C150) and based on laying conditions and internal pressures stated on the plans.

Cement mortar lining and seal coating for pipe shall be in accordance with ANSI A21.4 (AWWA C104). Bituminous outside coating shall be in accordance with ANSI A21.51 (AWWA C151).

Page 15-5, Subarticle 1510-3 Construction Methods, add the following sentences:

Testing of all water pipe shall be in accordance with Article 1510, with the exception of the amount of allowable leakage. Leakage is not allowed; pressure shall be maintained at 200 PSI for the duration of the test. Fayetteville PWC shall be present for all testing of water main.

Page 15-6, Sub-article 1510-3 (B), Testing and Sterilization
change the allowable leakage formula to:

$$W = LD\sqrt{P} \div 148,000$$

PROJECT SPECIAL PROVISIONS

Utility Construction

Page 15-6, Sub-article 1510-3 (B), Testing and Sterilization, sixth paragraph:

Replace the paragraph with the following:

Sterilize water lines in accordance with Section 1003 of The Rules Governing Public Water supply and AWWA C651 Section 4.4.3, the Continuous Feed Method. Provide a chlorine solution with between 50 parts per million and 100 parts per million in the initial feed. If the chlorine level drops below 10 parts per million during a 24 hour period, then flush, refill with fresh chlorine solution, and repeat for 24 hours. Provide certified bacteriological and contaminant test results from a state-approved or state-certified laboratory. Operate all valves and controls to assure thorough sterilization.

Page 15-6, Sub-article 1510-3 (B), Testing and Sterilization, seventh paragraph:

delete the words "may be performed concurrently or consecutively."
and replace with "shall be performed consecutively."

PROJECT SPECIAL PROVISIONS
Utilities by Others

General:

The following utility companies have facilities that will be in conflict with the construction of this project:

- A. Piedmont Gas (Gas)
- B. Duke Progress (Power – Transmission)
- C. Duke Progress (Power - Distribution)
- D. Fayetteville Public Works Commission (Power)
- E. Sandhills Utility (Power - Fort Bragg)
- F. CenturyLink (Telephone)
- G. Old North Utilities (Water and Sewer - Fort Bragg)
- H. Time Warner Cable (CATV)
- I. Fort Bragg (Telephone)
- J. Fort Bragg (Gas)

The conflicting facilities of these concerns will be adjusted prior to the date of availability, unless otherwise noted and are therefore listed in these special provisions for the benefit of the Contractor. All utility work listed herein will be done by the utility owners. All utilities are shown on the plans from the best available information.

The Contractor's attention is directed to Article 105.8 of the Standard Specifications.

Utilities Requiring Adjustment:

A. Piedmont Gas

- 1. See Utility Conflict Plans by Others. The contact person is Mr. Ronnie Love at 910-309-7011.
Ronnie.Love@piedmontng.com

B. Duke Progress - Transmission

- 1. All work will be completed by May 31, 2015
See Utility Conflict Plans by Others. The contact person is Mr. Jamie Loy at 919-546-6034.
jamie.loy@pgnmail.com

C. Duke Progress - Distribution

- 2. All work will be completed by November 1, 2014
See Utility Conflict Plans by Others. The contact person is Mr. J. B. Jones at 910-206-1966.
Jb.Jones@duke-energy.com

PROJECT SPECIAL PROVISIONS

Utilities by Others

D. Fayetteville Public Works Commission - (Power)

1. All work will be completed by November 1, 2014
See Utility Conflict Plans by Others. The contact person is
Mr. Marc Tunstall at 910-223-4502.
Marc.tunstall@faypwc.com

E. Sandhills Utility

1. All work will be completed by December 1, 2014
See Utility Conflict Plans by Others. The contact person is
Mr. Bill Cannon at 910-818-3204.
bcannon@sandhillsutility.com

F. CenturyLink

1. All work will be completed by November 1, 2014
See Utility Conflict Plans by Others. The contact person is
Mr. Kevin Godwin at 910-366-2142.
Kevin.Godwin@CenturtLink.com

G. Old North Utilities

1. All work will be completed by November 1, 2014
See Utility Conflict Plans by Others. The contact person is
Mr. Pat Jennings at 910-495.1311 Ext. 116.
patrick.jennings@onus.asusinc.com

H. Time Warner Cable

1. All work will be completed by December 1, 2014
See Utility Conflict Plans by Others. The contact person is
Mr. Tommy Roberts at 919-920-7409.
trobert@telics.com

I. Fort Bragg DPW (Telephone)

1. All work will be completed by November 1, 2014
See Utility Conflict Plans by Others. The contact person is
Mr. John Hamilton at 910-396-4475.
john.m.hamilton40.civ@mail.mil

PROJECT SPECIAL PROVISIONS

Utilities by Others

J. Fort Bragg DPW (Gas)

1. All work will be completed by November 1, 2014
See Utility Conflict Plans by Others. The contact person is
Mr. Clayton Parker at 910-321-2957 (Works for Piedmont Natural Gas;
Piedmont Natural Gas will be acquiring Fort Bragg's gas line).
Clayton.Parker@piedmontng.com

**Project Special Provisions
Erosion Control**

STABILIZATION REQUIREMENTS:

Stabilization for this project shall comply with the time frame guidelines as specified by the NCG-010000 general construction permit effective August 3, 2011 issued by the North Carolina Department of Environment and Natural Resources Division of Water Quality. Temporary or permanent ground cover stabilization shall occur within 7 calendar days from the last land-disturbing activity, with the following exceptions in which temporary or permanent ground cover shall be provided in 14 calendar days from the last land-disturbing activity:

- Slopes between 2:1 and 3:1, with a slope length of 10 ft. or less
- Slopes 3:1 or flatter, with a slope of length of 50 ft. or less
- Slopes 4:1 or flatter

The stabilization timeframe for High Quality Water (HQW) Zones shall be 7 calendar days with no exceptions for slope grades or lengths. High Quality Water Zones (HQW) Zones are defined by North Carolina Administrative Code 15A NCAC 04A.0105 (25). Temporary and permanent ground cover stabilization shall be achieved in accordance with the provisions in this contract and as directed.

SEEDING AND MULCHING:

(East)

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined. All rates are in pounds per acre.

All Roadway Areas

March 1 - August 31		September 1 - February 28	
50#	Tall Fescue	50#	Tall Fescue
10#	Centipede	10#	Centipede
25#	Bermudagrass (hulled)	35#	Bermudagrass (unhulled)
500#	Fertilizer	500#	Fertilizer
4000#	Limestone	4000#	Limestone

Waste and Borrow Locations

March 1 - August 31		September 1 - February 28	
75#	Tall Fescue	75#	Tall Fescue
25#	Bermudagrass (hulled)	35#	Bermudagrass (unhulled)
500#	Fertilizer	500#	Fertilizer
4000#	Limestone	4000#	Limestone

Note: 50# of Bahiagrass may be substituted for either Centipede or Bermudagrass only upon Engineer's request.

Approved Tall Fescue Cultivars

2 nd Millennium	Duster	Magellan	Rendition
Avenger	Endeavor	Masterpiece	Scorpion
Barlexas	Escalade	Matador	Shelby
Barlexas II	Falcon II, III, IV & V	Matador GT	Signia
Barrera	Fidelity	Millennium	Silverstar
Barrington	Finesse II	Montauk	Southern Choice II
Biltmore	Firebird	Mustang 3	Stetson
Bingo	Focus	Olympic Gold	Tarheel
Bravo	Grande II	Padre	Titan Ltd
Cayenne	Greenkeeper	Paraiso	Titanium
Chapel Hill	Greystone	Picasso	Tomahawk
Chesapeake	Inferno	Piedmont	Tacer
Constitution	Justice	Pure Gold	Trooper
Chipper	Jaguar 3	Prospect	Turbo
Coronado	Kalahari	Quest	Ultimate
Coyote	Kentucky 31	Rebel Exeda	Watchdog
Davinci	Kitty Hawk	Rebel Sentry	Wolfpack
Dynasty	Kitty Hawk 2000	Regiment II	
Dominion	Lexington	Rembrandt	

On cut and fill slopes 2:1 or steeper Centipede shall be applied at the rate of 5 pounds per acre and add 20# of Sericea Lespedeza from January 1 - December 31.

Fertilizer shall be 10-20-20 analysis. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis and as directed.

Native Grass Seeding and Mulching

(East)

Native Grass Seeding and Mulching shall be performed on the disturbed areas of wetlands and riparian areas, and adjacent to Stream Relocation construction within a 50 foot zone on both sides of the stream or depression, measured from top of stream bank or center of depression. The stream bank of the stream relocation shall be seeded by a method that does not alter the typical cross section of the stream bank. Native Grass Seeding and Mulching shall also be performed in the permanent soil reinforcement mat section of preformed scour holes, and in other areas as directed.

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined. All rates are in pounds per acre.

March 1 - August 31

18# Creeping Red Fescue
 6# Indiangrass
 8# Little Bluestem
 4# Switchgrass
 25# Browntop Millet
 500# Fertilizer
 4000# Limestone

September 1 - February 28

18# Creeping Red Fescue
 6# Indiangrass
 8# Little Bluestem
 4# Switchgrass
 35# Rye Grain
 500# Fertilizer
 4000# Limestone

Approved Creeping Red Fescue Cultivars:

Aberdeen

Boreal

Epic

Cindy Lou

Fertilizer shall be 10-20-20 analysis. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis and as directed.

Native Grass Seeding and Mulching shall be performed in accordance with Section 1660 of the *Standard Specifications* and vegetative cover sufficient to restrain erosion shall be installed immediately following grade establishment.

Measurement and Payment

Native Grass *Seeding and Mulching* will be measured and paid for in accordance with Article 1660-8 of the *Standard Specifications*.

All areas seeded and mulched shall be tacked with asphalt. Crimping of straw in lieu of asphalt tack shall not be allowed on this project.

CRIMPING STRAW MULCH:

Crimping shall be required on this project adjacent to any section of roadway where traffic is to be maintained or allowed during construction. In areas within six feet of the edge of pavement, straw is to be applied and then crimped. After the crimping operation is complete, an additional application of straw shall be applied and immediately tacked with a sufficient amount of undiluted emulsified asphalt.

Straw mulch shall be of sufficient length and quality to withstand the crimping operation.

Crimping equipment including power source shall be subject to the approval of the Engineer providing that maximum spacing of crimper blades shall not exceed 8".

TEMPORARY SEEDING:

Fertilizer shall be the same analysis as specified for *Seeding and Mulching* and applied at the rate of 400 pounds and seeded at the rate of 50 pounds per acre. Sweet Sudan Grass, German Millet

or Browntop Millet shall be used in summer months and Rye Grain during the remainder of the year. The Engineer will determine the exact dates for using each kind of seed.

FERTILIZER TOPDRESSING:

Fertilizer used for topdressing on all roadway areas except slopes 2:1 and steeper shall be 10-20-20 grade and shall be applied at the rate of 500 pounds per acre. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 10-20-20 analysis and as directed.

Fertilizer used for topdressing on slopes 2:1 and steeper and waste and borrow areas shall be 16-8-8 grade and shall be applied at the rate of 500 pounds per acre. A different analysis of fertilizer may be used provided the 2-1-1 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 16-8-8 analysis and as directed.

SUPPLEMENTAL SEEDING:

The kinds of seed and proportions shall be the same as specified for *Seeding and Mulching*, with the exception that no centipede seed will be used in the seed mix for supplemental seeding. The rate of application for supplemental seeding may vary from 25# to 75# per acre. The actual rate per acre will be determined prior to the time of topdressing and the Contractor will be notified in writing of the rate per acre, total quantity needed, and areas on which to apply the supplemental seed. Minimum tillage equipment, consisting of a sod seeder shall be used for incorporating seed into the soil as to prevent disturbance of existing vegetation. A clodbuster (ball and chain) may be used where degree of slope prevents the use of a sod seeder.

MOWING:

The minimum mowing height on this project shall be 4 inches.

LAWN TYPE APPEARANCE:

All areas adjacent to lawns must be hand finished as directed to give a lawn type appearance. Remove all trash, debris, and stones $\frac{3}{4}$ " and larger in diameter or other obstructions that could interfere with providing a smooth lawn type appearance. These areas shall be reseeded to match their original vegetative conditions, unless directed otherwise by the Field Operations Engineer.

REFORESTATION:

Description

Reforestation will be planted within interchanges and along the outside borders of the road, and in other areas as directed. *Reforestation* is not shown on the plan sheets. See the Reforestation Detail Sheet RF-1. See Reforestation Detail Sheet RF-2 for plantings in areas of pavement removal within the Fort Bragg Military Reservation and in other areas as directed.

All non-maintained riparian buffers impacted by the placement of temporary fill or clearing activities shall be restored to the preconstruction contours and revegetated with native woody species.

The entire *Reforestation* operation shall comply with the requirements of Section 1670 of the *Standard Specifications*.

Materials

Reforestation shall be bare root seedlings 12"-18" tall.

Construction Methods

Reforestation shall be planted as soon as practical following permanent *Seeding and Mulching*. The seedlings shall be planted in a 16-foot wide swath adjacent to mowing pattern line, or as directed.

Root dip: The roots of reforestation seedlings shall be coated with a slurry of water, and either a fine clay (kaolin) or a superabsorbent that is designated as a bare root dip. The type, mixture ratio, method of application, and the time of application shall be submitted to the Engineer for approval.

With the approval of the Engineer, seedlings may be coated before delivery to the job or at the time of planting, but at no time shall the roots of the seedlings be allowed to dry out. The roots shall be moistened immediately prior to planting.

Seasonal Limitations: *Reforestation* shall be planted from November 15 through March 15.

Measurement and Payment

Reforestation will be measured and paid for in accordance with Article 1670-17 of the *Standard Specifications*.

RESPONSE FOR EROSION CONTROL:

Description

Furnish the labor, materials, tools and equipment necessary to move personnel, equipment, and supplies to the project necessary for the pursuit of any or all of the following work as shown herein, by an approved subcontractor.

Section	Erosion Control Item	Unit
1605	Temporary Silt Fence	LF
1606	Special Sediment Control Fence	LF/TON

1615	Temporary Mulching	ACR
1620	Seed - Temporary Seeding	LB
1620	Fertilizer - Temporary Seeding	TN
1631	Matting for Erosion Control	SY
SP	Coir Fiber Mat	SY
1640	Coir Fiber Baffles	LF
SP	Permanent Soil Reinforcement Mat	SY
1660	Seeding and Mulching	ACR
1661	Seed - Repair Seeding	LB
1661	Fertilizer - Repair Seeding	TON
1662	Seed - Supplemental Seeding	LB
1665	Fertilizer Topdressing	TON
SP	Safety/Highly Visible Fencing	LF
SP	Response for Erosion Control	EA

Construction Methods

Provide an approved subcontractor who performs an erosion control action as described in the NPDES Inspection Form SPPP30. Each erosion control action may include one or more of the above work items.

Measurement and Payment

Response for Erosion Control will be measured and paid for by counting the actual number of times the subcontractor moves onto the project, including borrow and waste sites, and satisfactorily completes an erosion control action described in Form 1675. The provisions of Article 104-5 of the *Standard Specifications* will not apply to this item of work.

Payment will be made under:

Pay Item

Response for Erosion Control

Pay Unit

Each

MINIMIZE REMOVAL OF VEGETATION:

The Contractor shall minimize removal of vegetation at stream banks and disturbed areas within the project limits as directed.

STOCKPILE AREAS:

The Contractor shall install and maintain erosion control devices sufficient to contain sediment around any erodible material stockpile areas as directed.

ACCESS AND HAUL ROADS:

At the end of each working day, the Contractor shall install or re-establish temporary diversions or earth berms across access/haul roads to direct runoff into sediment devices. Silt fence sections that are temporarily removed shall be reinstalled across access/haul roads at the end of each working day.

WASTE AND BORROW SOURCES:

Payment for temporary erosion control measures, except those made necessary by the Contractor's own negligence or for his own convenience, will be paid for at the appropriate contract unit price for the devices or measures utilized in borrow sources and waste areas.

No additional payment will be made for erosion control devices or permanent seeding and mulching in any commercial borrow or waste pit. All erosion and sediment control practices that may be required on a commercial borrow or waste site will be done at the Contractor's expense.

All offsite Staging Areas, Borrow and Waste sites shall be in accordance with "Borrow and Waste Site Reclamation Procedures for Contracted Projects" located at:

http://www.ncdot.gov/doh/operations/dp_chief_eng/roadside/fieldops/downloads/Files/ContractedReclamationProcedures.pdf

All forms and documents referenced in the "Borrow and Waste Site Reclamation Procedures for Contracted Projects" shall be included with the reclamation plans for offsite staging areas, and borrow and waste sites.

TEMPORARY DIVERSION:

This work consists of installation, maintenance, and cleanout of *Temporary Diversions* in accordance with Section 1630 of the *Standard Specifications*. The quantity of excavation for installation and cleanout will be measured and paid for as *Silt Excavation* in accordance with Article 1630-4 of the *Standard Specifications*.

CLEAN WATER DIVERSION:**Description**

This work consists of installing, maintaining, and removing any and all material required for the construction of clean water diversions. The clean water diversions shall be used to direct water flowing from offsite around/away from specific area(s) of construction.

Materials

Refer to Division 10

Item

Geotextile for Soil Stabilization, Type 4

Section

1056

Construction Methods

The Contractor shall install the clean water diversions in accordance with the details in the plans and at locations indicated in the plans, and as directed. Upon installation, the excavated material shall be immediately stabilized as provided in Section 1620 of the *Standard Specifications*. Other stabilization methods may be utilized with prior approval from the Engineer.

Line clean water diversion with geotextile unrolled in the direction of flow and lay smoothly but loosely on soil surface without creases. Bury top of slope geotextile edge in a trench at least 5" deep and tamp securely. Make vertical overlaps a minimum of 18" with upstream geotextile overlapping the downstream geotextile.

Secure geotextile with eleven gauge wire staples shaped into a *u* shape with a length of not less than 6" and a throat not less than 1" in width. Place staples along outer edges and throughout the geotextile a maximum of 3 ft. horizontally and vertically.

Measurement and Payment

Silt Excavation will be measured and paid for in accordance with Article 1630-4 of the *Standard Specifications*.

Geotextile for Soil Stabilization will be measured and paid for in accordance with Article 270-4 of the *Standard Specifications*.

Stabilization of the excavated material will be paid for as *Temporary Seeding* as provided in Section 1620 of the *Standard Specifications*.

Such price and payment shall be considered full compensation for all work covered by this section including all materials, construction, maintenance, and removal of the clean water diversions.

SAFETY FENCE AND JURISDICTIONAL FLAGGING:**Description**

Safety Fence shall consist of furnishing materials, installing and maintaining polyethylene or polypropylene fence along the outside riparian buffer, wetland, or water boundary, or other boundaries located within the construction corridor to mark the areas that have been approved to

infringe within the buffer, wetland, endangered vegetation, culturally sensitive areas or water. The fence shall be installed prior to any land disturbing activities.

Interior boundaries for jurisdictional areas noted above shall be delineated by stakes and highly visible flagging.

Jurisdictional boundaries at staging areas, waste sites, or borrow pits, whether considered outside or interior boundaries shall be delineated by stakes and highly visible flagging.

Materials

(A) Safety Fencing

Polyethylene or polypropylene fence shall be a highly visible preconstructed safety fence approved by the Engineer. The fence material shall have an ultraviolet coating.

Either wood posts or steel posts may be used. Wood posts shall be hardwood with a wedge or pencil tip at one end, and shall be at least 5 ft. in length with a minimum nominal 2" x 2" cross section. Steel posts shall be at least 5 ft. in length, and have a minimum weight of 0.85 lb/ft of length.

(B) Boundary Flagging

Wooden stakes shall be 4 feet in length with a minimum nominal 3/4" x 1-3/4" cross section. The flagging shall be at least 1" in width. The flagging material shall be vinyl and shall be orange in color and highly visible.

Construction Methods

No additional clearing and grubbing is anticipated for the installation of this fence. The fence shall be erected to conform to the general contour of the ground.

(A) Safety Fencing

Posts shall be set at a maximum spacing of 10 ft., maintained in a vertical position and hand set or set with a post driver. If hand set, all backfill material shall be thoroughly tamped. Wood posts may be sharpened to a dull point if power driven. Posts damaged by power driving shall be removed and replaced prior to final acceptance. The tops of all wood posts shall be cut at a 30-degree angle. The wood posts may, at the option of the Contractor, be cut at this angle either before or after the posts are erected.

The fence geotextile shall be attached to the wood posts with one 2" galvanized wire staple across each cable or to the steel posts with wire or other acceptable means.

Place construction stakes to establish the location of the safety fence in accordance with Article 105-9 or Article 801-1 of the *Standard Specifications*. No direct pay will be made for the staking

of the safety fence. All stakeouts for safety fence shall be considered incidental to the work being paid for as "Construction Surveying", except that where there is no pay item for construction surveying, all safety fence stakeout will be performed by state forces.

The Contractor shall be required to maintain the safety fence in a satisfactory condition for the duration of the project as determined by the Engineer.

(B) Boundary Flagging

Boundary flagging delineation of interior boundaries shall consist of wooden stakes on 25 feet maximum intervals with highly visible orange flagging attached. Stakes shall be installed a minimum of 6" into the ground. Interior boundaries may be staked on a tangent that runs parallel to buffer but must not encroach on the buffer at any location. Interior boundaries of hand clearing shall be identified with a different colored flagging to distinguish it from mechanized clearing.

Boundary flagging delineation of interior boundaries will be placed in accordance with Article 105-9 or Article 801-1 of the *Standard Specifications*. No direct pay will be made for delineation of the interior boundaries. This delineation will be considered incidental to the work being paid for as *Construction Surveying*, except that where there is no pay item or construction surveying the cost of boundary flagging delineation shall be included in the unit prices bid for the various items in the contract. Installation for delineation of all jurisdictional boundaries at staging areas, waste sites, or borrow pits shall consist of wooden stakes on 25 feet maximum intervals with highly visible orange flagging attached. Stakes shall be installed a minimum of 6" into the ground. Additional flagging may be placed on overhanging vegetation to enhance visibility but does not substitute for installation of stakes.

Installation of boundary flagging for delineation of all jurisdictional boundaries at staging areas, waste sites, or borrow pits shall be performed in accordance with Subarticle 230-4(B)(3)(d) or Subarticle 802-2(F) of the *Standard Specifications*. No direct pay will be made for this delineation, as the cost of same shall be included in the unit prices bid for the various items in the contract.

The Contractor shall be required to maintain alternative stakes and highly visible flagging in a satisfactory condition for the duration of the project as determined by the Engineer.

Measurement and Payment

Safety Fence will be measured and paid as the actual number of linear feet of polyethylene or polypropylene fence installed in place and accepted. Such payment will be full compensation including but not limited to furnishing and installing fence geotextile with necessary posts and post bracing, staples, tie wires, tools, equipment and incidentals necessary to complete this work.

Payment will be made under:

Pay Item

Safety Fence

Pay Unit

Linear Foot

PERMANENT SOIL REINFORCEMENT MAT:**Description**

This work consists of furnishing and placing *Permanent Soil Reinforcement Mat*, of the type specified, over previously prepared areas as directed.

Materials

The product shall be a permanent erosion control reinforcement mat and shall be constructed of synthetic or a combination of coconut and synthetic fibers evenly distributed throughout the mat between a bottom UV stabilized netting and a heavy duty UV stabilized top net. The matting shall be stitched together with UV stabilized polypropylene thread to form a permanent three-dimensional structure. The mat shall have the following minimum physical properties:

Property	Test Method	Value	Unit
Light Penetration	ASTM D6567	9	%
Thickness	ASTM D6525	0.40	in
Mass Per Unit Area	ASTM D6566	0.55	lb/sy
Tensile Strength	ASTM D6818	385	lb/ft
Elongation (Maximum)	ASTM D6818	49	%
Resiliency	ASTM D1777	>70	%
UV Stability *	ASTM D4355	≥80	%
Porosity (Permanent Net)	ECTC Guidelines	≥85	%
Maximum Permissible Shear Stress (Vegetated)	Performance Bench Test	≥8.0	lb/ft ²
Maximum Allowable Velocity (Vegetated)	Performance Bench Test	≥16.0	ft/s

*ASTM D1682 Tensile Strength and % strength retention of material after 1000 hours of exposure.

Submit a certification (Type 1, 2, or 3) from the manufacturer showing:

- (A) the chemical and physical properties of the mat used, and
- (B) conformance of the mat with this specification.

Construction Methods

Matting shall be installed in accordance with Subarticle 1631-3(B) of the *Standard Specifications*.

All areas to be protected with the mat shall be brought to final grade and seeded in accordance with Section 1660 of the *Standard Specifications*. The surface of the soil shall be smooth, firm, stable and free of rocks, clods, roots or other obstructions that would prevent the mat from lying in direct contact with the soil surface. Areas where the mat is to be placed will not need to be mulched.

Measurement and Payment

Permanent Soil Reinforcement Mat will be measured and paid for as the actual number of square yards measured along the surface of the ground over which Permanent Soil Reinforcement Mat is installed and accepted. Overlaps will not be included in the measurement, and will be considered as incidental to the work. Such payment shall be full compensation for furnishing and installing the mat, including overlaps, and for all required maintenance.

Payment will be made under:

Pay Item	Pay Unit
Permanent Soil Reinforcement Mat	Square Yard

SKIMMER BASIN WITH BAFFLES:

(East)

Description

Provide a skimmer basin to remove sediment from construction site runoff at locations shown in the erosion control plans. See the Skimmer Basin with Baffles Detail sheet provided in the erosion control plans. Work includes constructing sediment basin, installation of temporary slope drain pipe and coir fiber baffles, furnishing, installation and cleanout of skimmer, providing and placing stone pad on bottom of basin underneath skimmer device, providing and placing a geotextile spillway liner, providing coir fiber mat stabilization for the skimmer outlet, disposing of excess materials, removing temporary slope drain, coir fiber baffles, geotextile liner and skimmer device, backfilling basin area with suitable material and providing proper drainage when basin area is abandoned.

Materials

Item	Section
Stone for Erosion Control, Class B	1042
Geotextile for Soil Stabilization, Type 4	1056
Fertilizer for Temporary Seeding	1060-2
Seed for Temporary Seeding	1060-4
Seeding and Mulching	1060-4
Matting for Erosion Control	1060-8
Staples	1060-8
Coir Fiber Mat	1060-14
Temporary Slope Drain	1622-2
Coir Fiber Baffle	1640

Provide appropriately sized and approved skimmer device.

Provide Schedule 40 PVC pipe with a length of 6 ft. to attach to the skimmer and the coupling connection to serve as the arm pipe. For skimmer sizes of 2.5 in. and smaller, the arm pipe diameter shall be 1.5 inches. For skimmer sizes of 3 in. and larger, refer to manufacturer recommendation.

Provide 4" diameter Schedule 40 PVC pipe to attach to coupling connection of skimmer to serve as the barrel pipe through the earthen dam.

The geotextile for the spillway liner shall meet the following minimum physical properties for low permeability, woven polypropylene geotextiles:

Property	Test Method	Value	Unit
Tensile Strength	ASTM D-4632	315	lb.
Tensile Elongation (Maximum)	ASTM D-4632	15	%
Trapezoidal Tear	ASTM D-4533	120	lbs.
CBR Puncture	ASTM D-6241	900	lbs.
UV Resistance	ASTM D-4355	70	%
(% retained at 500 hrs.)			
Apparent Opening Size (AOS)	ASTM D-4751	40	US Std. Sieve
Permittivity	ASTM D-4491	0.05	sec ⁻¹
Water Flow Rate	ASTM D-4491	4	gal/min/ft ²

Anchors: Staples, stakes, or reinforcement bars shall be used as anchors.

Wooden Stakes:

Provide hardwood stakes 12"- 24" long with a 2" x 2" nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving through the coir fiber mat and down into the underlying soil. The other end of the stake needs to have a 1"- 2" long head at the top with a 1"- 2" notch following to catch and secure the coir fiber mat.

Steel Reinforcement Bars:

Provide uncoated #10 steel reinforcement bars 24" nominal length. The bars shall have a 4" diameter bend at one end with a 4" straight section at the tip to catch and secure the coir fiber mat.

Staples:

Provide staples made of 0.125" diameter new steel wire formed into a u shape not less than 12" in length with a throat of 1" in width.

Construction Methods

Excavate basin according to the erosion control plans with basin surface free of obstructions, debris, and pockets of low-density material. Install temporary slope drain pipe and construct the primary spillway according to the Skimmer Basin with Baffles Detail sheet in the erosion control plans. Temporary slope drain pipe at inlet of basin may be replaced by Type 4 geotextile as directed. Construct the coir fiber baffles according to *Roadway Standard Drawings* No. 1640.01 and Section 1640 of the *Standard Specifications*.

Install skimmer device according to manufacturer recommendations. Install 4" Schedule 40 PVC pipe into dam on the lower side of basin 1 ft. from the bottom of the basin and according to the detail, and extend the pipe so the basin will drain. Attach a 6 ft. arm pipe to the coupling connection and skimmer according to manufacturer recommendations. Attach the rope included with the skimmer to the tee between the vent socket and the tube inlet, and the other end to a wooden stake or metal post. Clean out skimmer device when it becomes clogged with sediment and/or debris and is unable to float at the top of water in skimmer basin. Take appropriate measures to avoid ice accumulation in the skimmer device. Construct a stone pad of Class B stone directly underneath the skimmer device at bottom of basin. The pad shall be a minimum of 12" in height, and shall have a minimum cross sectional area of 4 ft. by 4 ft.

Line primary spillway with low permeability polypropylene geotextile unrolled in the direction of flow and lay smoothly but loosely on soil surface without creases. Bury edges of geotextile in a trench at least 5" deep and tamp firmly. If geotextile for the primary spillway is not one continuous piece of material, make horizontal overlaps a minimum of 18" with upstream geotextile overlapping the downstream geotextile. Secure geotextile with eleven gauge wire staples shaped into a *u* shape with a length of not less than 12" and a throat not less than 1" in width. Place staples along outer edges and throughout the geotextile a maximum of 3 ft. horizontally and vertically. Geotextile shall be placed to the bottom and across the entire width of the basin according to the Skimmer Basin with Baffles detail. Place sealant inside basin around barrel pipe on top of geotextile with a minimum width of 6 in.

At the skimmer outlet, provide a smooth soil surface free from stones, clods, or debris that will prevent contact of the coir fiber matting with the soil. Unroll the matting and apply without stretching such that it will lie smoothly but loosely on the soil surface. Wooden stakes, reinforcement bars, or staples may be used as anchors in accordance with the details in the plans and as directed. Place anchors across the matting at the ends approximately 1 ft. apart. Place anchors along the outer edges and down the center of the matting 3 ft. apart.

All bare side slope sections of the skimmer basin shall be seeded with a temporary or permanent seed mix as directed and in accordance with Articles 1620-3, 1620-4, 1620-5, 1660-4, 1660-5 and 1660-7 of the *Standard Specifications*. Straw or excelsior matting shall be installed on all bare side slope sections immediately upon the completion of seeding and in accordance with Article 1631-3 of the *Standard Specifications*.

Measurement and Payment

Silt Excavation will be measured and paid for in accordance with Article 1630-4 of the *Standard Specifications*, as calculated from the typical section throughout the length of the basin as shown on the final approved plans.

Geotextile for Soil Stabilization will be measured and paid for in accordance with Article 270-4 of the *Standard Specifications*.

Low Permeability Geotextile will be measured and paid for as the actual number of square yards measured along the surface of the spillway over which the geotextile is installed and accepted.

Coir Fiber Baffles will be measured and paid for in accordance with Article 1640-4 of the *Standard Specifications*.

___" *Skimmer* will be measured in units of each. ___" *Skimmer* will be measured and paid for as the maximum number of each size skimmer acceptably installed and in use at any one time during the life of the project. Barrel and arm pipe, cleanout, relocation and reinstallation of ___" *Skimmer* is considered incidental to the measurement of the quantity of ___" *Skimmer* and no separate payment will be made. No separate payment shall be made if ___" *Skimmer*, barrel and/or arm pipe(s) are damaged by ice accumulation.

Coir Fiber Mat will be measured and paid for as the actual number of square yards measured along the surface of the ground over which coir fiber mat is installed and accepted.

Temporary Slope Drain will be measured and paid for in accordance with Article 1622-4 of the *Standard Specifications*.

Stone for Erosion Control, Class ___ will be measured and paid for in accordance with Article 1610-4 of the *Standard Specifications*.

Seeding and Mulching will be measured and paid for in accordance with Article 1660-8 of the *Standard Specifications*.

Seed for Temporary Seeding will be measured and paid for in accordance with Article 1620-6 of the *Standard Specifications*.

Fertilizer for Temporary Seeding will be measured and paid for in accordance with Article 1620-6 of the *Standard Specifications*.

Matting for Erosion Control will be measured and paid for in accordance with Article 1631-4 of the *Standard Specifications*.

No measurement will be made for other items or for over excavation or stockpiling.

Payment will be made under:

Pay Item	Pay Unit
___" Skimmer	Each
Coir Fiber Mat	Square Yard
Low Permeability Geotextile	Square Yard

TIERED SKIMMER BASIN WITH BAFFLES:

(East)

Description

Provide a tiered skimmer basin to remove sediment from construction site runoff at locations shown in the erosion control plans. See the Tiered Skimmer Basin Detail sheet provided in the erosion control plans. Tiered Skimmer Basins shall be installed in areas where topography creates a large elevation difference between the inlet and outlet of a single skimmer basin. Work includes constructing sediment basins, installation of coir fiber baffles, installation of temporary slope drains, furnishing, installation and cleanout of skimmer, providing and placing stone pad on bottom of basin underneath skimmer device, providing and placing geotextile spillway liners, providing coir fiber mat stabilization for the skimmer outlet, disposing of excess materials, removing temporary slope drains, coir fiber baffles, geotextile liner and skimmer device, backfilling basin area with suitable material and providing proper drainage when basin area is abandoned.

Materials

Item	Section
Stone for Erosion Control, Class B	1042
Fertilizer for Temporary Seeding	1060-2
Seed for Temporary Seeding	1060-4
Seeding and Mulching	1060-4
Matting for Erosion Control	1060-8
Staples	1060-8
Coir Fiber Mat	1060-14
Temporary Slope Drain	1622-2
Coir Fiber Baffle	1640

Provide appropriately sized and approved skimmer device.

Provide Schedule 40 PVC pipe with a length of 6 ft. to attach to the skimmer and the coupling connection to serve as the arm pipe. For skimmer sizes of 2.5 in. and smaller, the arm pipe diameter shall be 1.5 inches. For skimmer sizes of 3 in. and larger, refer to manufacturer recommendation.

Provide 4" diameter Schedule 40 PVC pipe to attach to coupling connection of skimmer to serve as the barrel pipe through the earthen dam.

The geotextile for the spillway liner shall meet the following minimum physical properties for low permeability, woven polypropylene geotextiles:

Property	Test Method	Value	Unit
Tensile Strength	ASTM D-4632	315	lb.
Tensile Elongation (Maximum)	ASTM D-4632	15	%
Trapezoidal Tear	ASTM D-4533	120	lbs.
CBR Puncture	ASTM D-6241	900	lbs.
UV Resistance (% retained at 500 hrs.)	ASTM D-4355	70	%
Apparent Opening Size (AOS)	ASTM D-4751	40	US Std. Sieve
Permittivity	ASTM D-4491	0.05	sec ⁻¹
Water Flow Rate	ASTM D-4491	4	gal/min/ft ²

Anchors: Staples, stakes, or reinforcement bars shall be used as anchors.

Wooden Stakes:

Provide hardwood stakes 12"- 24" long with a 2" x 2" nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving through the coir fiber mat and down into the underlying soil. The other end of the stake needs to have a 1"- 2" long head at the top with a 1"- 2" notch following to catch and secure the coir fiber mat.

Steel Reinforcement Bars:

Provide uncoated #10 steel reinforcement bars 24" nominal length. The bars shall have a 4" diameter bend at one end with a 4" straight section at the tip to catch and secure the coir fiber mat.

Staples:

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

Construction Methods

Excavate basins according to the erosion control plans with basin surface free of obstructions, debris, and pockets of low-density material. Install temporary slope drains and construct the primary spillways according to the Tiered Skimmer Basin Detail sheet in the erosion control plans. Construct the coir fiber baffles according to *Roadway Standard Drawings* No. 1640.01 and Section 1640 of the *Standard Specifications*. Multiple upper basins, or Modified Silt Basins Type 'B' as labeled on the detail, may be required based on site conditions and as directed.

Install skimmer device according to manufacturer recommendations. Install 4" Schedule 40 PVC pipe into dam on the lower side of basin 1 ft. from the bottom of the basin and according to the detail, and extend the pipe so the basin will drain. Attach a 6 ft. arm pipe to the coupling

connection and skimmer according to manufacturer recommendations. Attach the rope included with the skimmer to the tee between the vent socket and the tube inlet, and the other end to a wooden stake or metal post. Clean out skimmer device when it becomes clogged with sediment and/or debris and is unable to float at the top of water in skimmer basin. Take appropriate measures to avoid ice accumulation in the skimmer device. Construct a stone pad of Class B stone directly underneath the skimmer device at bottom of basin. The pad shall be a minimum of 12" in height, and shall have a minimum cross sectional area of 4 ft. by 4 ft.

Install a minimum of 2 (two) temporary slope drains to dewater the upper basin to the lower basin. The slope drains shall be installed a minimum of 6 inches, or one radius width of the temporary slope drain pipe, below the base of the primary spillway section of the upper basin. The outlet of the slope drains shall be placed on the bottom elevation of the lower basin.

Line primary spillways with low permeability polypropylene geotextile unrolled in the direction of flow and lay smoothly but loosely on soil surface without creases. Bury edges of geotextile in a trench at least 5" deep and tamp firmly. If geotextile for primary spillways is not one continuous piece of material, make horizontal overlaps a minimum of 18" with upstream geotextile overlapping the downstream geotextile. Secure geotextile with eleven gauge wire staples shaped into a *u* shape with a length of not less than 12" and a throat not less than 1" in width. Place staples along outer edges and throughout the geotextile a maximum of 3 ft. horizontally and vertically. Geotextile shall be placed to the bottom and across the entire width of the basin according to the Tiered Skimmer Basin with Baffles detail.

At the skimmer outlet, provide a smooth soil surface free from stones, clods, or debris that will prevent contact of the coir fiber matting with the soil. Unroll the matting and apply without stretching such that it will lie smoothly but loosely on the soil surface. Wooden stakes, reinforcement bars, or staples may be used as anchors in accordance with the details in the plans and as directed. Place anchors across the matting at the ends approximately 1 ft. apart. Place anchors along the outer edges and down the center of the matting 3 ft. apart. Place sealant inside basin around barrel pipe on top of geotextile with a minimum width of 6 in.

All bare side slope sections of the skimmer basin shall be seeded with a temporary or permanent seed mix as directed and in accordance with Articles 1620-3, 1620-4, 1620-5, 1660-4, 1660-5 and 1660-7 of the *Standard Specifications*. Straw or excelsior matting shall be installed on all bare side slope sections immediately upon the completion of seeding and in accordance with Article 1631-3 of the *Standard Specifications*.

Measurement and Payment

Silt Excavation will be measured and paid for in accordance with Article 1630-4 of the *Standard Specifications*, as calculated from the typical section throughout the length of the basin as shown on the final approved plans.

Low Permeability Geotextile will be measured and paid for as the actual number of square yards measured along the surface of the spillway over which the geotextile is installed and accepted.

Coir Fiber Baffles will be measured and paid for in accordance with Article 1640-4 of the *Standard Specifications*.

___" *Skimmer* will be measured in units of each. ___" *Skimmer* will be measured and paid for as the maximum number of each size skimmer acceptably installed and in use at any one time during the life of the project. Barrel and arm pipe, cleanout, relocation and reinstallation of ___" *Skimmer* is considered incidental to the measurement of the quantity of ___" *Skimmer* and no separate payment will be made. No separate payment shall be made if ___" *Skimmer*, barrel and/or arm pipe(s) are damaged by ice accumulation.

Coir Fiber Mat will be measured and paid for as the actual number of square yards measured along the surface of the ground over which coir fiber mat is installed and accepted.

Temporary Slope Drain will be measured and paid for in accordance with Article 1622-4 of the *Standard Specifications*.

Stone for Erosion Control, Class ___ will be measured and paid for in accordance with Article 1610-4 of the *Standard Specifications*.

Seeding and Mulching will be measured and paid for in accordance with Article 1660-8 of the *Standard Specifications*.

Seed for Temporary Seeding will be measured and paid for in accordance with Article 1620-6 of the *Standard Specifications*.

Fertilizer for Temporary Seeding will be measured and paid for in accordance with Article 1620-6 of the *Standard Specifications*.

Matting for Erosion Control will be measured and paid for in accordance with Article 1631-4 of the *Standard Specifications*.

No measurement will be made for other items or for over excavation or stockpiling.

Payment will be made under:

Pay Item	Pay Unit
___" Skimmer	Each
Coir Fiber Mat	Square Yard
Low Permeability Geotextile	Square Yard

INFILTRATION BASIN WITH BAFFLES:

(East)

Description

Provide an infiltration basin to remove sediment from construction site runoff at locations shown in the erosion control plans. See the Infiltration Basin with Baffles Detail sheet provided in the

erosion control plans. Work includes constructing sediment basin, installation of coir fiber baffles, providing and placing geotextile spillway liner, providing coir fiber mat stabilization for the primary spillway outlet, disposing of excess materials, removing geotextile liner and coir fiber mat, backfilling basin area with suitable material and providing proper drainage when basin area is abandoned.

Materials

Item	Section
Staples	1060-8
Coir Fiber Mat	1060-14
Coir Fiber Baffle	1640

The geotextile for the spillway liner shall meet the following minimum physical properties for low permeability, woven polypropylene geotextiles:

Property	Test Method	Value	Unit
Tensile Strength	ASTM D-4632	315	lb.
Tensile Elongation (Maximum)	ASTM D-4632	15	%
Trapezoidal Tear	ASTM D-4533	120	lbs.
CBR Puncture	ASTM D-6241	900	lbs.
UV Resistance (% retained at 500 hrs.)	ASTM D-4355	70	%
Apparent Opening Size (AOS)	ASTM D-4751	40	US Std. Sieve
Permittivity	ASTM D-4491	0.05	sec ⁻¹
Water Flow Rate	ASTM D-4491	4	gal/min/ft ²

Anchors: Staples, stakes, or reinforcement bars shall be used as anchors.

Wooden Stakes:

Provide hardwood stakes 12"- 24" long with a 2" x 2" nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving through the coir fiber mat and down into the underlying soil. The other end of the stake needs to have a 1"- 2" long head at the top with a 1"- 2" notch following to catch and secure the coir fiber mat.

Steel Reinforcement Bars:

Provide uncoated #10 steel reinforcement bars 24" nominal length. The bars shall have a 4" diameter bend at one end with a 4" straight section at the tip to catch and secure the coir fiber mat.

Staples:

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

Construction Methods

Excavate basin according to the erosion control plans with basin surface free of obstructions, debris, and pockets of low-density material. Excavation into or below the water table shall not occur, and avoid compacting the bottom of the basin with equipment tires, excavation bucket, etc. Construct the coir fiber baffles according to *Roadway Standard Drawings* No. 1640.01 and Section 1640 of the *Standard Specifications*. Construct earth berm around perimeter of infiltration basin as shown in the detail and the earth berm height shall be limited to 3 ft.

Construct the primary spillway according to the Infiltration Basin with Baffles Detail sheet in the erosion control plans. Line primary spillway with low permeability polypropylene geotextile unrolled in the direction of flow and lay smoothly but loosely on soil surface without creases. Bury edges of geotextile in a trench at least 5" deep and tamp firmly. Make vertical overlaps a minimum of 18" with upstream geotextile overlapping the downstream geotextile. Secure geotextile with eleven gauge wire staples shaped into a *u* shape with a length of not less than 12" and a throat not less than 1" in width. Place staples along outer edges and throughout the geotextile a maximum of 3 ft. horizontally and vertically. Geotextile shall be placed to the bottom and across the entire width of the basin according to the Infiltration Basin with Baffles detail.

At the primary spillway outlet, provide a smooth soil surface free from stones, clods, or debris that will prevent contact of the coir fiber matting with the soil. Unroll the matting and apply without stretching such that it will lie smoothly but loosely on the soil surface. Wooden stakes, reinforcement bars, or staples may be used as anchors in accordance with the details in the plans and as directed. Place anchors across the matting at the ends approximately 1 ft. apart. Place anchors along the outer edges and down the center of the matting 3 ft. apart.

Measurement and Payment

Silt Excavation will be measured and paid for in accordance with Article 1630-4 of the *Standard Specifications*, as calculated from the typical section throughout the length of the basin as shown on the final approved plans.

Low Permeability Geotextile will be measured and paid for as the actual number of square yards measured along the surface of the spillway over which the geotextile is installed and accepted.

Coir Fiber Baffles will be measured and paid for in accordance with Article 1640-4 of the *Standard Specifications*.

Coir Fiber Mat will be measured and paid for as the actual number of square yards measured along the surface of the ground over which coir fiber mat is installed and accepted.

No measurement will be made for other items or for over excavation or stockpiling.

Payment will be made under:

Pay Item	Pay Unit
Coir Fiber Mat	Square Yard
Low Permeability Geotextile	Square Yard

EARTHEN DAM WITH SKIMMER:

(East)

Description

Provide an earthen dam with a skimmer attached to a barrel pipe at the outlet of a proposed roadway ditch to remove sediment from construction site runoff at locations shown in the erosion control plans. See the Earthen Dam with Skimmer Detail sheet provided in the erosion control plans. Work includes constructing earthen dam, installation of coir fiber baffles, furnishing, installation and cleanout of skimmer, providing and placing stone pad on bottom of ditch underneath skimmer device, providing and placing geotextile spillway liner, providing coir fiber mat stabilization for the skimmer outlet, removing earthen dam, coir fiber baffles, geotextile liner and skimmer device, and disposing of excess materials.

Materials

Item	Section
Stone for Erosion Control, Class B	1042
Staples	1060-8
Coir Fiber Mat	1060-14
Coir Fiber Baffle	1640

Provide appropriately sized and approved skimmer device.

Provide Schedule 40 PVC pipe with a length of 6 ft. to attach to the skimmer and the coupling connection to serve as the arm pipe. For skimmer sizes of 2.5 in. and smaller, the arm pipe diameter shall be 1.5 inches. For skimmer sizes of 3 in. and larger, refer to manufacturer recommendation.

Provide 4" diameter Schedule 40 PVC pipe to attach to coupling connection of skimmer to serve as the barrel pipe through the earthen dam.

The geotextile for the spillway liner shall meet the following minimum physical properties for low permeability, woven polypropylene geotextiles:

Property	Test Method	Value	Unit
Tensile Strength	ASTM D-4632	315	lb.
Tensile Elongation (Maximum)	ASTM D-4632	15	%
Trapezoidal Tear	ASTM D-4533	120	lbs.
CBR Puncture	ASTM D-6241	900	lbs.
UV Resistance	ASTM D-4355	70	%

(% retained at 500 hrs.)			
Apparent Opening Size (AOS)	ASTM D-4751	40	US Std. Sieve
Permittivity	ASTM D-4491	0.05	sec ⁻¹
Water Flow Rate	ASTM D-4491	4	gal/min/ft ²

Anchors: Staples, stakes, or reinforcement bars shall be used as anchors.

Wooden Stakes:

Provide hardwood stakes 12"- 24" long with a 2" x 2" nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving through the coir fiber mat and down into the underlying soil. The other end of the stake needs to have a 1"- 2" long head at the top with a 1"- 2" notch following to catch and secure the coir fiber mat.

Steel Reinforcement Bars:

Provide uncoated #10 steel reinforcement bars 24" nominal length. The bars shall have a 4" diameter bend at one end with a 4" straight section at the tip to catch and secure the coir fiber mat.

Staples:

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

Construction Methods

Excavate proposed ditch according to the roadway plans and cross sections with ditch surface free of obstructions, debris, and pockets of low-density material. Construct earthen dam and install the primary spillway according to the Earthen Dam with Skimmer Detail sheet in the erosion control plans. Construct the coir fiber baffles according to *Roadway Standard Drawings* No. 1640.01 and Section 1640 of the *Standard Specifications*. Accumulated silt behind the earthen dam and baffles shall be removed regularly and as directed.

Install skimmer device according to manufacturer recommendations. Install 4" Schedule 40 PVC pipe into dam on the lower side of basin 1 ft. from the bottom of the basin and according to the detail, and extend the pipe so the basin will drain. Attach a 6 ft. arm pipe to the coupling connection and skimmer according to manufacturer recommendations. Attach the rope included with the skimmer to the tee between the vent socket and the tube inlet, and the other end to a wooden stake or metal post. Clean out skimmer device when it becomes clogged with sediment and/or debris and is unable to float at the top of water impounded in the ditch. Take appropriate measures to avoid ice accumulation in the skimmer device. Construct a stone pad of Class B stone directly underneath the skimmer device at bottom of ditch. The pad shall be a minimum of 12" in height, and shall have a minimum cross sectional area of 4 ft. by 4 ft.

Line primary spillway with low permeability polypropylene geotextile unrolled in the direction of flow and lay smoothly but loosely on soil surface without creases. Bury edges of geotextile in a trench at least 5" deep and tamp firmly. If geotextile for the primary spillway is not one continuous piece of material, make horizontal overlaps a minimum of 18" with upstream geotextile overlapping the downstream geotextile. Secure geotextile with eleven gauge wire staples shaped into a *u* shape with a length of not less than 12" and a throat not less than 1" in width. Place staples along outer edges and throughout the geotextile a maximum of 3 ft. horizontally and vertically. Geotextile shall be placed to the bottom and across the entire width of the ditch according to the Earthen Dam with Skimmer Detail. Place sealant inside basin around barrel pipe on top of geotextile with a minimum width of 6 in.

At the skimmer outlet, provide a smooth soil surface free from stones, clods, or debris that will prevent contact of the coir fiber matting with the soil. Unroll the matting and apply without stretching such that it will lie smoothly but loosely on the soil surface. Wooden stakes, reinforcement bars, or staples may be used as anchors in accordance with the details in the plans and as directed. Place anchors across the matting at the ends approximately 1 ft. apart. Place anchors along the outer edges and down the center of the matting 3 ft. apart.

Measurement and Payment

The construction of the earthen dam will be paid for as *Borrow Excavation* as provided in Section 230 of the *Standard Specifications* or included in the lump sum price for grading.

Silt Excavation will be measured and paid for in accordance with Article 1630-4 of the *Standard Specifications*, as calculated from the typical section throughout the length of the ditch as shown on the final approved plans.

Low Permeability Geotextile will be measured and paid for as the actual number of square yards measured along the surface of the spillway over which the geotextile is installed and accepted.

Coir Fiber Baffles will be measured and paid for in accordance with Article 1640-4 of the *Standard Specifications*.

___" *Skimmer* will be measured in units of each. ___" *Skimmer* will be measured and paid for as the maximum number of each size skimmer acceptably installed and in use at any one time during the life of the project. Barrel and arm pipe, cleanout, relocation and reinstallation of ___" *Skimmer* is considered incidental to the measurement of the quantity of ___" *Skimmer* and no separate payment will be made. No separate payment shall be made if ___" *Skimmer*, barrel and/or arm pipe(s) are damaged by ice accumulation.

Coir Fiber Mat will be measured and paid for as the actual number of square yards measured along the surface of the ground over which coir fiber mat is installed and accepted.

Stone for Erosion Control, Class ___ will be measured and paid for in accordance with Article 1610-4 of the *Standard Specifications*.

No measurement will be made for other items or for over excavation or stockpiling.

Payment will be made under:

Pay Item	Pay Unit
___" Skimmer	Each
Coir Fiber Mat	Square Yard
Low Permeability Geotextile	Square Yard

STORMWATER BASIN EROSION CONTROL:

Description

Provide a skimmer to remove sediment from construction site runoff in permanent stormwater basins at locations shown in the erosion control plans. Work includes constructing basin, installation of coir fiber baffles, furnishing, installation and cleanout of skimmer, providing and placing stone pad on bottom of basin underneath skimmer device, stabilizing side slopes of basin with matting and seed, disposing of excess materials, removing coir fiber baffles, and skimmer device.

Materials

Item	Section
Seeding and Mulching	1060-4
Matting for Erosion Control	1060-8
Staples	1060-8
Coir Fiber Baffle	1640

Provide appropriately sized and approved skimmer device.

Provide Schedule 40 PVC pipe with a length of 6 ft. to attach to the skimmer and the coupling connection to serve as the arm pipe. For skimmer sizes of 2.5 in. and smaller, the arm pipe diameter shall be 1.5 inches. For skimmer sizes of 3 in. and larger, refer to manufacturer recommendation.

Provide 4" diameter Schedule 40 PVC pipe to attach to coupling connection of skimmer to serve as the barrel pipe through the earthen dam.

Construction Methods

Construct permanent stormwater basin according to the plans with basin surface free of obstructions, debris, and pockets of low-density material. Construct the coir fiber baffles according to *Roadway Standard Drawings* No. 1640.01 and Section 1640 of the *Standard Specifications*.

Install skimmer device according to manufacturer recommendations. Install the coupling connection provided with the skimmer 1 ft. from the bottom of the basin and attach to permanent stormwater drainage structure. Attach the 6 ft. arm pipe to the coupling connection and skimmer according to manufacturer recommendations. Attach the rope included with the skimmer to the tee between the vent socket and the tube inlet, and the other end to a wooden stake or metal post. Clean out skimmer device when it becomes clogged with sediment and/or debris and is unable to float at the top of water in basin. Take appropriate measures to avoid ice accumulation in the skimmer device. Construct a stone pad of Class B stone directly underneath the skimmer device at bottom of basin. The pad shall be a minimum of 12" in height, and shall have a minimum cross sectional area of 4 ft. by 4 ft.

All bare side slope sections of the stormwater basin shall be seeded with a permanent seed mix as directed and in accordance with Articles 1660-4, 1660-5 and 1660-7 of the *Standard Specifications*. Straw or excelsior matting shall be installed on all bare side slope sections immediately upon the completion of seeding and in accordance with Article 1631-3 of the *Standard Specifications*.

Measurement and Payment

Silt Excavation will be measured and paid for in accordance with Article 1630-4 of the *Standard Specifications*, as calculated from the typical section throughout the length of the basin as shown on the final approved plans.

Coir Fiber Baffles will be measured and paid for in Accordance with Article 1640-4 of the *Standard Specifications*.

___ " *Skimmer* will be measured in units of each. ___ " *Skimmer* will be measured and paid for as the maximum number of each size skimmer acceptably installed and in use at any one time during the life of the project. Barrel and arm pipe, cleanout, relocation and reinstallation of ___ " *Skimmer* is considered incidental to the measurement of the quantity of ___ " *Skimmer* and no separate payment will be made. No separate payment shall be made if ___ " *Skimmer*, barrel and/or arm pipe(s) are damaged by ice accumulation.

Stone for Erosion Control, Class ___ will be measured and paid for in accordance with Article 1610-4 of the *Standard Specifications*.

Seeding and Mulching will be measured and paid for in accordance with Article 1660-8 of the *Standard Specifications*.

Matting for Erosion Control will be measured and paid for in accordance with Article 1631-4 of the *Standard Specifications*.

No measurement will be made for other items or for over excavation or stockpiling.

Payment will be made under:

Pay Item

___ " Skimmer

Pay Unit

Each

WATTLE:**Description**

Wattles are tubular products consisting of excelsior fibers encased in synthetic netting. Wattles are used on slopes or channels to intercept runoff and act as a velocity break. Wattles are to be placed at locations shown on the plans or as directed. Installation shall follow the detail provided in the plans and as directed. Work includes furnishing materials, installation of wattles, matting installation, and removing wattles.

Materials

Wattle shall meet the following specifications:

100% Curled Wood (Excelsior) Fibers	
Minimum Diameter	12 in.
Minimum Density	2.5 lb/ft ³ +/- 10%
Net Material	Synthetic
Net Openings	1 in. x 1 in.
Net Configuration	Totally Encased
Minimum Weight	20 lb. +/- 10% per 10 ft. length

Anchors: Stakes shall be used as anchors.

Wooden Stakes:

Provide hardwood stakes a minimum of 2-ft. long with a 2 in. x 2 in. nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving down into the underlying soil.

Matting shall meet the requirements of Article 1060-8 of the *Standard Specifications*, or shall meet specifications provided elsewhere in this contract.

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

Construction Methods

Wattles shall be secured to the soil by wire staples approximately every 1 linear foot and at the end of each section of wattle. A minimum of 4 stakes shall be installed on the downstream side of the wattle with a maximum spacing of 2 linear feet along the wattle, and according to the

detail. Install a minimum of 2 stakes on the upstream side of the wattle according to the detail provided in the plans. Stakes shall be driven into the ground a minimum of 10 in. with no more than 2 in. projecting from the top of the wattle. Drive stakes at an angle according to the detail provided in the plans.

Only install wattle(s) to a height in ditch so flow will not wash around wattle and scour ditch slopes and according to the detail provided in the plans and as directed. Overlap adjoining sections of wattles a minimum of 6 in.

Installation of matting shall be in accordance with the detail provided in the plans, and in accordance with Article 1631-3 of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

The Contractor shall maintain the wattles until the project is accepted or until the wattles are removed, and shall remove and dispose of silt accumulations at the wattles when so directed in accordance with the requirements of Section 1630 of the *Standard Specifications*.

Measurement and Payment

Wattle will be measured and paid for by the actual number of linear feet of wattles which are installed and accepted. Such price and payment will be full compensation for all work covered by this section, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to install the *Wattle*.

Matting will be measured and paid for in accordance with Article 1631-4 of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

Payment will be made under:

Pay Item	Pay Unit
Wattle	Linear Foot

COIR FIBER WATTLES WITH POLYACRYLAMIDE (PAM):

Description

Coir Fiber Wattles are tubular products consisting of coir fibers (coconut fibers) encased in coir fiber netting. Coir Fiber Wattles are used on slopes or channels to intercept runoff and act as a velocity break. Coir Fiber Wattles are to be placed at locations shown on the plans or as directed. Installation shall follow the detail provided in the plans and as directed. Work includes furnishing materials, installation of coir fiber wattles, matting installation, PAM application, and removing wattles.

Materials

Coir Fiber Wattle shall meet the following specifications:

100% Coir (Coconut) Fibers	
Minimum Diameter	12 in.
Minimum Density	3.5 lb/ft ³ +/- 10%
Net Material	Coir Fiber
Net Openings	2 in. x 2 in.
Net Strength	90 lbs.
Minimum Weight	2.6 lbs./ft. +/- 10%

Anchors: Stakes shall be used as anchors.

Wooden Stakes:

Provide hardwood stakes a minimum of 2-ft. long with a 2 in. x 2 in. nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving down into the underlying soil.

Matting shall meet the requirements of Article 1060-8 of the *Standard Specifications*, or shall meet specifications provided elsewhere in this contract.

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

Polyacrylamide (PAM) shall be applied in powder form and shall be anionic or neutrally charged. Soil samples shall be obtained in areas where the wattles will be placed, and from offsite material used to construct the roadway, and analyzed for the appropriate PAM flocculant to be utilized with each wattle. The PAM product used shall be listed on the North Carolina Department of Environment and Natural Resources (NCDENR) Division of Water Quality (DWQ) web site as an approved PAM product for use in North Carolina.

Construction Methods

Coir Fiber Wattles shall be secured to the soil by wire staples approximately every 1 linear foot and at the end of each section of wattle. A minimum of 4 stakes shall be installed on the downstream side of the wattle with a maximum spacing of 2 linear feet along the wattle, and according to the detail. Install a minimum of 2 stakes on the upstream side of the wattle according to the detail provided in the plans. Stakes shall be driven into the ground a minimum of 10 in. with no more than 2 in. projecting from the top of the wattle. Drive stakes at an angle according to the detail provided in the plans.

Only install coir fiber wattle(s) to a height in ditch so flow will not wash around wattle and scour ditch slopes and according to the detail provided in the plans and as directed. Overlap adjoining sections of wattles a minimum of 6 in.

Installation of matting shall be in accordance with the detail provided in the plans, and in accordance with Article 1631-3 of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

Apply PAM over the lower center portion of the coir fiber wattle where the water is going to flow over at a rate of 2 ounces per wattle, and 1 ounce of PAM on matting on each side of the wattle. PAM applications shall be done during construction activities after every rainfall event that is equal to or exceeds 0.50 in.

The Contractor shall maintain the coir fiber wattles until the project is accepted or until the wattles are removed, and shall remove and dispose of silt accumulations at the wattles when so directed in accordance with the requirements of Section 1630 of the *Standard Specifications*.

Measurement and Payment

Coir Fiber Wattles will be measured and paid for by the actual number of linear feet of wattles which are installed and accepted. Such price and payment will be full compensation for all work covered by this section, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to install the *Coir Fiber Wattles*.

Matting will be measured and paid for in accordance with Article 1631-4 of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

Polyacrylamide(PAM) will be measured and paid for by the actual weight in pounds of PAM applied to the coir fiber wattles. Such price and payment will be full compensation for all work covered by this section, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to apply the *Polyacrylamide(PAM)*.

Payment will be made under:

Pay Item	Pay Unit
Polyacrylamide(PAM)	Pound
Coir Fiber Wattle	Linear Foot

TEMPORARY ROCK SILT CHECK TYPE A WITH EXCELSIOR MATTING AND POLYACRYLAMIDE (PAM):

Description

Temporary Rock Silt Checks Type A with Excelsior Matting and Polyacrylamide (PAM) are devices utilized in temporary and permanent ditches to reduce runoff velocity and incorporate PAM into the construction runoff to increase settling of sediment particles and reduce turbidity of runoff. Temporary Rock Silt Checks Type A with Excelsior Matting and PAM are to be placed at locations shown on the plans or as directed. Installation shall follow the detail provided in the plans and as directed. Work includes furnishing materials, installation of

Temporary Rock Silt Checks Type A, matting installation, PAM application, and removing Temporary Rock Silt Checks Type A with Excelsior Matting and PAM.

Materials

Structural stone shall be class B stone that meets the requirements of Section 1042 of the *Standard Specifications* for Stone for Erosion Control, Class B.

Sediment control stone shall be #5 or #57 stone, which meets the requirements of Section 1005 of the *Standard Specifications* for these stone sizes.

Matting shall meet the requirements of Excelsior Matting in Subarticle 1060-8(B) of the *Standard Specifications*, or shall meet specifications provided elsewhere in this contract.

Polyacrylamide (PAM) shall be applied in powder form and shall be anionic or neutrally charged. Soil samples shall be obtained in areas where the Temporary Rock Silt Checks Type A with Excelsior Matting and PAM will be placed, and from offsite material used to construct the roadway, and analyzed for the appropriate PAM flocculant to be utilized with each Temporary Rock Silt Check Type A. The PAM product used shall be listed on the North Carolina Department of Environment and Natural Resources (NCDENR) Division of Water Quality (DWQ) web site as an approved PAM product for use in North Carolina.

Construction Methods

Temporary Rock Silt Checks Type A shall be installed in accordance with Subarticle 1633-3(A) of the *Standard Specifications*, Roadway Standard Drawing No. 1633.01 and the detail provided in the plans.

Installation of matting shall be in accordance with the detail provided in the plans, and anchored by placing Class B stone on top of the matting at the upper and lower ends.

Apply PAM at a rate of 4 ounces over the center portion of the Temporary Rock Silt Checks Type A and matting where the water is going to flow over. PAM applications shall be done during construction activities and after every rainfall event that is equal to or exceeds 0.50 in.

The Contractor shall maintain the Temporary Rock Silt Checks Type A with Excelsior Matting and PAM until the project is accepted or until the Temporary Rock Silt Checks Type A with Excelsior Matting and PAM are removed, and shall remove and dispose of silt accumulations at the Temporary Rock Silt Checks Type A with Excelsior Matting and PAM when so directed in accordance with the requirements of Section 1630 of the *Standard Specifications*.

Measurement and Payment

Temporary Rock Silt Checks Type A will be measured and paid for in accordance with Article 1633-5 of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

Matting will be measured and paid for in accordance with Article 1631-4 of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

Polyacrylamide(PAM) will be measured and paid for by the actual weight in pounds of PAM applied to the Temporary Rock Silt Checks Type A. Such price and payment will be full compensation for all work covered by this section, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to apply the *Polyacrylamide(PAM)*.

Payment will be made under:

Pay Item	Pay Unit
Polyacrylamide(PAM)	Pound

BORROW PIT DEWATERING BASIN:

(3-17-09) (Rev 3-2-11)

Description

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

Construct, maintain and remove earth embankments used to reduce turbidity from dewatering borrow sites. Work includes providing porous coir fiber baffle, filtration geotextile, stone and outlet structures; cleaning out, maintaining, removing and disposing of the borrow pit dewatering basin and all components; and reshaping, dressing, seeding and mulching the area.

Materials

Refer to Division 10

Item	Section
Riprap, Class A, B, 1, and 2	1042
Geotextile for Drainage, Type 2	1056
Coir Fiber Baffle	1640-2

Use suitable excavated materials, as specified in Sections 225, 230 and 240 of the *Standard Specifications* in the construction of earth embankments for borrow pit dewatering basins, except where otherwise specified.

Construction Methods

Construct borrow pit dewatering basins according to the detail in the erosion control plans, and at locations shown on Reclamation Plans or in areas as directed.

The volume of the borrow pit dewatering basin will be based on a 2 hour retention time. The pump rate shall not exceed 1,000 GPM. The Contractor, at his option, may use a greater retention time for managing turbidity.

The straight line distance between the inlet and outlet shall be divided to include a forebay chamber in the upper quarter cell. Install one porous coir fiber baffle across the full width of the basin to delineate the forebay chamber. Do not use earthen or rock baffle. Install filtration geotextile on the interior side slopes and the floor of the forebay.

The water pumped from the borrow pit into the dewatering basin shall be obtained from the top of the water column and shall be discharged into the forebay in a non-erodible manner.

The borrow pit dewatering basin outlet shall be a vertical non-perforated riser pipe or flash board riser attached with a watertight connection to a barrel that carries the water through the embankment.

Maintenance and Removal

Maintain the borrow pit dewatering basin, coir fiber baffle, and remove and dispose of silt accumulations in accordance with Article 1630-3 of the *Standard Specifications*. The Contractor may include a drain device for maintenance and removal at his discretion.

Remove the borrow pit dewatering basin once dewatering operations are completed. Grade, seed, and mulch the area after removal of the borrow pit dewatering basin in accordance with Section 1660 of the *Standard Specifications*. The area shall be stabilized with an approved groundcover before final acceptance of the site.

Measurement and Payment

No direct payment will be made for borrow pit dewatering basins with the exception of the work of silt removal during dewatering basin operation and the work of seeding and mulching after removal of the dewatering basin. All other work and materials required for installation, maintenance and removal of borrow pit dewatering basins shall be incidental to *Borrow Excavation*. Such price and payments will be full compensation for the work of constructing, maintaining and removing the borrow pit dewatering basin including, but not limited to, the construction and removal of the borrow pit dewatering basin; furnishing of the outlet structure, baffle, filtration geotextile, stone and optional drain devices; and removal of all such items once dewatering operations are completed.

Removal and disposal of silt accumulations during dewatering operations will be measured and paid at the contract unit price per cubic yard for *Silt Excavation* in accordance with Article 1630-4 of the *Standard Specifications*.

Grading, seeding, and mulching the area after removal of the borrow pit dewatering basin will be measured and paid at the contract unit price per acre for *Seeding and Mulching* in accordance with Section 1660-8 of the *Standard Specifications*.

CULVERT DIVERSION CHANNEL:**Description**

This work consists of providing a *Culvert Diversion Channel* to detour the existing stream around the culvert construction site at locations shown on the plans. Work includes constructing the diversion channel, disposing of excess materials, providing and placing geotextile liner, maintaining the diversion area in an acceptable condition, removing geotextile liner, backfilling diversion channel area with suitable material, and providing proper drainage when diversion channel area is abandoned.

Materials

Refer to Division 10

Item	Section
Geotextile for Soil Stabilization, Type 4	1056

Construction Methods

Grade channel according to the plans with channel surface free of obstructions, debris, and pockets of low-density material. Utilize suitable material and provide disposal area for unsuitable material.

Line channel with geotextile unrolled in the direction of flow and lay smoothly but loosely on soil surface without creases. Bury top of slope geotextile edge in a trench at least 5" deep and tamp securely. Make vertical overlaps a minimum of 18" with upstream geotextile overlapping the downstream geotextile.

Secure geotextile with eleven gauge wire staples shaped into a *u* shape with a length of not less than 6" and a throat not less than 1" in width. Place staples along outer edges and throughout the geotextile a maximum of 3 ft. horizontally and vertically.

Measurement and Payment

Culvert Diversion Channel will be measured and paid for as the actual number of cubic yards excavated, as calculated from the typical section throughout the length of the diversion channel as shown on the final approved plans.

Geotextile for Soil Stabilization will be measured and paid for in accordance with Article 270-4 of the *Standard Specifications*.

Such price and payment shall be considered full compensation for all work covered by this section including all materials, construction, maintenance, and removal of *Culvert Diversion Channel*.

Payment will be made under:

Pay Item	Pay Unit
Culvert Diversion Channel	Cubic Yard

IMPERVIOUS DIKE:

Description

This work consists of furnishing, installing, maintaining, and removing an *Impervious Dike* for the purpose of diverting normal stream flow around the construction site. The Contractor shall construct an impervious dike in such a manner approved by the Engineer. The impervious dike shall not permit seepage of water into the construction site or contribute to siltation of the stream. The impervious dike shall be constructed of an acceptable material in the locations noted on the plans or as directed.

Materials

Acceptable materials shall include but not be limited to sheet piles, sandbags, and/or the placement of an acceptable size stone lined with polypropylene or other impervious geotextile.

Earth material shall not be used to construct an impervious dike when it is in direct contact with the stream unless vegetation can be established before contact with the stream takes place.

Measurement and Payment

Impervious Dike will be measured and paid as the actual number of linear feet of impervious dike(s) constructed, measured in place from end to end of each separate installation that has been completed and accepted. Such price and payment will be full compensation for all work including but not limited to furnishing materials, construction, maintenance, and removal of the impervious dike.

Payment will be made under:

Pay Item	Pay Unit
Impervious Dike	Linear Foot

COIR FIBER MAT:

Description

Furnish material, install and maintain coir fiber mat in locations shown on the plans or in locations as directed. Work includes providing all materials, excavating and backfilling, and placing and securing coir fiber mat with stakes, steel reinforcement bars or staples as directed.

Materials**Item**

Coir Fiber Mat

Section

1060-14

Anchors: Stakes, reinforcement bars, or staples shall be used as anchors.

Wooden Stakes:

Provide hardwood stakes 12"- 24" long with a 2" x 2" nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving through the coir fiber mat and down into the underlying soil. The other end of the stake needs to have a 1"- 2" long head at the top with a 1"- 2" notch following to catch and secure the coir fiber mat.

Steel Reinforcement Bars:

Provide uncoated #10 steel reinforcement bars 24" nominal length. The bars shall have a 4" diameter bend at one end with a 4" straight section at the tip to catch and secure the coir fiber mat.

Staples:

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

Construction Methods

Place the coir fiber mat immediately upon final grading. Provide a smooth soil surface free from stones, clods, or debris that will prevent the contact of the mat with the soil. Unroll the mat and apply without stretching such that it will lie smoothly but loosely on the soil surface.

For stream relocation applications, take care to preserve the required line, grade, and cross section of the area covered. Bury the top slope end of each piece of mat in a narrow trench at least 6 in. deep and tamp firmly. Where one roll of matting ends and a second roll begins, overlap the end of the upper roll over the buried end of the second roll so there is a 6 in. overlap. Construct check trenches at least 12 in. deep every 50 ft. longitudinally along the edges of the mat or as directed. Fold over and bury mat to the full depth of the trench, close and tamp firmly. Overlap mat at least 6 in. where 2 or more widths of mat are installed side by side.

Place anchors across the mat at the ends approximately 1 ft. apart. Place anchors along the outer edges and down the center of the mat 3 ft. apart.

Adjustments in the trenching or anchoring requirements to fit individual site conditions may be required.

Measurement and Payment

Coir Fiber Mat will be measured and paid for as the actual number of square yards measured along the surface of the ground over which coir fiber mat is installed and accepted.

No measurement will be made for anchor items.

Payment will be made under:

Pay Item	Pay Unit
Coir Fiber Mat	Square Yard

COMPOST BLANKET:**Description**

This work shall consist of furnishing, installing, maintaining, and seeding a water permeable *Compost Blanket* to reduce soil erosion and sediment by promoting the establishment of vegetation on sandy soils where vegetation is difficult to establish.

Materials

Compost:

Compost used for Compost Blankets shall be weed free and derived from a well-decomposed source of organic matter. The compost shall be produced using an aerobic composting process meeting CFR 503 regulations, including time and temperature data indicating effective weed seed, pathogen, and insect larvae kill. The compost shall be free of any refuse, contaminants or other materials toxic to plant growth. Non-composted products will not be accepted. Test methods for the items below should follow USCC TMECC guidelines for laboratory procedures:

1. pH between 5.0-8.0 in accordance with TMECC 04.11-A, "Electrometric pH Determinations for Compost".
2. For seeded Compost Blankets, seed should be incorporated at the time of application in the entire depth of the compost blanket, at rates per foot, per square yard, or per acre, as acceptable to the engineer. The following particle sizes shall also be followed: 100% passing a 2" sieve; 99% passing a 1" sieve; minimum of 60% passing a ½" sieve. All other testing parameters remain the same. The seeding rates are generally similar or slightly higher than those used when considering application of seed via hydroseeding or other seeding methods.
3. Moisture content of less than 60% in accordance with standardized test methods for moisture determination.
4. Material shall be relatively free (<1% by dry weight) of inert or foreign man made materials.
5. A sample shall be submitted to the engineer for approval prior to being used and must comply with all local, state and federal regulations.

Construction Methods

1. Compost Blankets will be placed as directed. Unless otherwise specified, Compost Blankets should be installed at a minimum depth of 1".
2. The Compost Blanket shall be seeded at time of installation for establishment of permanent vegetation. The Engineer will specify seeding requirements.
3. Compost Blankets are not to be used in direct flow situations or in runoff channels.
4. The type and rate of seed, fertilizer and lime shall be in accordance with the Seeding and Mulching provisions of this contract and as directed.

Maintenance

1. The Contractor shall perform routine inspections and maintain the Compost Blanket in a functional condition at all times.
2. Where the Compost Blanket fails, it will be routinely repaired.
3. The Compost Blanket will be seeded on site, at rates and seed types as determined by the Engineer. Once vegetation is established, final seeding is not required.

Performance

1. The Contractor is responsible for establishing a working erosion control system and may, with approval of the Engineer, work outside the minimum construction requirements as needed.
2. Where the Compost Blanket deteriorates or fails, it will be repaired or replaced with a more effective approved alternative.

Measurement and Payment

The Contractor shall provide the Engineer with proof that a 1" thick Compost Blanket has been applied. This rate equals approximately 270 cubic yards of compost material per acre of application area. The Contractor shall supply satisfactory evidence that the specified amount of material has been effectively placed (i.e., truck load tickets).

Compost Blanket will be measured and paid for as the actual number of acres measured along the surface of the ground over which the Compost Blanket is installed and accepted.

Payment will be made under:

Pay Item	Pay Unit
Compost Blanket	Acre

FABRIC INSERT INLET PROTECTION DEVICE (HIGH FLOW)**Description**

This work shall consist of installing, maintaining, and removing *Fabric Insert Inlet Protection Device*, of the type specified, in inlet structures (catch basins, drop inlets, etc) in areas where asphalt or concrete may not be fully removed in lieu Rock Inlet Sediment Traps Type C, or as directed.

Materials

The product shall be a fabric inlet protection device composed of a fitted woven polypropylene geotextile double sewn with nylon thread. The *Fabric Insert Inlet Protection Device* shall be manufactured to fit the opening of the catch basin or drop inlet and will have two dump straps attached at the bottom to facilitate the emptying of the device and shall have lifting loops for lifting the device from the basin. The *Fabric Insert Inlet Protection Device* shall have a restraint cord approximately halfway up the bag to keep the sides away from the catch basin walls.

The stitching shall meet the following physical properties:

Physical	Test Method	English
Average Wide Width Strength	ASTM D-4884	165 lb/in

The fitted filter assembly shall have the following physical properties:

Physical	Test Method	English
Grab Tensile	ASTM D-4632	255 x 275 lbs
Minimum Puncture Strength	ASTM D-4833	125 lbs
Mullen Burst	ASTM D-3786	420 PSI
Minimum UV Resistance	ASTM D-4355	70 %.
Flow Rate	ASTM D-4491	200 gal/min/ft ²
Apparent Opening	ASTM D-4751	20 US Sieve
Permittivity	ASTM D-4491	1.5 sec ⁻¹

Construction Methods

Strictly comply with manufacturer's installation instructions and recommendations. Maintenance shall include regular daily inspections and after each qualifying rain event. The *Fabric Insert Inlet Protection Device* shall be emptied, cleaned and placed back into the basin when it reaches 50% capacity or as directed.

Measurement and Payment

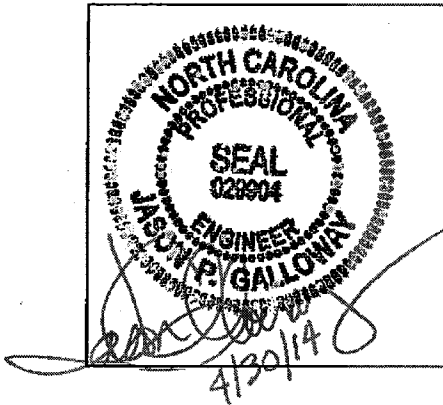
This work will be paid for at the contract unit price per *Fabric Insert Inlet Protection Device* of the type specified, complete in place and accepted. Such payment shall be full compensation for

furnishing and installing the *Fabric Insert Inlet Protection Device* in accordance with this specification and for all required maintenance.

Maintenance of the device, cleanout and disposal of accumulated sediments shall be paid for by *Fabric Insert Inlet Protection Device Cleanout*.

Payment will be made under:

Pay Item	Pay Unit
Fabric Insert Inlet Protection Device	Each
Fabric Insert Inlet Protection Device Cleanout	Each



**Project Special Provisions
(Version 12.3)
Signals and Intelligent Transportation Systems**

*Prepared By: jg
30-Apr-14*

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1. 2012 STANDARD SPECIFICATIONS FOR ROADS & STRUCTURES

The 2012 Standard Specifications are revised as follows:

1.1. Junction Boxes (1098-5)

Page 10-212, sub-Section 1098-5(C) Oversized Junction Boxes

Revise sentence to read, "Provide oversized junction boxes and covers with minimum inside dimensions of 28"(l) x 15"(w) x 22"(h)."

1.2. Controllers with Cabinets – Material (1751-2)

Page 17-37, Section 1751-2 Material

Add the following paragraph:

When the plans or specifications require a Type 2070L controller, contractor may provide a Type 2070E controller. Unless otherwise allowed by the Engineer, provide controllers of only one type.

1.3. Pedestals (1743)

Page 17-34, Add the following new sub-Section:

1743-4 - Screw-In Helical Foundation Anchor Assembly**Description:**

Furnish and install screw-in helical foundation as an alternative to the standard reinforced concrete foundation specified in Article 1743 "Pedestals" of the Standard Specifications, for supporting Type I and Type II Pedestals. Do not use for Type III Pedestals.

Materials for Type I – Pedestrian Pushbutton Post:

Fabricate pipe assembly consisting of a 4" diameter x 56" long pipe, single helical blade and square fixed attachment plate. Furnish pipe in accordance with ASTM A-53 ERW Grade B and include a 2" x 3" cable opening in the pipe at 18" below the attachment plate. Furnish steel attachment plate and helical blade in accordance with ASTM A-36. Include (4) slotted mounting holes in the attachment plate to fit bolt circles ranging from 7-3/4" to 14-3/4" diameter. Furnish additional 3/4" keyholes at slotted holes to permit anchor bolt installation and replacement from top surface. Include combination bolt-head retainer and dirt scrapers at the attachment plate underside to allow for a level or flush-mount plate installation with respect to the finished grade. Galvanize pipe assembly components in accordance with AASHTO M 111 or an approved equivalent.

Furnish (4) 3/4"-10NC x 3" square head anchor bolts to meet the requirements of ASTM 325. Provide (4) 3/4" plain flat galvanized washers, (4) 3/16" thick galvanized plate washers and (4) 3/4" galvanized hex nuts. Galvanize in accordance with AASHTO M 111 or an approved equivalent.

Construction Methods for Type I – Pedestrian Pushbutton Post:

Advance or mechanically screw foundation into soil up until top of attachment plate is level with finished grade. Slide the anchor bolt heads through the keyhole openings and under the attachment plate with threads pointing up. Bolt the pedestal base to the foundation attachment plate. For further construction methods, see manufacturer's installation drawings.

Materials for Type II – Normal-Duty Pedestal:

Fabricate pipe assembly consisting of a 6" diameter x 60" long, single helical blade, 1-1/4" diameter stinger rod and square fixed attachment plate. Furnish pipe in accordance with ASTM A-53 ERW Grade B using schedule 40 wall thickness and include a 2" x 3" cable opening in the pipe at 18" below the attachment plate. Furnish steel attachment plate, helical blade and stinger rod in accordance with ASTM A-36. Include (4) slotted mounting holes in the attachment plate to fit bolt circles ranging from

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10" to 15" diameter. Furnish additional 1-1/4" keyholes at slotted holes to permit anchor bolt installation and replacement from top surface. Include combination bolt-head retainer and dirt scrapers at the attachment plate underside to allow for a level or flush-mount plate installation with respect to the finished grade. Galvanize pipe assembly components in accordance with AASHTO M 111 or an approved equivalent.

Furnish (4) 1"-8NC x 4" galvanized Grade 5 square head anchor bolts. Provide (4) 1" plain flat galvanized washers and (4) 1" galvanized hex nuts. Galvanize in accordance with AASHTO M 111 or an approved equivalent.

Construction Methods for Type II – Normal-Duty Pedestal:

Advance or mechanically screw foundation into soil up until top of attachment plate is level with finished grade. Slide the anchor bolt heads through the keyhole openings and under the attachment plate with threads pointing up. Bolt the pedestal base to the foundation attachment plate.

For further construction methods, see manufacturer's installation drawings.

Page 17-34, revise Measurement and Payment to sub-Section 1743-5.

Revise the last paragraph to read:

No measurement will be made for pedestal foundations, pedestal screw-in helical foundations, grounding systems and any peripheral pedestal mounting hardware as these are incidental to furnishing and installing pedestals.

2. SIGNAL HEADS**2.1. MATERIALS****A. General:**

Fabricate vehicle signal head housings and end caps from die-cast aluminum. Fabricate 12-inch and 16-inch pedestrian signal head housings and end caps from die-cast aluminum. Fabricate 9-inch pedestrian signal head housings, end caps, and visors from virgin polycarbonate material. Provide visor mounting screws, door latches, and hinge pins fabricated from stainless steel. Provide interior screws, fasteners, and metal parts fabricated from stainless steel or corrosion resistant material.

Fabricate tunnel and traditional visors from sheet aluminum.

Paint all surfaces inside and outside of signal housings and doors. Paint outside surfaces of tunnel and traditional visors, messenger cable mounting assemblies, pole and pedestal mounting assemblies, and pedestrian pushbutton housings. Have electrostatically-applied, fused-polyester paint in highway yellow (Federal Standard 595C, Color Chip Number 13538) a minimum of 2.5 to 3.5 mils thick. Do not apply paint to the latching hardware or rigid vehicle signal head mounting brackets for mast-arm attachments.

Have the interior surfaces of tunnel and traditional visors painted an alkyd urea black synthetic baking enamel with a minimum gloss reflectance and meeting the requirements of MIL-E-10169, "Enamel Heat Resisting, Instrument Black."

Where required, provide polycarbonate signal heads and visors that comply with the provisions pertaining to the aluminum signal heads listed on the QPL with the following exceptions:

Fabricate signal head housings, end caps, and visors from virgin polycarbonate material. Provide UV stabilized polycarbonate plastic with a minimum thickness of 0.1 ± 0.01 inches that is highway yellow (Federal Standard 595C, Color Chip 13538). Ensure the color is incorporated into the plastic material before molding the signal head housings and end caps. Ensure the plastic

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formulation provides the following physical properties in the assembly (tests may be performed on separately molded specimens):

Test	Required	Method
Specific Gravity	1.17 minimum	ASTM D 792
Flammability	Self-extinguishing	ASTM D 635
Tensile Strength, yield, PSI	8500 minimum	ASTM D 638
Izod impact strength, ft-lb/in [notched, 1/8 inch]	12 minimum	ASTM D 256

For pole mounting, provide side of pole mounting assemblies with framework and all other hardware necessary to make complete, watertight connections of the signal heads to the poles and pedestals. Fabricate the mounting assemblies and frames from aluminum with all necessary hardware, screws, washers, etc. to be stainless steel. Provide mounting fittings that match the positive locking device on the signal head with the serrations integrally cast into the brackets. Provide upper and lower pole plates that have a 1 ¼-inch vertical conduit entrance hubs with the hubs capped on the lower plate and 1 ½-inch horizontal hubs. Ensure that the assemblies provide rigid attachments to poles and pedestals so as to allow no twisting or swaying of the signal heads. Ensure that all raceways are free of sharp edges and protrusions, and can accommodate a minimum of ten Number 14 AWG conductors.

For pedestal mounting, provide a post-top slipfitter mounting assembly that matches the positive locking device on the signal head with serrations integrally cast into the slipfitter. Provide stainless steel hardware, screws, washers, etc. Provide a minimum of six 3/8 X 3/4-inch long square head bolts for attachment to pedestal. Provide a center post for multi-way slipfitters.

For light emitting diode (LED) traffic signal modules, provide the following requirements for inclusion on the Department's Qualified Products List for traffic signal equipment.

1. Sample submittal,
2. Third-party independent laboratory testing results for each submitted module with evidence of testing and conformance with all of the Design Qualification Testing specified in section 6.4 of each of the following Institute of Transportation Engineers (ITE) specifications:
 - Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Circular Signal Supplement
 - Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Vehicle Arrow Traffic Signal Supplement
 - Pedestrian Traffic Control Signal Indications –Light Emitting Diode (LED) Signal Modules.

(Note: The Department currently recognizes two approved independent testing laboratories. They are Intertek ETL Semko and Light Metrics, Incorporated with Garwood Laboratories. Independent laboratory tests from other laboratories may be considered as part of the QPL submittal at the discretion of the Department,

3. Evidence of conformance with the requirements of these specifications,
4. A manufacturer's warranty statement in accordance with the required warranty, and

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5. Submittal of manufacturer's design and production documentation for the model, including but not limited to, electrical schematics, electronic component values, proprietary part numbers, bill of materials, and production electrical and photometric test parameters.
6. Evidence of approval of the product to bear the Intertek ETL Verified product label for LED traffic signal modules.

In addition to meeting the performance requirements for the minimum period of 60 months, provide a written warranty against defects in materials and workmanship for the modules for a period of 60 months after installation of the modules. During the warranty period, the manufacturer must provide new replacement modules within 45 days of receipt of modules that have failed at no cost to the State. Repaired or refurbished modules may not be used to fulfill the manufacturer's warranty obligations. Provide manufacturer's warranty documentation to the Department during evaluation of product for inclusion on Qualified Products List (QPL).

B. Vehicle Signal Heads:

Comply with the ITE standard "Vehicle Traffic Control Signal Heads". Provide housings with provisions for attaching backplates.

Provide visors that are 8 inches in length for 8-inch vehicle signal head sections. Provide visors that are 10 inches in length for 12-inch vehicle signal heads.

Provide a termination block with one empty terminal for field wiring for each indication plus one empty terminal for the neutral conductor. Have all signal sections wired to the termination block. Provide barriers between the terminals that have terminal screws with a minimum Number 8 thread size and that will accommodate and secure spade lugs sized for a Number 10 terminal screw.

Mount termination blocks in the yellow signal head sections on all in-line vehicle signal heads. Mount the termination block in the red section on five-section vehicle signal heads.

Furnish vehicle signal head interconnecting brackets. Provide one-piece aluminum brackets less than 4.5 inches in height and with no threaded pipe connections. Provide hand holes on the bottom of the brackets to aid in installing wires to the signal heads. Lower brackets that carry no wires and are used only for connecting the bottom signal sections together may be flat in construction.

For messenger cable mounting, provide messenger cable hangers, wire outlet bodies, balance adjusters, bottom caps, wire entrance fitting brackets, and all other hardware necessary to make complete, watertight connections of the vehicle signal heads to the messenger cable. Fabricate mounting assemblies from malleable iron or steel and provide serrated rings made of aluminum. Provide messenger cable hangers and balance adjusters that are galvanized before being painted. Fabricate balance adjuster eyebolt and eyebolt nut from stainless steel or galvanized malleable iron. Provide messenger cable hangers with U-bolt clamps. Fabricate washers, screws, bolts, clevis pins, cotter pins, nuts, and U-bolt clamps from stainless steel.

For mast-arm mounting, provide rigid vehicle signal head mounting brackets and all other hardware necessary to make complete, watertight connections of the vehicle signal heads to the mast arms and to provide a means for vertically adjusting the vehicle signal heads to proper alignment. Fabricate the mounting assemblies from aluminum, and provide serrated rings made of aluminum. Provide stainless steel cable attachment assemblies to secure the brackets to the mast arms. Ensure all fastening hardware and fasteners are fabricated from stainless steel.

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Provide LED vehicular traffic signal modules (hereafter referred to as modules) that consist of an assembly that uses LEDs as the light source in lieu of an incandescent lamp for use in traffic signal sections. Use LEDs that are aluminum indium gallium phosphorus (AlInGaP) technology for red and yellow indications and indium gallium nitride (InGaN) for green indications. Install the ultra bright type LEDs that are rated for 100,000 hours of continuous operation from -40°F to +165°F. Design modules to have a minimum useful life of 60 months and to meet all parameters of this specification during this period of useful life.

For the modules, provide spade terminals crimped to the lead wires and sized for a #10 screw connection to the existing terminal block in a standard signal head. Do not provide other types of crimped terminals with a spade adapter.

Ensure the power supply is integral to the module assembly. On the back of the module, permanently mark the date of manufacture (month & year) or some other method of identifying date of manufacture.

Tint the red, yellow and green lenses to correspond with the wavelength (chromaticity) of the LED. Transparent tinting films are unacceptable. Provide a lens that is integral to the unit with a smooth outer surface.

1. LED Circular Signal Modules:

Provide modules in the following configurations: 12-inch circular sections, and 8-inch circular sections. All makes and models of LED modules purchased for use on the State Highway System shall appear on the current NCDOT Traffic Signal Qualified Products List (QPL).

Provide the manufacturer's model number and the product number (assigned by the Department) for each module that appears on the 2012 or most recent Qualified Products List. In addition, provide manufacturer's certification in accordance with Article 106-3 of the *Standard Specifications*, that each module meets or exceeds the ITE "Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Circular Signal Supplement" dated June 27, 2005 (hereafter referred to as VTCSH Circular Supplement) and other requirements stated in this specification.

Provide modules that meet the following requirements when tested under the procedures outlined in the VTCSH Circular Supplement:

Module Type	Max. Wattage at 165° F	Nominal Wattage at 77° F
12-inch red circular	17	11
8-inch red circular	13	8
12-inch green circular	15	15
8-inch green circular	12	12

For yellow circular signal modules, provide modules tested under the procedures outlined in the VTCSH Circular Supplement to insure power required at 77° F is 22 Watts or less for the 12-inch circular module and 13 Watts or less for the 8-inch circular module.

Note: Use a wattmeter having an accuracy of $\pm 1\%$ to measure the nominal wattage and maximum wattage of a circular traffic signal module. Power may also be derived from voltage, current and power factor measurements.

2. LED Arrow Signal Modules

Provide 12-inch omnidirectional arrow signal modules. All makes and models of LED modules purchased for use on the State Highway System shall appear on the current NCDOT Traffic Signal Qualified Products List (QPL).

Provide the manufacturer's model number and the product number (assigned by the Department) for each module that appears on the 2012 or most recent Qualified Products List. In addition, provide manufacturer's certification in accordance with Article 106-3 of the *Standard Specifications*, that each module meets or exceeds the requirements for 12-inch omnidirectional modules specified in the ITE "Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Vehicle Arrow Traffic Signal Supplement" dated July 1, 2007 (hereafter referred to as VTCSH Arrow Supplement) and other requirements stated in this specification.

Provide modules that meet the following requirements when tested under the procedures outlined in the VTCSH Arrow Supplement:

Module Type	Max. Wattage at 165° F	Nominal Wattage at 77° F
12-inch red arrow	12	9
12-inch green arrow	11	11

For yellow arrow signal modules, provide modules tested under the procedures outlined in the VTCSH Arrow Supplement to insure power required at 77° F is 12 Watts or less.

Note: Use a wattmeter having an accuracy of $\pm 1\%$ to measure the nominal wattage and maximum wattage of an arrow traffic signal module. Power may also be derived from voltage, current and power factor measurements.

3. LED U-Turn Arrow Signal Modules:

Provide modules in the following configurations: 12-inch left u-turn arrow signal modules and 12-inch right u-turn arrow signal modules.

Modules are not required to be listed on the ITS and Signals Qualified Products List. Provide manufacturer's certification in accordance with Article 106-3 of the *Standard Specifications*, that each module meets or exceeds the ITE "Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Circular Signal Supplement" dated June 27, 2005 (hereafter referred to as VTCSH Circular Supplement) and other requirements stated in this specification.

Provide modules that have minimum maintained luminous intensity values that are not less than 16% of the values calculated using the method described in section 4.1 of the VTCSH Circular Supplement.

Provide modules that meet the following requirements when tested under the procedures outlined in the VTCSH Circular Supplement:

Module Type	Max. Wattage at 165° F	Nominal Wattage at 77° F
12-inch red u-turn arrow	17	11
12-inch green u-turn arrow	15	15

For yellow u-turn arrow signal modules, provide modules tested under the procedures outlined in the VTCSH Circular Supplement to ensure power required at 77° F is 22 Watts or less.

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Note: Use a wattmeter having an accuracy of $\pm 1\%$ to measure the nominal wattage and maximum wattage of a circular traffic signal module. Power may also be derived from voltage, current and power factor measurements.

C. Pedestrian Signal Heads:

Provide pedestrian signal heads with international symbols that meet the MUTCD. Do not provide letter indications.

Comply with the ITE standard for "Pedestrian Traffic Control Signal Indications" and the following sections of the ITE standard for "Vehicle Traffic Control Signal Heads" in effect on the date of advertisement:

- Section 3.00 - "Physical and Mechanical Requirements"
- Section 4.01 - "Housing, Door, and Visor: General"
- Section 4.04 - "Housing, Door, and Visor: Materials and Fabrication"
- Section 7.00 - "Exterior Finish"

Provide a double-row termination block with three empty terminals and number 10 screws for field wiring. Provide barriers between the terminals that accommodate a spade lug sized for number 10 terminal screws. Mount the termination block in the hand section. Wire all signal sections to the terminal block.

Where required by the plans, provide 16-inch pedestrian signal heads with traditional three-sided, rectangular visors, 6 inches long. Where required by the plans, provide 12-inch pedestrian signal heads with traditional three-sided, rectangular visors, 8 inches long.

Provide 2-inch diameter pedestrian push-buttons with weather-tight housings fabricated from die-cast aluminum and threading in compliance with the NEC for rigid metal conduit. Provide a weep hole in the housing bottom and ensure that the unit is vandal resistant.

Provide push-button housings that are suitable for mounting on flat or curved surfaces and that will accept 1/2-inch conduit installed in the top. Provide units that have a heavy duty push-button assembly with a sturdy, momentary, normally-open switch. Have contacts that are electrically insulated from the housing and push-button. Ensure that the push-buttons are rated for a minimum of 5 mA at 24 volts DC and 250 mA at 12 volts AC.

Provide standard R10-3 signs with mounting hardware that comply with the MUTCD in effect on the date of advertisement. Provide R10-3E signs for countdown pedestrian heads and R10-3B for non-countdown pedestrian heads.

Design the LED pedestrian traffic signal modules (hereafter referred to as modules) for installation into standard pedestrian traffic signal sections that do not contain the incandescent signal section reflector, lens, eggcrate visor, gasket, or socket. Provide modules that consist of an assembly that uses LEDs as the light source in lieu of an incandescent lamp. Use LEDs that are of the latest aluminum indium gallium phosphorus (AlInGaP) technology for the Portland Orange hand and countdown displays. Use LEDs that are of the latest indium gallium nitride (InGaN) technology for the Lunar White walking man displays. Install the ultra-bright type LEDs that are rated for 100,000 hours of continuous operation from -40°F to $+165^{\circ}\text{F}$. Design modules to have a minimum useful life of 60 months and to meet all parameters of this specification during this period of useful life.

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Design all modules to operate using a standard 3 - wire field installation. Provide spade terminals crimped to the lead wires and sized for a #10 screw connection to the existing terminal block in a standard pedestrian signal housing. Do not provide other types of crimped terminals with a spade adapter.

Ensure the power supply is integral to the module assembly. On the back of the module, permanently mark the date of manufacture (month & year) or some other method of identifying date of manufacture.

Provide modules in the following configuration: 16-inch displays which have the solid hand/walking man overlay on the left and the countdown on the right, and 12-inch displays which have the solid hand/walking man module as an overlay. All makes and models of LED modules purchased for use on the State Highway System shall appear on the current NCDOT Traffic Signal Qualified Products List (QPL).

Provide the manufacturer's model number and the product number (assigned by the Department) for each module that appears on the 2012 or most recent Qualified Products List. In addition, provide manufacturer's certification in accordance with Article 106-3 of the *Standard Specifications*, that each module meets or exceeds the ITE "Pedestrian Traffic Control Signal Indicators - Light Emitting Diode (LED) Signal Modules" dated August 04, 2010 (hereafter referred to as PTCSI Pedestrian Standard) and other requirements stated in this specification.

Provide modules that meet the following requirements when tested under the procedures outlined in the PTCSI Pedestrian Standard:

Module Type	Max. Wattage at 165° F	Nominal Wattage at 77° F
Hand Indication	16	13
Walking Man Indication	12	9
Countdown Indication	16	13

Note: Use a wattmeter having an accuracy of $\pm 1\%$ to measure the nominal wattage and maximum wattage of a circular traffic signal module. Power may also be derived from voltage, current and power factor measurements.

Provide module lens that is hard coated or otherwise made to comply with the material exposure and weathering effects requirements of the Society of Automotive Engineers (SAE) J576. Ensure all exposed components of the module are suitable for prolonged exposure to the environment, without appreciable degradation that would interfere with function or appearance.

Ensure the countdown display continuously monitors the traffic controller to automatically learn the pedestrian phase time and update for subsequent changes to the pedestrian phase time.

Ensure the countdown display begins normal operation upon the completion of the preemption sequence and no more than one pedestrian clearance cycle.

D. Signal Cable:

Furnish 16-4 and 16-7 signal cable that complies with IMSA specification 20-1 except provide the following conductor insulation colors:

- For 16-4 cable: white, yellow, red, and green

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- For 16-7 cable: white, yellow, red, green, yellow with black stripe tracer, red with black stripe tracer, and green with black stripe tracer. Apply continuous stripe tracer on conductor insulation with a longitudinal or spiral pattern.

Provide a ripcord to allow the cable jacket to be opened without using a cutter. IMSA specification 19-1 will not be acceptable. Provide a cable jacket labeled with the IMSA specification number and provide conductors constructed of stranded copper.

3. MICROWAVE VEHICLE DETECTOR – SINGLE ZONE

3.1. DESCRIPTION

Furnish and install a microwave vehicle detection unit and manufacturer recommended cables and hardware in accordance with the plans and specifications.

3.2. MATERIALS

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

Provide a detector for either side-fire or forward-fire configuration. Ensure the detector will detect vehicle in sunny, cloudy, rainy, snowy, and foggy weather conditions with self-tuning to auto-adjust in changing environmental conditions. Ensure the detector can operate from the voltage supplied by a NEMA and Type-170 traffic signal cabinet. Ensure the detector can provide detection calls to the traffic signal controller within a NEMA and Type-170 cabinet. Ensure the detector will put out a constant call in the event of a component failure or loss of power. Ensure the detector has an operating temperature range of -20 to 150 degrees F. Ensure a water resistant housing for the detector.

For advance pulse detection, ensure the detector senses vehicles in motion at a range of 200 feet with an operating frequency of 10.525 GHz +/- 25MHz.

For stop bar presence detection, ensure the detector outputs a constant call while a vehicle is in the detection zone. Ensure the presence detection unit can cover a detection zone as shown on the plans and has an effective range of at least 75 feet from the detector unit to the aim point on the road surface.

For units without an integrated card rack interface, provide Form C output relay contacts rated a minimum of 3A, 24VDC.

If a laptop is used to adjust detector settings, ensure that software is licensed for use by the Department and by any other agency responsible for maintaining or operating the microwave detection system. Provide the Department with a license to duplicate and distribute the software as necessary for design and maintenance support.

3.3. CONSTRUCTION METHODS

Install the microwave vehicle detector in accordance with the manufacturer's recommendations.

Monitor and maintain the detector unit during construction to ensure microwave vehicle detector is functioning properly and aimed for the detection zone shown in the plans. Refer to Subarticle 1700-3 (D) Maintenance and Repair of Materials of the *Standard Specifications* for failure to maintain the microwave detection system.

3.4. MEASUREMENT AND PAYMENT

Actual number of microwave vehicle detector units furnished, installed, and accepted.

No measurement will be made of cables or hardware, as these will be considered incidental to furnishing and installing microwave vehicle detectors.

Payment will be made under:

Microwave Vehicle Detector – Single Zone..... Each

4. TRAFFIC SIGNAL SUPPORTS**4.1. METAL TRAFFIC SIGNAL SUPPORTS – ALL POLES****A. General:**

Furnish and install metal strain poles and metal poles with mast arms, grounding systems, and all necessary hardware. The work covered by this special provision includes requirements for the design, fabrication, and installation of both standard and custom/site specifically designed metal traffic signal supports and associated foundations.

Provide metal traffic signal support systems that contain no guy assemblies, struts, or stay braces. Provide designs of completed assemblies with hardware that equals or exceeds AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals* 5th Edition, 2009 (hereafter called 5th Edition AASHTO), including the latest interim specifications. Provide assemblies with a round or near-round (18 sides or more) cross-section, or a multi sided cross section with no less than six sides. The sides may be straight, convex, or concave.

Pole heights shown on signal plans are estimated from available data for bid purposes. Prior to furnishing metal signal poles, use field measurements and adjusted cross-sections to determine whether pole heights are sufficient to obtain required clearances. If pole heights are not sufficient, the Contractor should immediately notify the Engineer of the required revised pole heights.

Ensure that metal signal poles permit cables to be installed inside poles and any required mast arms. For holes in the poles and arms used to accommodate cables, provide full-circumference grommets. Arm flange plate wire access holes should be deburred, non grommited, and oversized to fit around the 2" diameter grommited shaft flange plate wire access hole.

After fabrication, have steel poles, required mast arms, and all parts used in the assembly hot-dip galvanized per section 1076. Design structural assemblies with weep holes large enough and properly located to drain molten zinc during the galvanization process. Provide hot-dip galvanizing on structures that meets or exceeds ASTM Standard A-123. Provide galvanizing on hardware that meets or exceeds ASTM Standard A-153. Ensure that threaded material is brushed and retapped as necessary after galvanizing. Perform repair of damaged galvanizing that complies with the following:

Repair of Galvanizing.....Article 1076-7

Standard Drawings for Metal Poles are available that supplement these project special provisions. These drawings are located on the Department's website:

<https://connect.ncdot.gov/resources/safety/pages/ITS-Design-Resources.aspx>

Comply with article 1098-1B of the 2012 *STANDARD SPECIFICATIONS FOR ROADS & STRUCTURES*, hereinafter referred to as the *Standard Specifications* for submittal requirements. Furnish shop drawings for approval. Provide the copies of detailed shop drawings for each type of structure as summarized below. Ensure that shop drawings include material specifications for each component and identify welds by type and size on the detail drawing only, not in table format. **Do not release structures for fabrication until shop drawings have been approved by NCDOT.** Provide an itemized bill of materials for all structural components and associated connecting hardware on the drawings.

Comply with article 1098-1A of the *Standard Specifications* for Qualified Products List (QPL) submittals. All shop drawings must include project location description, signal inventory number(s) and a project number or work order number on the drawings.

Summary of information required for metal pole review submittal:

Item	Hardcopy Submittal	Electronic Submittal	Comments / Special Instructions
Sealed, Approved Signal Plan/Loading Diagram	1	1	All structure design information needs to reflect the latest approved signal plans
Custom Pole Shop Drawings	4 sets	1 set	Show NCDOT inventory number(s), contractor's name and relevant revision number in the title block. All drawings must have a unique <u>drawing</u> number for each project and identified for multiple pages.
Standard Pole Shop Drawings (from the QPL)	4 sets	1 set	Submit drawings on 11" x 17" format media. Show NCDOT inventory number(s), contractor's name and relevant revision number in the title block. All drawings must have a <u>unique drawing</u> number for each project and identified for multiple pages.
Structure Calculations	1 set	1 set	Not required for Standard QPL Poles
Standard Pole Foundation Drawings	1 set	1 set	Submit drawings on 11" x 17" format media. Submit a completed Standard Foundation Selection form for each pole using foundation table on Metal Pole Drawing M-8.
Custom Foundation Drawings	4 sets	1 set	Submit drawings on 11" x 17" format media. Show NCDOT inventory number(s), contractor's name and relevant revision number in the title block. All drawings must have a <u>unique drawing</u> number for each project and identified for multiple pages. If QPL Poles are used, include the corresponding QPL pole shop drawings with this submittal.
Foundation Calculations	1	1	Submit copies of LPILE input, output and pile

			tip deflection graph per Section 11.4 of this specification for each foundation. Not required for Standard QPL Poles
Soil Boring Logs and Report	1	1	Report should include a location plan and a soil classification report including soil capacity, water level, hammer efficiency, soil bearing pressure, soil density, etc. for each pole.

NOTE – All shop drawings and custom foundation design drawings must be sealed by a Professional Engineer licensed in the state of North Carolina. All geotechnical information must be sealed by either a Professional Engineer or geologist licensed in the state of North Carolina. Include a title block and revision block on the shop drawings and foundation drawings showing the NCDOT inventory number.

Shop drawings and foundation drawings may be submitted together or separately for approval. However, shop drawings must be approved before foundations can be reviewed. Foundation designs will be returned without review if the associated shop drawing has not been approved. Incomplete submittals will be returned without review. The Reviewer has the right to request additional analysis and copies of the calculations to expedite the approval process.

B. Materials:

Fabricate metal pole and arm shaft from coil or plate steel to meet the requirements of ASTM A 595 Grade A tubes. For structural steel shapes, plates and bars use A572 Gr 50 min or ASTM A709 Gr 50 min. Provide pole and arm shafts that are round in cross section or multisided tubular shapes and have a uniform linear taper of 0.14 in/ft. Construct shafts from one piece of single ply plate or coil so there are no circumferential weld splices. Galvanize in accordance with AASHTO M 111 or an approved equivalent.

Use the submerged arc process or other NCDOT previously approved process suitable for pole shaft and arms to continuously weld pole shafts and arm shafts along their entire length. The longitudinal seam weld will be finished flush to the outside contour of the base metal. Ensure shafts have no circumferential welds except at the lower end joining the shaft to the pole base and arm base. Provide welding that conforms to Article 1072-18 of the *Standard Specifications*, except that no field welding on any part of the pole will be permitted unless approved by a qualified engineer.

Refer to Metal Pole Standard Drawing Sheets M2 through M5 for fabrication details. Fabricate anchor bases from plate steel meeting, as a minimum, the requirements of ASTM A 36M or cast steel meeting the requirements of ASTM A 27M Grade 485-250, AASHTO M270 Gr 36 or an approved equivalent. Conform to the applicable bolt pattern and orientation as shown on Metal Pole Standard Drawing Sheet M2.

Ensure all hardware is galvanized steel or stainless steel. The Contractor is responsible for ensuring that the designer/fabricator specifies connecting hardware and/or materials that do not create a dissimilar metal corrosive reaction.

Provide a minimum of four (4) 1-1/2" diameter high strength bolts for connection between arm plate and pole plate. Increase number of bolts to six (6) 1-1/2" diameter high strength bolts when arm lengths are greater than 50'-0" long.

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Unless otherwise required by the design, ensure each anchor rod is 2" diameter and 60" length. Provide 10" minimum thread projection at the top of the rod, and 8" minimum at the bottom of the rod. Use anchor rod assembly and drilled pier foundation materials that meet the *Foundations and Anchor Rod Assemblies for Metal Poles* provision.

For each structural bolt and other steel hardware, hot dip galvanizing shall conform to the requirements of AASHTO M 232 (ASTM A 153). Ensure end caps for poles or mast arms are constructed of cast aluminum conforming to Aluminum Alloy 356.0F.

Provide a circular anchor bolt lock plate that will be secured to the anchor bolts at the embedded end with 2 washers and 2 nuts. Provide a base plate template that matches the bolt circle diameter of the anchor bolt lock plate. Construct plates and templates from 1/4" minimum thick steel with a minimum width of 4". Galvanizing is not required for both plates.

Provide 4 heavy hex nuts and 4 flat washers for each anchor bolt. For nuts, use AASHTO M291 grade 2H, DH, or DH3 or equivalent material. For flat washers, use AASHTO M293 or equivalent material.

C. Construction Methods:

Erect signal support poles only after concrete has attained a minimum allowable compressive strength of 3000 psi. Install anchor rod assemblies in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* provision.

For further construction methods, see construction methods for Metal Strain Pole, or Metal Pole with Mast Arm.

Connect poles to grounding electrodes and bond them to the electrical service grounding electrodes.

For holes in the poles used to accommodate cables, install grommets before wiring pole or arm. Do not cut or split grommets.

Attach the terminal compartment cover to the pole by a sturdy chain or cable. Ensure the chain or cable is long enough to permit the cover to hang clear of the compartment opening when the cover is removed, and is strong enough to prevent vandalism. Ensure the chain or cable will not interfere with service to the cables in the pole base.

Attach cap to pole with a sturdy chain or cable. Ensure the chain or cable is long enough to permit the cap to hang clear of the opening when the cap is removed.

Perform repair of damaged galvanizing that complies with the *Standard Specifications*, Article 1076-7 "Repair of Galvanizing."

Install galvanized wire mesh around the perimeter of the base plate to cover the gap between the base plate and top of foundation for debris and pest control.

Install a 1/4" thick plate for concrete foundation tag to include: concrete grade, depth, diameter, and reinforcement sizes of the installed foundation.

4.2. METAL POLE UPRIGHTS (VERTICAL MEMBERS)**A. Materials:**

- Provide tapered tubular shafts and fabricated of steel conforming to ASTM A-595 Grade A or an approved equivalent.

- Hot-dip galvanize poles in accordance with AASHTO M 111 or an approved equivalent.
- Have shafts that are continuously welded for the entire length by the submerged arc process, and with exposed welds ground or rolled smooth and flush with the base metal. Provide welding that conforms to Article 1072-18 of the *Standard Specification* except that no field welding on any part of the pole will be permitted.
- Have Shafts with no circumferential welds except at the lower end joining the shaft to the base.
- Have anchor bases for steel poles fabricated from plate steel meeting as a minimum the requirements of ASTM A 36M or cast steel meeting the requirements of ASTM A 27M Grade 485-250 or an approved equivalent.

Provide a grounding lug(s) in the approximate vicinity of the messenger cable clamp for bonding and grounding messenger cable. Lugs must accept #4 or #6 AWG wire to bond messenger cables to the pole in order to provide an effective ground fault circuit path. Refer to Metal Pole Standard Drawing Sheet M6 for construction details.

Have poles permanently stamped above the hand holes with the identification tag details as shown on Metal Pole Standard Drawing Sheet M2.

Provide liquid tight flexible metal conduit (Type LFMC), liquid tight flexible nonmetallic conduit (Type LFNC), high density polyethylene conduit (Type HDPE), or approved equivalent to isolate conductors feeding luminaires.

Fabricate poles from a single piece of steel or aluminum with single line seam weld with no transverse butt welds. Fabrication of two ply pole shafts is unacceptable with the exception of fluted shafts. Provide tapers for all shafts that begin at base and that have diameters which decrease uniformly at the rate of not more than 0.14 inch per foot (11.7 millimeters per meter) of length.

Provide four anchor nuts and four washers for each anchor bolt. Ensure that anchor bolts have required diameters, lengths, and positions, and will develop strengths comparable to their respective poles.

Provide a terminal compartment with cover and screws in each pole that encompasses the hand hole and contains a 12-terminal barrier type terminal block. Provide two terminal screws with a removable shorting bar between them for each termination. Furnish terminal compartment covers attached to the pole by a sturdy chain or cable approved by the Engineer. Ensure that the chain or cable is long enough to permit the cover to hang clear of the compartment opening when the cover is removed, and is strong enough to prevent vandals from being able to disconnect the cover from the pole. Ensure that the chain or cable will not interfere with service to the cables in the pole base.

Install grounding lugs that will accept #4 or #6 AWG wire to electrically bond messenger cables to the pole. Refer to Metal Pole Standard Drawing Sheet M6 for construction details.

For each pole, provide a 1/2 inch minimum thread diameter, coarse thread stud and nut for grounding which will accommodate #6 AWG ground wire. Ensure that the lug is electrically bonded to the pole and is conveniently located inside the pole at the hand hole.

Provide a removable pole cap with stainless steel attachment screws for the top of each pole. Ensure that the cap is cast aluminum conforming to Aluminum Association Alloy 356.0F. Furnish cap attached to the pole with a sturdy chain or cable approved by the Engineer. Ensure that the chain

or cable is long enough to permit the cap to hang clear of the pole-top opening when the cap is removed.

When required by the plans, furnish couplings 42 inches above the bottom of the base for mounting of pedestrian pushbuttons. Provide mounting points consisting of 1-1/2 inch internally threaded half-couplings that comply with the NEC and that are mounted within the poles. Ensure that couplings are essentially flush with the outside surfaces of the poles and are installed before any required galvanizing. Provide a threaded plug in each mounting point. Ensure that the surface of the plug is essentially flush with the outer end of the mounting point when installed and has a recessed hole to accommodate a standard wrench.

4.3. STRAIN POLE SHAFTS

Provide 2 messenger cable (span wire) clamps and associated hardware for attachment of messenger cable. Ensure that diameter of the clamp is appropriate to its location on the pole and is appropriately designed to be adjustable from 1'-6" below the top, down to 6'-6" below the top of the pole. Do not attach more than one support cable to a messenger cable clamp.

Provide a minimum of three (3) 2 inch (50 mm) holes equipped with an associated coupling and weatherhead on the messenger cable load side of the pole to accommodate passage of signal cables from inside the pole. Provide galvanized threaded plugs for all unused couplings at pole entrance points. Refer to Metal Pole Standard Drawing Sheet M3 for fabrication details.

Ensure that allowable pole deflection does not exceed that allowed per 5th Edition AASHTO. Ensure maximum deflection at the top of the pole does not exceed 2.5 percent of the pole height.

4.4. MAST ARM POLE SHAFTS

Ensure that allowable pole deflection does not exceed that allowed per 5th Edition AASHTO. Ensure that maximum angular rotation of the top of the mast arm pole does not exceed 1 degree 40 minutes (1°40').

A. Construction Methods:

Install metal poles, hardware, and fittings as shown on the manufacturer's installation drawings. Install metal poles so that when the pole is fully loaded it is within 1 degree 40 minutes (1°40') of vertical. Install poles with the manufacturer's recommended "rake." Use threaded leveling nuts to establish rake if required.

4.5. MAST ARMS

Provide pole plates and associated gussets and fittings for attachment of required mast arms. As part of each mast arm attachment, provide a cable passage hole in the pole to allow passage of signal cables from the pole to the arm.

Ensure that allowable mast arm deflection does not exceed that allowed per 5th Edition AASHTO. Also when arm is fully loaded, tip of the arm shall not go below the arm attachment point with the pole for all load conditions per 5th Edition AASHTO.

Furnish all arm plates and necessary attachment hardware, including bolts and brackets.

Provide two extra bolts for each arm.

Provide grommet holes on the arms to accommodate cables for the signals.

Provide arms with weatherproof connections for attaching to the shaft of the pole.

Provide hardware that is galvanized steel, stainless steel, or corrosive-resistant aluminum.

Provide a removable end cap with stainless steel attachment screws for the end of each mast arm. Ensure that the cap is cast aluminum conforming to Aluminum Association Alloy 356.0F. Furnish cap attached to the arm with a sturdy chain or cable approved by the Engineer. Ensure that the chain or cable is long enough to permit the cap to hang clear of the arm end opening when the cap is removed.

Comply with the following for Steel Luminaire Arms:

- In addition to tapered tube, luminaire arms may be standard weight black steel pipe conforming to ASTM A 53-90a, Type E or Type S, Grade B or an approved equivalent.
- Conform to the welding requirements of the steel poles.
- After all fabricating, cutting, punching, and welding are completed, luminaire arms should be hot-dipped galvanized inside and outside.
- In accordance with the National Electrical Code (NEC) Article 230.2(E), provide identification of the electrical source provider for the luminaire feeder circuit with contact information on a permanent label located in the pole hand hole in the vicinity of the feeder circuit raceway.

A. Materials:

After all fabricating, cutting, punching, and welding are completed, hot-dip galvanize the structure in accordance with the AASHTO M 111 or an approved equivalent.

B. Construction Methods:

Install horizontal-type arms with sufficient manufactured rise to keep arm from deflecting below the arm attachment height.

Attach cap to the mast arm with a sturdy chain or cable. Ensure that the chain or cable is long enough to permit the cap to hang clear of the arm opening when the cap is removed.

For mast arm poles, use full penetration welds with back-up ring at the pole base and at the arm base connection.

4.6. DRILLED PIER FOUNDATIONS FOR METAL TRAFFIC SIGNAL POLES

Analysis procedures and formulas shall be based on AASHTO 5th Edition, latest ACI code and the *Drilled Shafts: Construction Procedures and Design Methods* FHWA-IF99-025 manual. Design methods based on engineering publications or research papers needs to have prior approval from NCDOT. The Department reserves the right to accept or disapprove any method used for the analysis.

Use a Factor of Safety of 1.33 for torsion and 2.0 for bending for the foundation design.

Foundation design for lateral load shall not exceed 1" lateral deflection at top of foundation.

For lateral analysis, use LPILE Plus V6.0 or later. Inputs, results and corresponding graphs are to be submitted with the design calculations.

Skin Friction is to be calculated using the α -method for cohesive soils and the β -method for cohesion-less soils (**Bröms method will not be accepted**). Detailed descriptions of the " α " and " β " methods can be found in *FHWA-IF-99-025*.

Omit first 2.5ft for cohesive soils when calculating skin friction.

When extreme loading and poor soil conditions are encountered, the one diameter length omitted from the shaft depth calculations (per FHWA-1F-99-025) may be added back in for Torsion calculations (with prior NCDOT approval).

When hammer efficiency is not provided, assume a value of 0.70.

Design all custom foundations to carry the maximum capacity of each metal pole. For standard case strain poles only, if a custom foundation is designed, use the shear, axial and moment reactions from the Standard Foundation Selection Table shown on Standard Drawing Nos. M8 and M9.

When poor soil conditions are encountered which could create an excessively large foundation design, consideration may be given to allowing an exemption to the maximum capacity design. The contractor must gain approval from the engineer before reducing a foundation's capacity. On projects where poor soil is known to be present, it is advisable that the contractor consider getting foundations approved before releasing poles for fabrication.

Have the contractor notify the engineer if the proposed foundation is to be installed on a slope other than 8H: 1V or flatter.

A. Description:

Furnish and install foundations for NCDOT metal poles with all necessary hardware in accordance with the plans and specifications.

Metal Pole Standards have been developed and implemented by NCDOT for use at signalized intersections in North Carolina. If the plans call for a standard pole, then a standard foundation may be selected from the plans. However, the Contractor is not required to use a standard foundation. If the Contractor chooses to design a non-standard site-specific foundation for a standard pole or if the plans call for a non-standard site-specific pole, design the foundation to conform to the applicable provisions in the NCDOT Metal Pole Standard Drawings and Section B7 (Non-Standard Foundation Design) below. If non-standard site specific foundations are designed for standard QPL approved strain poles, the foundation designer must use the design moment specified by load case on Metal Pole Standard Drawing Sheets M8 and M9. Failure to conform to this requirement will be grounds for rejection of the design.

If the Contractor chooses to design a non-standard foundation for a standard pole and the soil test results indicate a standard foundation is feasible for the site, the Contractor will be paid the cost of the standard foundation (drilled pier and wing wall, if applicable). Any additional costs associated with a non-standard site-specific foundation including additional materials, labor and equipment will be considered incidental to the cost of the standard foundation. All costs for the non-standard foundation design will also be considered incidental to the cost of the standard foundation.

B. Soil Test and Foundation Determination:

4. General:

Drilled piers are reinforced concrete sections, cast-in-place against in situ, undisturbed material. Drilled piers are of straight shaft type and vertical.

Some standard drilled piers for supporting poles with mast arms may require wing walls to resist torsional rotation. Based upon this provision and the results of the required soil test, a drilled pier length and wing wall requirement may be determined and constructed in accordance with the plans.

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For non-standard site-specific poles, the contractor-selected pole fabricator will determine if the addition of wing walls is necessary for the supporting foundations.

5. Soil Test:

Perform a soil test at each proposed metal pole location. Complete all required fill placement and excavation at each signal pole location to finished grade before drilling each boring. Soil tests performed that are not in compliance with this requirement may be rejected and will not be paid. Drill one boring to a depth of 26 feet within a 25 foot radius of each proposed foundation.

Perform standard penetration tests (SPT) in accordance with ASTM D 1586 at depths of 1, 2.5, 5, 7.5, 10, 15, 20 and 26 feet. Discontinue the boring if one of the following occurs:

- A total of 100 blows have been applied in any 2 consecutive 6-in. intervals.
- A total of 50 blows have been applied with < 3-in. penetration.

Describe each intersection as the "Intersection of (*Route or SR #*), (*Street Name*) and (*Route or SR #*), (*Street Name*), _____ County, Signal Inventory No. ____". Label borings with "B- *N, S, E, W, NE, NW, SE or SW*" corresponding to the quadrant location within the intersection. Pole numbers should be made available to the Drill Contractor. Include pole numbers in the boring label if they are available. If they are not available, ensure the boring labels can be cross-referenced to corresponding pole numbers. For each boring, submit a legible (hand written or typed) boring log signed and sealed by a licensed Geologist or Professional Engineer registered in North Carolina. Include on each boring the SPT blow counts and N-values at each depth, depth of the boring, hammer efficiency, depth of water table and a general description of the soil types encountered using the AASHTO Classification System.

6. Standard Foundation Determination:

Use the following method for determining the Design N-value:

$$N_{AVG} = \frac{(N@1' + N@2.5' + \dots + N@Deepest \text{ Boring Depth})}{\text{Total Number of N-values}}$$

$$Y = (N@1')^2 + (N@2.5')^2 + \dots + (N@Deepest \text{ Boring Depth})^2$$

$$Z = (N@1' + N@2.5' + \dots + N@Deepest \text{ Boring Depth})$$

$$N_{STD \text{ DEV}} = \left(\frac{(\text{Total Number of N-values} \times Y) - Z^2}{(\text{Total Number of N-values}) \times (\text{Total Number of N-values} - 1)} \right)^{0.5}$$

Design N-value equals lesser of the following two conditions:

$$N_{AVG} - (N_{STD \text{ DEV}} \times 0.45)$$

Or

$$\text{Average of First Four N-Values} = \frac{(N@1' + N@2.5' + N@5' + N@7.5')}{4}$$

Note: If less than 4 N-values are obtained because of criteria listed in Section 2 above, use average of N-values collected for second condition. Do not include the N-value at the deepest boring depth for above calculations if the boring is discontinued at or before the required boring depth because of criteria listed in Section 2 above. Use N-value of zero for weight of hammer or weight of rod. If N-value is greater than 50, reduce N-value to 50 for calculations.

If standard NCDOT strain poles are shown on the plans and the Contractor chooses to use standard foundations, determine a drilled pier length, "L," for each signal pole from the Standard Foundations Chart (sheet M 8) based on the Design N-value and the predominant soil type. For each standard pole location, submit a completed "Metal Pole Standard Foundation Selection Form" signed by the Contractor's representative. Signature on form is for verification purposes only. Include the Design N-value calculation and resulting drilled pier length, "L," on each form.

If non-standard site-specific poles are shown on the plans, submit completed boring logs collected in accordance with Section 2 (Soil Test) above along with pole loading diagrams from the plans to the contractor-selected pole fabricator to assist in the pole and foundation design.

If one of the following occurs, the Standard Foundations Chart shown on the plans may not be used and a non-standard foundation may be required. In such case, contact the Engineer.

- The Design N-value is less than 4.
- The drilled pier length, "L", determined from the Standard Foundations Chart, is greater than the depth of the corresponding boring.

In the case where a standard foundation cannot be used, the Department will be responsible for the additional cost of the non-standard foundation.

Foundation designs are based on level ground around the traffic signal pole. If the slope around the edge of the drilled pier is steeper than 8:1 (H:V) or the proposed foundation will be less than 10 feet from the top of an embankment slope, the Contractor is responsible for providing slope information to the foundation designer and to the Engineer so it can be considered in the design.

The "Metal Pole Standard Foundation Selection Form" may be found at:

<http://www.ncdot.gov/doh/preconstruct/highway/geotech/formdet/misc/MetalPole.pdf>

If assistance is needed, contact the Engineer.

7. Non-Standard Foundation Design:

Design non-standard foundations based upon site-specific soil test information collected in accordance with Section 2 (Soil Test) above. Design drilled piers for side resistance only in accordance with Section 4.6 of the *AASHTO Standard Specifications for Highway Bridges*. Use the computer software LPILE version-6.0 or later manufactured by Ensoft, Inc. to analyze drilled piers. Use the computer software gINT V8i or later manufactured by Bentley Systems, Inc. with the current NCDOT gINT library and data template to produce SPT boring logs. Provide a drilled pier foundation for each pole with a length and diameter that result in a horizontal lateral movement of less than 1 inch at the top of the pier and a horizontal rotational movement of less than 1 inch at the edge of the pier. Contact the Engineer for pole loading diagrams for standard poles to be used for

non-standard foundation designs. Submit any non-standard foundation designs including drawings, calculations, and soil boring logs to the Engineer for review and approval before construction.

C. Drilled Pier Construction:

Construct drilled pier foundations in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* provision.

4.7. CUSTOM DESIGN OF TRAFFIC SIGNAL SUPPORTS

A. General:

Design traffic signal supports with foundations consisting of metal strain poles or metal poles with mast arms.

The lengths of the metal signal poles shown on the plans are estimated from available data for bid purposes. Determine the actual length of each pole from field measurements and adjusted cross-sections. Furnish the revised pole heights to the Engineer. Use all other dimensional requirements shown on the plans.

Ensure each pole includes an identification tag with information and location positions as defined on Metal Pole Standard Drawing Sheets M2, M3 and M4. All pole shaft tags must include the NCDOT Inventory number followed by the pole number shown on the traffic signal or ITS (non-signalized locations) plan.

Design all traffic signal support structures using the following 5th Edition AASHTO specifications:

- Design for a 50 year service life as recommended by Table 3-3.
- Use the wind pressure map developed from 3-second gust speeds, as provided in Article 3.8.
- Ensure signal support structures include natural wind gust loading and truck-induced gust loading in the fatigue design, as provided for in Articles 11.7.3 and 11.7.4, respectively. Designs need not consider periodic galloping forces.
- Assume the natural wind gust speed in North Carolina is 11.2 mph. For natural wind fatigue stress calculations, utilize a drag coefficient (C_d) computed for 11.2 mph wind velocity and not the basic wind speed velocity.
- Design for Category II fatigue, as provided for in Article 11.6, unless otherwise specified.
- Calculate all stresses using applicable equations from Section 5. The Maximum allowable stress ratios for all signal support designs are 0.9.
- Conform to article 10.4.2 and 11.8 for all deflection requirements.

Ensure that the design permits cables to be installed inside poles and mast arms.

Unless otherwise specified by special loading criteria, the computed surface area for ice load on signal heads is:

- 3-section, 12-inch, Surface area: 26.0 ft² (17.0 ft² without back plate)
- 4-section, 12-inch, Surface area: 32.0 ft² (21.0 ft² without back plate)
- 5-section, 12-inch, Surface area: 42.0 ft² (29.0 ft² without back plate)

The ice loading for signal heads defined above includes the additional surface area that back plates will induce. Special loading criteria may be specified in instances where back plates will not be installed on signal heads. Refer to the Loading Schedule on each Metal Pole Loading Diagram for revised signal head surface areas. The pole designer should revise ice loads accordingly in this instance. Careful examination of the plans when this is specified is important as this may impact sizing of the metal support structure and foundation design which could affect proposed bid quotes. All maximum stress ratios of 0.9 still apply.

Assume the combined minimum weight of a messenger cable bundle (including messenger cable, signal cable and detector lead-in cables) is 1.3 lbs/ft. Assume the combined minimum diameter of this cable bundle is 1.3 inches.

Ensure that designs provide a removable pole cap with stainless steel attachment screws for each pole top and mast arm end.

B. Metal Poles:

Submit design drawings for approval including pre-approved QPL pole drawings. Show all the necessary details and calculations for the metal poles including the foundation and connections. Include NCDOT inventory number on design drawings. Include as part of the design calculations the ASTM specification numbers for the materials to be used. Provide the types and sizes of welds on the design drawings. Include a Bill of Materials on design drawings. Ensure design drawings and calculations are signed, dated, and sealed by the responsible professional engineer licensed in the state of North Carolina. Immediately bring to the attention of the Engineer any structural deficiency that becomes apparent in any assembly or member of any assembly as a result of the design requirements imposed by these specifications, the plans, or the typical drawings. Said Professional Engineer is wholly responsible for the design of all poles and arms. Review and acceptance of these designs by the Department does not relieve the said Professional Engineer of his responsibility. **Do not fabricate the assemblies until receipt of the Department's approval of the design drawings.**

For mast arm poles, provide designs with provisions for pole plates and associated gussets and fittings for mast arm attachment. As part of each mast arm attachment, provide a grommited 2" diameter hole on the shaft side of the connection to allow passage of the signal cables from the pole to the arm.

Where ice is present, assume wind loads as shown in Figure 3-5 of the 5th Edition AASHTO Specification for Group III loading.

For each strain pole, provide two messenger cable clamps and associated hardware to attach the messenger support cable. Ensure that the diameter of the clamps is appropriately designed to be adjustable from 1'-6" inches below the top, down to 6'-6" below the top of the pole. Do not attach more than one messenger support cable to a messenger cable clamp.

Provide a grounding lug(s) in the approximate vicinity of the messenger cable clamp for bonding and grounding messenger cable. Lugs must accept #4 or #6 AWG wire to bond messenger cables to the pole in order to provide an effective ground fault circuit path. Refer to Metal Pole Standard Drawing Sheet M6 for construction details.

Design tapers for all pole shafts that begin at the base with diameters that decrease uniformly at the rate of 0.14 inch per foot of length.

Design a base plate on each pole. The minimum base plate thickness for all poles is determined by the following criteria:

Case 1 Circular or rectangular solid base plate with the upright pole welded to the top surface of base plate with full penetration butt weld, and where no stiffeners are provided. A base plate with a small center hole, which is less than 1/3 of the upright diameter, and located concentrically with the upright pole, may be considered as a solid base plate.

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

M = bending moment at the critical section of the base plate induced by one anchor bolt

P = anchoring force of each anchor bolt

D_1 = horizontal distance between the anchor bolt center and the outer face of the upright, or the difference between the bolt circle radius and the outside radius of the upright

Locate the critical section at the face of the anchor bolt and perpendicular to the bolt circle radius. The overlapped part of two adjacent critical sections is considered ineffective.

Case 2 Circular or rectangular base plate with the upright pole socketed into and attached to the base plate with two lines of fillet weld, and where no stiffeners are provided, or any base plate with a center hole that is larger in diameter than 1/3 of the upright diameter.

The magnitude of bending moment induced by the anchoring force of each anchor bolt is $M = P \times D_2$,

where P = anchoring force of each anchor bolt

D_2 = horizontal distance between the face of the upright and the face of the anchor bolt nut

Locate the critical section at the face of the anchor bolt top nut and perpendicular to the radius of the bolt circle. The overlapped part of two adjacent critical sections is considered ineffective.

If the base plate thickness calculated for Case 2 is less than Case 1, use the thickness calculated for Case 1.

The following additional owner requirements apply concerning pole base plates.

- Ensure that whichever case governs as defined above, the anchor bolt diameter is set to match the base plate thickness. If the minimum diameter required for the anchor bolt exceeds the thickness required for the base plate, set the base plate thickness equal to the required bolt diameter.
- For dual mast arm supports, or for single mast arm supports 50' or greater, use a minimum 8 bolt orientation with 2" diameter anchor bolts, and a 2" thick base plate.
- For all metal poles with mast arms, use a full penetration groove weld with a backing ring to connect the pole upright component to the base. Refer to Metal Pole Standard Drawing Sheet M4.

Ensure that designs have anchor bolt holes with a diameter 1/4 inch larger than the anchor bolt diameters in the base plate.

Ensure that the anchor bolts have the required diameters, lengths, and positions, and will develop strengths comparable to their respective poles.

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Provide designs with a 6 x 12-inch hand hole with a reinforcing frame for each pole.

Provide designs with a terminal compartment with cover and screws in each pole that encompasses the hand hole and contains provisions for a 12-terminal barrier type terminal block.

For each pole, provide designs with provisions for a 1/2 inch minimum thread diameter, coarse thread stud and nut for grounding which will accommodate a #6 AWG ground wire. Ensure the lug is electrically bonded to the pole and is conveniently located inside the pole at the hand hole.

When required, design couplings on the pole for mounting pedestrian pushbuttons at a height of 42 inches above the bottom of the base. Provide mounting points consisting of 1-1/2 inch internally threaded half-couplings that comply with the NEC that are mounted within the poles. Ensure the couplings are essentially flush with the outside surfaces of the poles and are installed before any required galvanizing. Provide a threaded plug for each half coupling. Ensure that the surface of the plug is essentially flush with the outer end of the mounting point when installed and has a recessed hole to accommodate a standard wrench.

C. Mast Arms:

Design all arm plates and necessary attachment hardware, including bolts and brackets as required by the plans.

Design for grommets holes on the arms to accommodate the cables for the signals if specified.

Design arms with weatherproof connections for attaching to the shaft of the pole.

Always use a full penetration groove weld with a backing ring to connect the mast arm to the pole. Refer to Metal Pole Standard Drawing Sheet M5.

Capacity of tapped flange plate must be sufficient to develop the full capacity of the connecting bolts. In all cases the flange plate of both arm and shaft must be at least as thick as the arm connecting bolts are in diameter.

4.8. METAL SIGNAL POLE REMOVALS**A. Description:**

Remove and salvage existing metal signal poles including mast arms, and remove and dispose of existing foundations, associated anchor bolts, electrical wires and connections.

B. Construction Methods:**1. Foundations:**

Remove and promptly dispose of the metal signal pole foundations including reinforcing steel, electrical wires, and anchor bolts to a minimum depth of two feet below the finished ground elevation. At the Contractor's option, remove the complete foundation.

2. Metal Poles:

Remove and salvage the metal signal poles. Promptly transport the metal signal poles from the project and deliver to the owner as directed by the Engineer. Use methods to remove the metal signal poles and attached traffic signal equipment that will not result in damage to other portions of the project or facility. Repair damages that are a result of the Contractor's actions at no additional cost to the Department.

Backfill and compact disturbed areas to match the finished ground elevation. Seed unpaved areas.

Use methods to remove the foundations that will not result in damage to other portions of the project or facility. Repair damages that are a result of the Contractor's actions at no cost to the Department.

4.9. POLE NUMBERING SYSTEM

A. New Poles

Attach an identification tag to each pole shaft and mast arm section as shown on Metal Pole Standard Drawing Sheet M2 "Typical Fabrication Details Common To All Metal Poles".

4.10. MEASUREMENT AND PAYMENT

Actual number of metal strain signal poles (without regard to height or load capacity) furnished, installed and accepted.

Actual number of metal poles with single mast arms furnished, installed, and accepted.

Actual number of soil tests with SPT borings drilled furnished and accepted.

Actual volume of concrete poured in cubic yards of drilled pier foundation furnished, installed and accepted.

Actual number of designs for mast arms with metal poles furnished and accepted.

Actual number of metal signal pole foundations removed and disposed.

Actual number of metal signal poles removed and salvaged.

No measurement will be made for foundation designs prepared with metal pole designs, as these will be considered incidental to designing signal support structures.

Payment will be made under:

Metal Strain Signal Pole.....	Each
Metal Pole with Single Mast Arm	Each
Soil Test.....	Each
Drilled Pier Foundation	Cubic Yard
Mast Arm with Metal Pole Design	Each
Metal Pole Foundation Removal	Each
Metal Pole Removal.....	Each

5. CONTROLLERS WITH CABINETS

5.1. MATERIALS – TYPE 2070L CONTROLLERS

Conform to CALTRANS *Transportation Electrical Equipment Specifications* (TEES) (dated August 16, 2002, plus Errata 1 dated October 27, 2003 and Errata 2 dated June 08, 2004) except as required herein.

Furnish Model 2070L controllers. Ensure that removal of the CPU module from the controller will place the intersection into flash.

The Department will provide software at the beginning of the burning-in period. Contractor shall give 5 working days notice before needing software. Program software provided by the Department.

Provide model 2070L controllers with the latest version of OS9 operating software and device drivers, composed of the unit chassis and at a minimum the following modules and assemblies:

- MODEL 2070 1B, CPU Module, Single Board
- MODEL 2070-2A, Field I/O Module (FI/O)
 - Note: Configure the Field I/O Module to disable both the External WDT Shunt/Toggle Switch and SP3 (SP3 active indicator is "off")
- MODEL 2070-3B, Front Panel Module (FP), Display B (8x40)
- MODEL 2070-4A, Power Supply Module, 10 AMP
- MODEL 2070-7A, Async Serial Com Module (9-pin RS-232)

Furnish one additional MODEL 2070-7A, Async Serial Com Module (9-pin RS-232) for all master controller locations.

For each master location and central control center, furnish a U.S. Robotics V.92 or approved equivalent auto-dial/auto-answer external modem to accomplish the interface to the Department-furnished microcomputers. Include all necessary hardware to ensure telecommunications.

5.2.MATERIALS – GENERAL CABINETS

Provide a moisture resistant coating on all circuit boards.

Provide one 20 mm diameter radial lead UL-recognized metal oxide varistor (MOV) between each load switch field terminal and equipment ground. Electrical performance is outlined below.

PROPERTIES OF MOV SURGE PROTECTOR	
Maximum Continuous Applied Voltage at 185° F	150 VAC (RMS) 200 VDC
Maximum Peak 8x20µs Current at 185° F	6500 A
Maximum Energy Rating at 185° F	80 J
Voltage Range 1 mA DC Test at 77° F	212-268 V
Max. Clamping Voltage 8x20µs, 100A at 77° F	395 V
Typical Capacitance (1 MHz) at 77° F	1600 pF

Provide a power line surge protector that is a two-stage device that will allow connection of the radio frequency interference filter between the stages of the device. Ensure that a maximum continuous current is at least 10A at 120V. Ensure that the device can withstand a minimum of 20 peak surge current occurrences at 20,000A for an 8x20 microsecond waveform. Provide a maximum

clamp voltage of 395V at 20,000A with a nominal series inductance of 200 μ h. Ensure that the voltage does not exceed 395V. Provide devices that comply with the following:

Frequency (Hz)	Minimum Insertion Loss (dB)
60	0
10,000	30
50,000	55
100,000	50
500,000	50
2,000,000	60
5,000,000	40
10,000,000	20
20,000,000	25

5.3. MATERIALS – TYPE 170E CABINETS

A. Type 170 E Cabinets General:

Conform to the city of Los Angeles' Specification No. 54-053-08, *Traffic Signal Cabinet Assembly Specification* (dated July 2008), except as required herein.

Furnish model 336S pole mounted cabinets configured for 8 vehicle phases, 4 pedestrian phases, and 6 overlaps. Do not reassign load switches to accommodate overlaps unless shown on electrical details. Provide 336S pole mounted cabinets that are 46" high with 40" high internal rack assemblies.

Furnish model 332 base mounted cabinets configured for 8 vehicle phases, 4 pedestrian phases, and 6 overlaps. When overlaps are required, provide auxiliary output files for the overlaps. Do not reassign load switches to accommodate overlaps unless shown on electrical details.

Provide model 200 load switches, model 222 loop detector sensors, model 252 AC isolators, and model 242 DC isolators according to the electrical details. As a minimum, provide one (1) model 2018 conflict monitor, one (1) model 206L power supply unit, two (2) model 204 flashers, one (1) DC isolator (located in slot I14), and four (4) model 430 flash transfer relays (provide seven (7) model 430 flash transfer relays if auxiliary output file is installed) with each cabinet.

B. Type 170 E Cabinet Electrical Requirements:

Provide a cabinet assembly designed to ensure that upon leaving any cabinet switch or conflict monitor initiated flashing operation, the controller starts up in the programmed start up phases and start up interval.

Furnish two sets of non-fading cabinet wiring diagrams and schematics in a paper envelope or container and placed in the cabinet drawer.

All AC+ power is subject to radio frequency signal suppression.

Provide surge suppression in the cabinet for each type of cabinet device. Provide surge protection for the full capacity of the cabinet input file. Provide surge suppression devices that operate properly over a temperature range of -40° F to +185° F. Ensure the surge suppression devices provide both common and differential modes of protection.

Provide a pluggable power line surge protector that is installed on the back of the PDA (power distribution assembly) chassis to filter and absorb power line noise and switching transients. Ensure the device incorporates LEDs for failure indication and provides a dry relay contact closure for the purpose of remote sensing. Ensure the device meets the following specifications:

Peak Surge Current (Single pulse, 8x20µs).....20,000A
Occurrences (8x20µs waveform).....10 minimum @ 20,000A
Maximum Clamp Voltage.....395VAC
Operating Current.....15 amps
Response Time.....< 5 nanoseconds

Provide a loop surge suppressor for each set of loop terminals in the cabinet. Ensure the device meets the following specifications:

Peak Surge Current (6 times, 8x20µs)
(Differential Mode).....400A
(Common Mode).....1,000A
Occurrences (8x20µs waveform).....500 min @ 200A
Maximum Clamp Voltage
(Differential Mode @400A).....35V
(Common Mode @1,000A).....35V
Response Time.....< 5 nanoseconds
Maximum Capacitance.....35 pF

Provide a data communications surge suppressor for each communications line entering or leaving the cabinet. Ensure the device meets the following specifications:

Peak Surge Current (Single pulse, 8x20µs).....10,000A
Occurrences (8x20µs waveform).....100 min @ 2,000A
Maximum Clamp Voltage.....Rated for equipment protected

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Response Time.....	< 1 nanosecond
Maximum Capacitance.....	1,500 pF
Maximum Series Resistance.....	15Ω

Provide a DC signal surge suppressor for each DC input channel in the cabinet. Ensure the device meets the following specifications:

Peak Surge Current (Single pulse, 8x20μs).....	10,000A
Occurrences (8x20μs waveform).....	100 @ 2,000A
Maximum Clamp Voltage.....	30V
Response Time.....	< 1 nanosecond

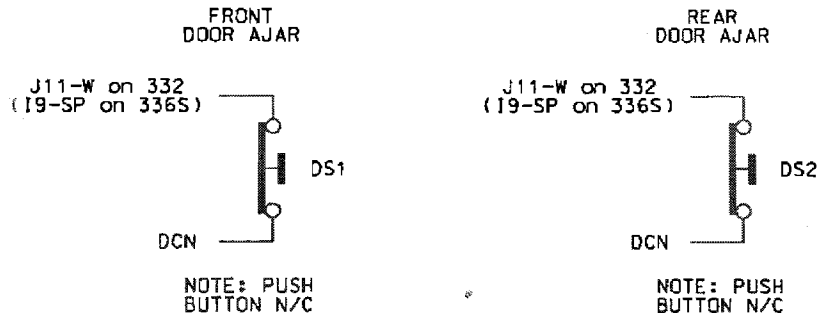
Provide a 120 VAC signal surge suppressor for each AC+ interconnect signal input. Ensure the device meets the following specifications:

Peak Surge Current (Single pulse, 8x20μs).....	20,000A
Maximum Clamp Voltage.....	350VAC
Response Time.....	< 200 nanoseconds
Discharge Voltage.....	<200 Volts @ 1,000A
Insulation Resistance.....	≥100 MΩ

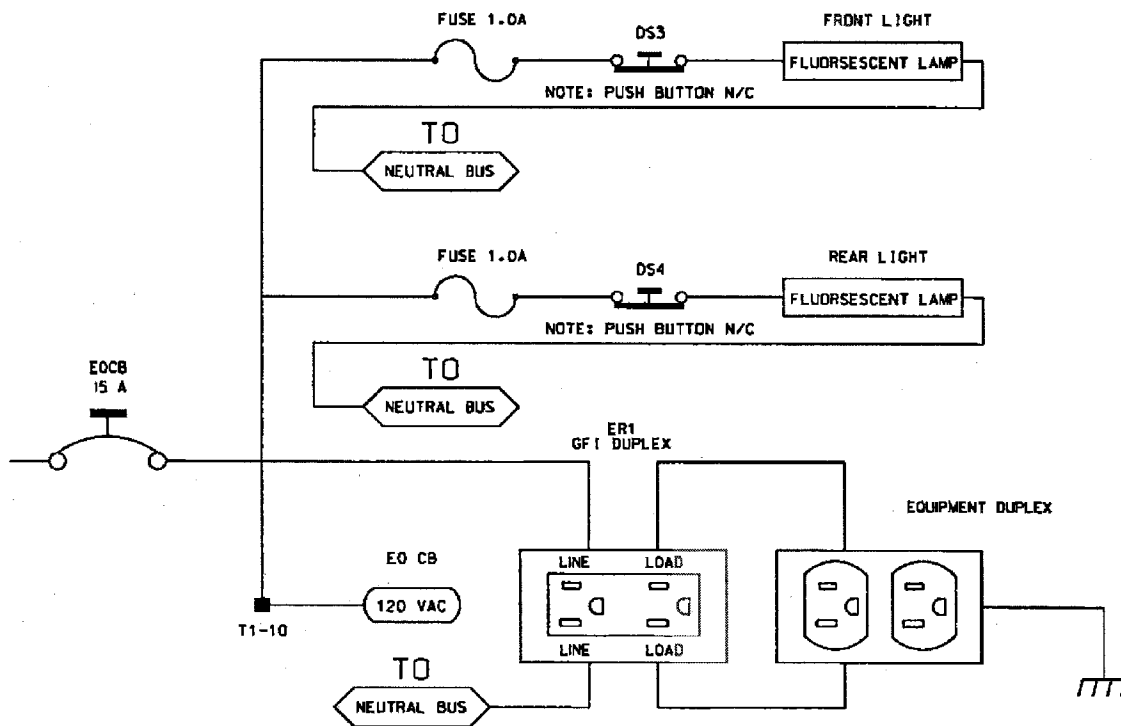
Provide conductors for surge protection wiring that are of sufficient size (ampacity) to withstand maximum overcurrents which could occur before protective device thresholds are attained and current flow is interrupted.

If additional surge protected power outlets are needed to accommodate fiber transceivers, modems, etc., install a UL listed, industrial, heavy-duty type power outlet strip with a minimum rating of 15 A / 125 VAC, 60 Hz. Provide a strip that has a minimum of 3 grounded outlets. Ensure the power outlet strip plugs into one of the controller unit receptacles located on the rear of the PDA. Ensure power outlet strip is mounted securely; provide strain relief if necessary.

Provide a door switch in the front and a door switch in the rear of the cabinet that will provide the controller unit with a Door Ajar alarm when either the front or the rear door is open. Ensure the door switches apply DC ground to the Input File when either the front door or the rear door is open.



Furnish a fluorescent fixture in the rear across the top of the cabinet and another fluorescent fixture in the front across the top of the cabinet at a minimum. Ensure that the fixtures provide sufficient light to illuminate all terminals, labels, switches, and devices in the cabinet. Conveniently locate the fixtures so as not to interfere with a technician's ability to perform work on any devices or terminals in the cabinet. Provide a protective diffuser to cover exposed bulbs. Install 16 watt T-4 lamps in the fluorescent fixtures. Provide a door switch to provide power to each fixture when the respective door is open. Wire the fluorescent fixtures to the 15 amp ECB (equipment circuit breaker).



Furnish a police panel with a police panel door. For model 336S cabinets, mount the police panel on the rear door. Ensure that the police panel door permits access to the police panel when the main door is closed. Ensure that no rainwater can enter the cabinet even with the police panel door open. Provide a police panel door hinged on the right side as viewed from the front. Provide a police panel

door lock that is keyed to a standard police/fire call box key. In addition to the requirements of LA Specification No. 54-053-08, provide the police panel with a toggle switch connected to switch the intersection operation between normal stop-and-go operation (AUTO) and manual operation (MANUAL). Ensure that manual control can be implemented using inputs and software such that the controller provides full programmed clearance times for the yellow clearance and red clearance for each phase while under manual control.

Provide a 1/4-inch locking phone jack in the police panel for a hand control to manually control the intersection. Provide sufficient room in the police panel for storage of a hand control and cord.

Ensure the 336S cabinet Input File is wired as follows:

336S Cabinet														
Port-Bit/C-1 Pin Assignment														
Slot #	1	2	3	4	5	6	7	8	9	10	11	12	13	14
C-1 (Spares)	59	60	61	62	63	64	65	66	75	76	77	78	79	80
Port	3-2	1-1	3-4	1-3	3-1	1-2	3-3	1-4	2-5	5-5	5-6	5-1	5-2	6-7
C-1	56	39	58	41	55	40	57	42	51	71	72	67	68	81
Port	2-1	1-5	2-3	1-7	2-2	1-6	2-4	1-8	2-6	5-7	5-8	5-3	5-4	6-8
C-1	47	43	49	45	48	44	50	46	52	73	74	69	70	82

For model 332 base mounted cabinets, ensure terminals J14-E and J14-K are wired together on the rear of the Input File. Connect TB9-12 (J14 Common) on the Input Panel to T1-2 (AC-) on the rear of the PDA.

Provide detector test switches mounted at the top of the cabinet rack or other convenient location which may be used to place a call on each of eight phases based on the chart below. Provide three positions for each switch: On (place call), Off (normal detector operation), and Momentary On (place momentary call and return to normal detector operation after switch is released). Ensure that the switches are located such that the technician can read the controller display and observe the intersection.

Connect detector test switches for cabinets as follows:

336S Cabinet		332 Cabinet	
Detector Call Switches	Terminals	Detector Call Switches	Terminals
Phase 1	I1-F	Phase 1	I1-W
Phase 2	I2-F	Phase 2	I4-W
Phase 3	I3-F	Phase 3	I5-W
Phase 4	I4-F	Phase 4	I8-W
Phase 5	I5-F	Phase 5	J1-W
Phase 6	I6-F	Phase 6	J4-W
Phase 7	I7-F	Phase 7	J5-W
Phase 8	I8-F	Phase 8	J8-W

Provide the PCB 28/56 connector for the conflict monitor unit (CMU) with 28 independent contacts per side, dual-sided with 0.156 inch contact centers. Provide the PCB 28/56 connector contacts with solder eyelet terminations. Ensure all connections to the PCB 28/56 connector are soldered to the solder eyelet terminations.

Ensure that all cabinets have the CMU connector wired according to the 332 cabinet connector pin assignments (include all wires for auxiliary output file connection). Wire pins 13, 16, R, and U of the CMU connector to a separate 4 pin plug, P1, as shown below. Provide a second plug, P2, which will mate with P1 and is wired to the auxiliary output file as shown below. Provide an additional plug, P3, which will mate with P1 and is wired to the pedestrian yellow circuits as shown below. When no auxiliary output file is installed in the cabinet, provide wires for the green and yellow inputs for channels 11, 12, 17, and 18, the red inputs for channels 17 and 18, and the wires for the P2 plug. Terminate the two-foot wires with ring type lugs, insulated, and bundled for optional use.

PIN	P1		P2		P3	
	FUNCTION	CONN TO	FUNCTION	CONN TO	FUNCTION	CONN TO
1	CH-9G	CMU-13	OLA-GRN	A123	2P-YEL	114
2	CH-9Y	CMU-16	OLA-YEL	A122	4P-YEL	105
3	CH-10G	CMU-R	OLB-GRN	A126	6P-YEL	120
4	CH-10Y	CMU-U	OLB-YEL	A125	8P-YEL	111

Do not provide the P20 terminal assembly (red monitor board) or red interface ribbon cable as specified in LA Specification No. 54-053-08.

Provide a P20 connector that mates with and is compatible with the red interface connector mounted on the front of the conflict monitor. Ensure that the P20 connector and the red interface

connector on the conflict monitor are center polarized to ensure proper connection. Ensure that removal of the P20 connector will cause the conflict monitor to recognize a latching fault condition and place the cabinet into flashing operation.

Wire the P20 connector to the output file and auxiliary output file using 22 AWG stranded wires. Ensure the length of these wires is a minimum of 42 inches in length. Provide a durable braided sleeve around the wires to organize and protect the wires.

Wire the P20 connector to the traffic signal red displays to provide inputs to the conflict monitor as shown below. Ensure the pedestrian Don't Walk circuits are wired to channels 13 through 16 of the P20 connector. When no auxiliary output file is installed in the cabinet, provide wires for channels 9 through 12 reds. Provide a wire for special function 1. Terminate the unused wires with ring type lugs, insulated, and bundled for optional use.

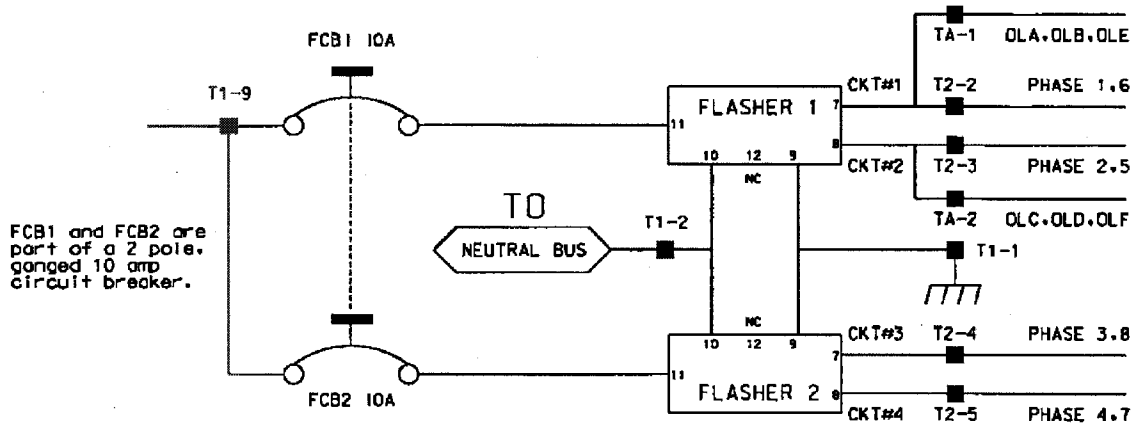
P20 Connector					
PIN	FUNCTION	CONN TO	PIN	FUNCTION	CONN TO
1	Channel 15 Red	119	2	Channel 16 Red	110
3	Channel 14 Red	104	4	Chassis GND	01-9
5	Channel 13 Red	113	6	N/C	
7	Channel 12 Red	AUX 101	8	Spec Function 1	
9	Channel 10 Red	AUX 124	10	Channel 11 Red	AUX 114
11	Channel 9 Red	AUX 121	12	Channel 8 Red	107
13	Channel 7 Red	122	14	Channel 6 Red	134
15	Channel 5 Red	131	16	Channel 4 Red	101
17	Channel 3 Red	116	18	Channel 2 Red	128
19	Channel 1 Red	125	20	Red Enable	01-14

Ensure the controller unit outputs to the auxiliary output file are pre-wired to the C5 connector. When no auxiliary output file is installed in the cabinet, connect the C5 connector to a storage socket located on the Input Panel or on the rear of the PDA.

Do not wire pin 12 of the load switch sockets.

In addition to the requirements of LA Specification No. 54-053-08, ensure relay K1 on the Power Distribution Assembly (PDA) is a four pole relay and K2 on the PDA is a two pole relay.

Provide a two pole, ganged circuit breaker for the flash bus circuit. Ensure the flash bus circuit breaker is an inverse time circuit breaker rated for 10 amps at 120 VAC with a minimum of 10,000 RMS symmetrical amperes short circuit current rating. Do not provide the auxiliary switch feature on the flash bus circuit breaker. Ensure the ganged flash bus circuit breaker is certified by the circuit breaker manufacturer to provide gang tripping operation.



Ensure auxiliary output files are wired as follows:

AUXILIARY OUTPUT FILE	
TERMINAL BLOCK TA ASSIGNMENTS	
POSITION	FUNCTION
1	Flasher Unit #1, Circuit 1/FTR1 (OLA, OLB)/FTR3 (OLE)
2	Flasher Unit #1, Circuit 2/FTR2 (OLC, OLD)/FTR3 (OLF)
3	Flash Transfer Relay Coils
4	AC -
5	Power Circuit 5
6	Power Circuit 5
7	Equipment Ground Bus
8	NC

Provide four spare load resistors mounted in each cabinet. Ensure each load resistor is rated as shown in the table below. Wire one side of each load resistor to AC-. Connect the other side of each resistor to a separate terminal on a four (4) position terminal block. Mount the load resistors and terminal block either inside the back of Output File No. 1 or on the upper area of the Service Panel.

ACCEPTABLE LOAD RESISTOR VALUES	
VALUE (ohms)	WATTAGE
1.5K – 1.9 K	25W (min)
2.0K – 3.0K	10W (min)

Provide Model 200 load switches, Model 204 flashers, Model 242 DC isolators, Model 252 AC isolators, and Model 206L power supply units that conform to CALTRANS' *"Transportation Electrical Equipment Specifications"* dated March 12, 2009 with Erratum 1.

C. Type 170 E Cabinet Physical Requirements:

Do not mold, cast, or scribe the name "City of Los Angeles" on the outside of the cabinet door as specified in LA Specification No. 54-053-08. Do not provide a Communications Terminal Panel as specified in LA Specification No. 54-053-08. Do not provide terminal block TBB on the Service Panel. Do not provide Cabinet Verification Test Program software or associated test jigs as specified in LA Specification No. 54-053-08.

Furnish unpainted, natural, aluminum cabinet shells. Ensure that all non-aluminum hardware on the cabinet is stainless steel or a Department approved non-corrosive alternate.

Ensure the lifting eyes, gasket channels, police panel, and all supports welded to the enclosure and doors are fabricated from 0.125 inch minimum thickness aluminum sheet and meet the same standards as the cabinet and doors.

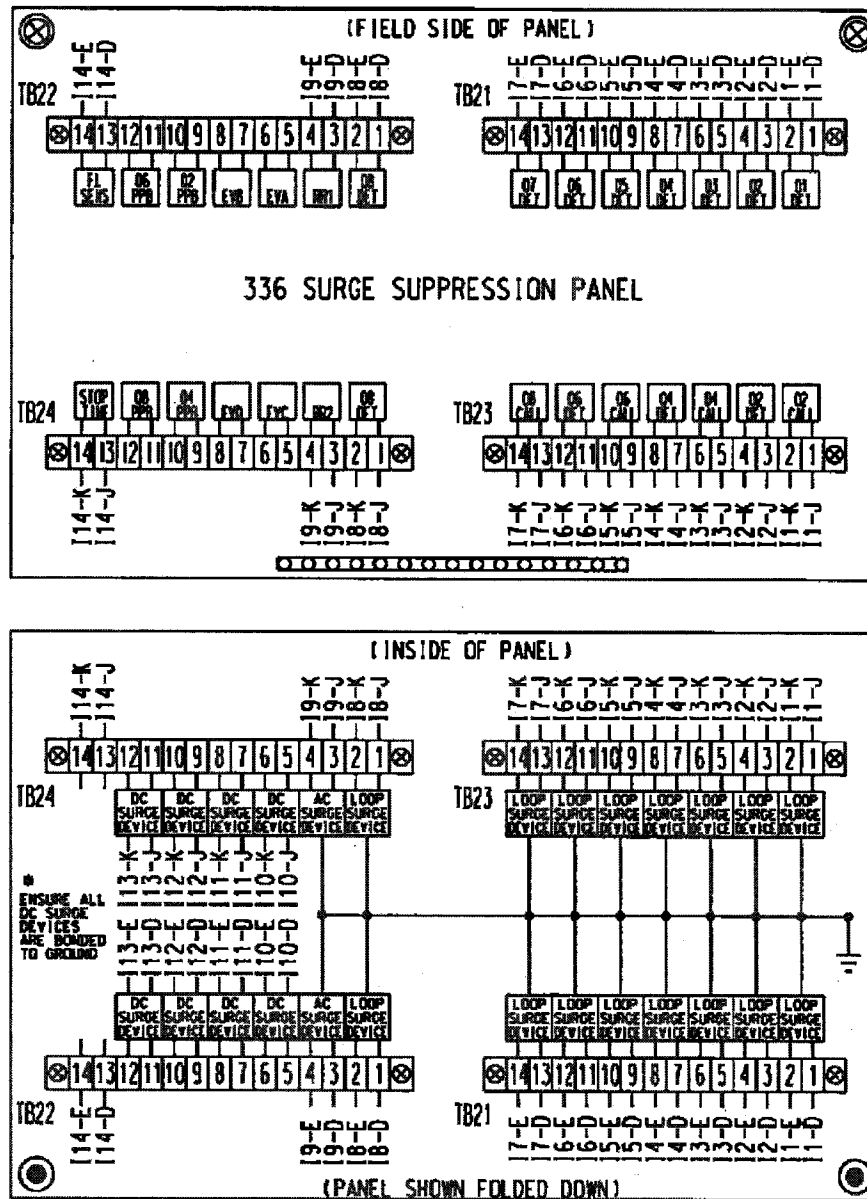
Provide front and rear doors with latching handles that allow padlocking in the closed position. Furnish 0.75 inch minimum diameter stainless steel handles with a minimum 0.5 inch shank. Place the padlocking attachment at 4.0 inches from the handle shank center to clear the lock and key. Provide an additional 4.0 inches minimum gripping length.

Provide Corbin #2 locks on the front and rear doors. Provide one (1) Corbin #2 and one (1) police master key with each cabinet. Ensure main door locks allow removal of keys in the locked position only.

Provide a surge protection panel with 16 loop surge protection devices and designed to allow sufficient free space for wire connection/disconnection and surge protection device replacement. For model 332 cabinets, provide an additional 20 loop surge protection devices. Provide an additional two AC+ interconnect surge devices to protect one slot and eight DC surge protection devices to protect four slots. Provide no protection devices on slot I14.

For pole mounted cabinets, mount surge protection devices for the AC+ interconnect inputs, inductive loop detector inputs, and low voltage DC inputs on a swing down panel assembly fabricated from sturdy aluminum. Attach the swing down panel to the bottom rear cabinet rack assembly using thumb screws. Ensure the swing down panel allows for easy removal of the input file without removing the surge protection panel assembly or its parts. Have the surge protection devices mounted horizontally on the panel and soldered to the feed through terminals of four 14 position terminal blocks with #8 screws mounted on the other side. Ensure the top row of terminals is connected to the upper slots and the bottom row of terminals is connected to the bottom slots. Provide a 15 position copper equipment ground bus attached to the field terminal side (outside) of

the swing down panel for termination of loop lead-in shield grounds. Ensure that a Number 4 AWG green wire connects the surge protection panel assembly ground bus to the main cabinet equipment ground.



For base mounted cabinets, mount surge protection panels on the left side of the cabinet as viewed from the rear. Attach each panel to the cabinet rack assembly using bolts and make it easily removable. Mount the surge protection devices in vertical rows on each panel and connect the

devices to one side of 12 position, double row terminal blocks with #8 screws. For each surge protection panel, terminate all grounds from the surge protection devices on a copper equipment ground bus attached to the surge protection panel. Wire the terminals to the rear of a standard input file using spade lugs for input file protection.

Provide permanent labels that indicate the slot and the pins connected to each terminal that may be viewed from the rear cabinet door. Label and orient terminals so that each pair of inputs is next to each other. Indicate on the labeling the input file (I or J), the slot number (1-14) and the terminal pins of the input slots (either D & E for upper or J & K for lower).

Provide a minimum 14 x 16 inch pull out, hinged top shelf located immediately below controller mounting section of the cabinet. Ensure the shelf is designed to fully expose the table surface outside the controller at a height approximately even with the bottom of the controller. Ensure the shelf has a storage bin interior which is a minimum of 1 inch deep and approximately the same dimensions as the shelf. Provide an access to the storage area by lifting the hinged top of the shelf. Fabricate the shelf and slide from aluminum or stainless steel and ensure the assembly can support the 2070L controller plus 15 pounds of additional weight. Ensure shelf has a locking mechanism to secure it in the fully extended position and does not inhibit the removal of the 2070L controller or removal of cards inside the controller when fully extended. Provide a locking mechanism that is easily released when the shelf is to be returned to its non-use position directly under the controller.

D. Model 2018 Enhanced Conflict Monitor:

Furnish Model 2018 Enhanced Conflict Monitors that provide monitoring of 18 channels. Ensure each channel consists of a green, yellow, and red field signal input. Ensure that the conflict monitor meets or exceeds CALTRANS' Transportation Electrical Equipment Specifications dated March 12, 2009 with Erratum 1 (hereafter referred to as CALTRANS' 2009 TEES) for a model 210 monitor unit and other requirements stated in this specification.

Ensure the conflict monitor is provided with an 18 channel conflict programming card. Pin EE and Pin T of the conflict programming card shall be connected together. Pin 16 of the conflict programming card shall be floating. Ensure that the absence of the conflict programming card will cause the conflict monitor to trigger (enter into fault mode), and remain in the triggered state until the programming card is properly inserted and the conflict monitor is reset.

Provide a conflict monitor that incorporates LED indicators into the front panel to dynamically display the status of the monitor under normal conditions and to provide a comprehensive review of field inputs with monitor status under fault conditions. Ensure that the monitor indicates the channels that were active during a conflict condition and the channels that experienced a failure for all other per channel fault conditions detected. Ensure that these indications and the status of each channel are retained until the Conflict Monitor is reset. Furnish LED indicators for the following:

- AC Power (Green LED indicator)
- VDC Failed (Red LED indicator)
- WDT Error (Red LED indicator)
- Conflict (Red LED indicator)
- Red Fail (Red LED indicator)
- Dual Indication (Red LED indicator)

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- Yellow/Clearance Failure (Red LED indicator)
- PCA/PC Ajar (Red LED indicator)
- Monitor Fail/Diagnostic Failure (Red LED indicator)
- 54 Channel Status Indicators (1 Red, 1 Yellow, and 1 Green LED indicator for each of the 18 channels)

Provide a switch to set the Red Fail fault timing. Ensure that when the switch is in the ON position the Red Fail fault timing value is set to 1350 +/- 150ms (2018 mode). Ensure that when the switch is in the OFF position the Red Fail fault timing value is set to 850 +/- 150ms (210 mode).

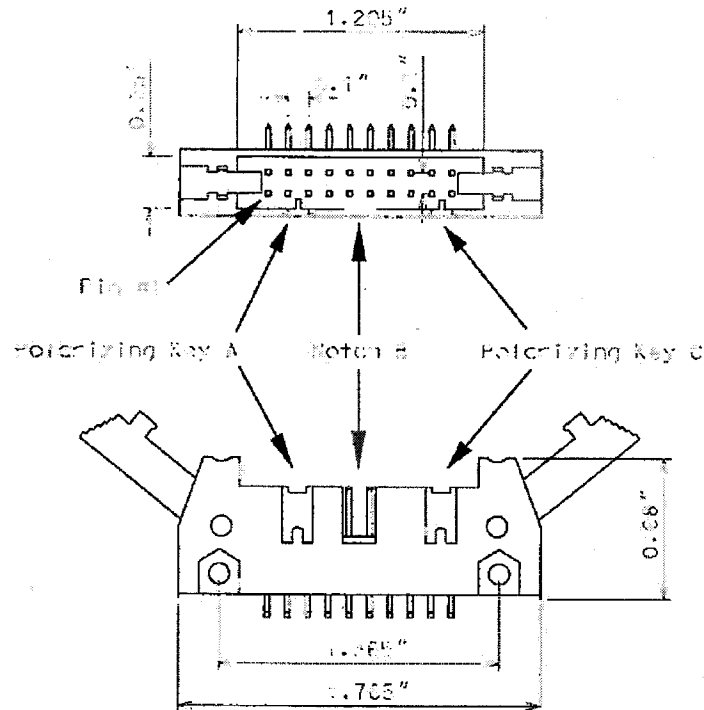
Provide a switch to set the Watchdog fault timing. Ensure that when the switch is in the ON position the Watchdog fault timing value is set to 1.0 +/- 0.1s (2018 mode). Ensure that when the switch is in the OFF position the Watchdog fault timing value is set to 1.5 +/- 0.1s (210 mode).

Provide a jumper or switch to set the AC line brown-out levels. Ensure that when the jumper is present or the switch is in the ON position the AC line dropout voltage threshold is 98 +/- 2 Vrms, the AC line restore voltage threshold is 103 +/- 2 Vrms, and the AC line brown-out timing value is set to 400 +/- 50ms (2018 mode). Ensure that when the jumper is not present or the switch is in the OFF position the AC line dropout voltage threshold is 92 +/- 2 Vrms, the AC line restore voltage threshold is 98 +/- 2 Vrms, and the AC line brown-out timing value is set to 80 +/- 17ms (210 mode).

Provide a jumper or switch that will enable and disable the Watchdog Latch function. Ensure that when the jumper is not present or the switch is in the OFF position the Watchdog Latch function is disabled. In this mode of operation, a Watchdog fault will be reset following a power loss, brownout, or power interruption. Ensure that when the jumper is present or the switch is in the ON position the Watchdog Latch function is enabled. In this mode of operation, a Watchdog fault will be retained until a Reset command is issued.

Provide a jumper that will reverse the active polarity for pin #EE (output relay common). Ensure that when the jumper is not present pin #EE (output relay common) will be considered 'Active' at a voltage greater than 70 Vrms and 'Not Active' at a voltage less than 50 Vrms (Caltrans mode). Ensure that when the jumper is present pin #EE (output relay common) will be considered 'Active' at a voltage less than 50 Vrms and 'Not Active' at a voltage greater than 70 Vrms (Failsafe mode).

In addition to the connectors required by CALTRANS' 2009 TEES, provide the conflict monitor with a red interface connector mounted on the front of the monitor. Ensure the connector is a 20 pin, right angle, center polarized, male connector with latching clip locks and polarizing keys. Ensure the right angle solder tails are designed for a 0.062" thick printed circuit board. Keying of the connector shall be between pins 3 and 5, and between 17 and 19. Ensure the connector has two rows of pins with the odd numbered pins on one row and the even pins on the other row. Ensure the connector pin row spacing is 0.10" and pitch is 0.10". Ensure the mating length of the connector pins is 0.24". Ensure the pins are finished with gold plating 30μ" thick.



Ensure the red interface connector pins on the monitor have the following functions:

Pin #	Function	Pin #	Function
1	Channel 15 Red	2	Channel 16 Red
3	Channel 14 Red	4	Chassis Ground
5	Channel 13 Red	6	Special Function 2
7	Channel 12 Red	8	Special Function 1
9	Channel 10 Red	10	Channel 11 Red
11	Channel 9 Red	12	Channel 8 Red
13	Channel 7 Red	14	Channel 6 Red
15	Channel 5 Red	16	Channel 4 Red
17	Channel 3 Red	18	Channel 2 Red
19	Channel 1 Red	20	Red Enable

Ensure that removal of the P20 cable connector will cause the conflict monitor to recognize a latching fault condition and place the cabinet into flashing operation.

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Provide Special Function 1 and Special Function 2 inputs to the unit which shall disable only Red Fail Monitoring when either input is sensed active. A Special Function input shall be sensed active when the input voltage exceeds 70 Vrms with a minimum duration of 550 ms. A Special Function input shall be sensed not active when the input voltage is less than 50 Vrms or the duration is less than 250 ms. A Special Function input is undefined by these specifications and may or may not be sensed active when the input voltage is between 50 Vrms and 70 Vrms or the duration is between 250 ms and 550 ms.

Ensure the conflict monitor recognizes field signal inputs for each channel that meet the following requirements:

- consider a Red input greater than 70 Vrms and with a duration of at least 500 ms as an "on" condition;
- consider a Red input less than 50 Vrms or with a duration of less than 200 ms as an "off" condition (no valid signal);
- consider a Red input between 50 Vrms and 70 Vrms or with a duration between 200 ms and 500 ms to be undefined by these specifications;
- consider a Green or Yellow input greater than 25 Vrms and with a duration of at least 500 ms as an "on" condition;
- consider a Green or Yellow input less than 15 Vrms or with a duration of less than 200 ms as an "off" condition; and
- consider a Green or Yellow input between 15 Vrms and 25 Vrms or with a duration between 200 ms and 500 ms to be undefined by these specifications.

Provide a conflict monitor that recognizes the faults specified by CALTRANS' 2009 TEES and the following additional faults. Ensure the conflict monitor will trigger upon detection of a fault and will remain in the triggered (in fault mode) state until the unit is reset at the front panel or through the external remote reset input for the following failures:

1. **Red Monitoring or Absence of Any Indication (Red Failure):** A condition in which no "on" voltage signal is detected on any of the green, yellow, or red inputs to a given monitor channel. If a signal is not detected on at least one input (R, Y, or G) of a conflict monitor channel for a period greater than 1000 ms when used with a 170 controller and 1500 ms when used with a 2070L controller, ensure monitor will trigger and put the intersection into flash. If the absence of any indication condition lasts less than 750 ms when used with a 170 controller and 1200 ms when used with a 2070L controller, ensure conflict monitor will not trigger. Red fail monitoring shall be enabled on a per channel basis by the use of switches located on the conflict monitor. Have red monitoring occur when all of the following input conditions are in effect:
 - a) Red Enable input to monitor is active (Red Enable voltages are "on" at greater than 70 Vrms, off at less than 50 Vrms, undefined between 50 and 70 Vrms), and
 - b) Neither Special Function 1 nor Special Function 2 inputs are active.

- c) Pin #EE (output relay common) is not active
2. **Short/Missing Yellow Indication Fault (Clearance Error):** Yellow indication following a green is missing or shorter than 2.7 seconds (with ± 0.1 -second accuracy). If a channel fails to detect an "on" signal at the Yellow input for a minimum of 2.7 seconds (± 0.1 second) following the detection of an "on" signal at a Green input for that channel, ensure that the monitor triggers and generates a clearance/short yellow error fault indication. Short/missing yellow (clearance) monitoring shall be enabled on a per channel basis by the use of switches located on the conflict monitor. This fault shall not occur when the channel is programmed for Yellow Inhibit, when the Red Enable signal is inactive or pin #EE (output relay common) is active.
 3. **Dual Indications on the Same Channel:** In this condition, more than one indication (R,Y,G) is detected as "on" at the same time on the same channel. If dual indications are detected for a period greater than 500 ms, ensure that the conflict monitor triggers and displays the proper failure indication (Dual Ind fault). If this condition is detected for less than 200 ms, ensure that the monitor does not trigger. G-Y-R dual indication monitoring shall be enabled on a per channel basis by the use of switches located on the conflict monitor. G-Y dual indication monitoring shall be enabled for all channels by use of a switch located on the conflict monitor. This fault shall not occur when the Red Enable signal is inactive or pin #EE (output relay common) is active.
 4. **Configuration Settings Change:** The configuration settings are comprised of (as a minimum) the permissive diode matrix, dual indication switches, yellow disable jumpers, any option switches, any option jumpers, and the Watchdog Enable switch. Ensure the conflict monitor compares the current configuration settings with the previous stored configuration settings on power-up, on reset, and periodically during operation. If any of the configuration settings are changed, ensure that the conflict monitor triggers and causes the program card indicator to flash. Ensure that configuration change faults are only reset by depressing and holding the front panel reset button for a minimum of three seconds. Ensure the external remote reset input does not reset configuration change faults.

Ensure the conflict monitor will trigger and the AC Power indicator will flash at a rate of $2 \text{ Hz} \pm 20\%$ with a 50% duty cycle when the AC Line voltage falls below the "drop-out" level. Ensure the conflict monitor will resume normal operation when the AC Line voltage returns above the "restore" level. Ensure the AC Power indicator will remain illuminated when the AC voltage returns above the "restore" level. Should an AC Line power interruption occur while the monitor is in the fault mode, then upon restoration of AC Line power, the monitor will remain in the fault mode and the correct fault and channel indicators will be displayed.

Provide a flash interval of at least 6 seconds and at most 10 seconds in duration following a power-up, an AC Line interruption, or a brownout restore. Ensure the conflict monitor will suspend all fault monitoring functions, close the Output relay contacts, and flash the AC indicator at a rate of $4 \text{ Hz} \pm 20\%$ with a 50% duty cycle during this interval. Ensure the termination of the flash interval after at least 6 seconds if the Watchdog input has made 5 transitions between the True and False state and the AC Line voltage is greater than the "restore" level. If the watchdog input has not made

5 transitions between the True and False state within 10 ± 0.5 seconds, the monitor shall enter a WDT error fault condition.

Ensure the conflict monitor will monitor an intersection with a minimum of four approaches using the four-section Flashing Yellow Arrow (FYA) vehicle traffic signal as outlined by the NCHRP 3-54 research project for protected-permissive left turn signal displays. Ensure the conflict monitor will operate in the FYA mode and FYAc (Compact) mode as specified below to monitor each channel for the following fault conditions: Conflict, Red Fail, Dual Indication, and Clearance. Provide a switch to select between the FYA mode and FYAc mode. Provide a switch to select each FYA phase movement for monitoring.

FYA mode

FYA Signal Head	Phase 1	Phase 3	Phase 5	Phase 7
Red Arrow	Channel 9 Red	Channel 10 Red	Channel 11 Red	Channel 12 Red
Yellow Arrow	Channel 9 Yellow	Channel 10 Yellow	Channel 11 Yellow	Channel 12 Yellow
Flashing Yellow Arrow	Channel 9 Green	Channel 10 Green	Channel 11 Green	Channel 12 Green
Green Arrow	Channel 1 Green	Channel 3 Green	Channel 5 Green	Channel 7 Green

FYAc mode

FYA Signal Head	Phase 1	Phase 3	Phase 5	Phase 7
Red Arrow	Channel 1 Red	Channel 3 Red	Channel 5 Red	Channel 7 Red
Yellow Arrow	Channel 1 Yellow	Channel 3 Yellow	Channel 5 Yellow	Channel 7 Yellow
Flashing Yellow Arrow	Channel 1 Green	Channel 3 Green	Channel 5 Green	Channel 7 Green
Green Arrow	Channel 9 Green	Channel 9 Yellow	Channel 10 Green	Channel 10 Yellow

Ensure that the conflict monitor will log at least nine of the most recent events detected by the monitor in non-volatile EEPROM memory (or equivalent). For each event, record at a minimum the time, date, type of event, status of each field signal indication with RMS voltage, and specific channels involved with the event. Ensure the conflict monitor will log the following events: monitor reset, configuration, previous fault, and AC line. Furnish the signal sequence log that shows all channel states (Greens, Yellows, and Reds) and the Red Enable State for a minimum of 2 seconds prior to the current fault trigger point. Ensure the display resolution of the inputs for the signal sequence log is not greater than 50 ms.

For conflict monitors used within an Ethernet communications system, provide a conflict monitor with an Ethernet 10/100 Mbps, RJ-45 port for data communication access to the monitor by a local notebook computer and remotely via a workstation or notebook computer device connected to the signal system local area network. The Ethernet port shall be electrically isolated from the conflict monitor's electronics and shall provide a minimum of 1500 Vrms isolation. Integrate monitor with Ethernet network in cabinet. Provide software to retrieve the time and date from a network server in order to synchronize the on-board times between the conflict monitor and the controller. Furnish and install the following Windows based, graphic user interface software on workstations and notebook computers where the signal system client software is installed: 1) software to view and retrieve all event log information, 2) software that will search and display a list of conflict monitor IP addresses and IDs on the network, and 3) software to change the conflict monitor's network parameters such as IP address and subnet mask.

For non-Ethernet connected monitors, provide a RS-232C/D compliant port (DB-9 female connector) on the front panel of the conflict monitor in order to provide communications from the conflict monitor to the 170/2070L controller or to a Department-furnished laptop computer. Electrically isolate the port interface electronics from all monitor electronics, excluding Chassis Ground. Ensure that the controller can receive all event log information through a controller Asynchronous Communications Interface Adapter (Type 170E) or Async Serial Comm Module (2070). Furnish and connect a serial cable from the conflict monitor's DB-9 connector to Comm Port 1 of the 2070 controller. Ensure conflict monitor communicates with the controller. Provide a Windows based graphic user interface software to communicate directly through the same monitor RS-232C/D compliant port to retrieve and view all event log information to a Department-furnished laptop computer. The RS-232C/D compliant port on the monitor shall allow the monitor to function as a DCE device with pin connections as follows:

Conflict Monitor RS-232C/D (DB-9 Female) Pinout		
Pin Number	Function	I/O
1	DCD	O
2	TX Data	O
3	RX Data	I
4	DTR	I
5	Ground	-
6	DSR	O
7	CTS	I
8	RTS	O
9	NC	-

MONITOR BOARD EDGE CONNECTOR

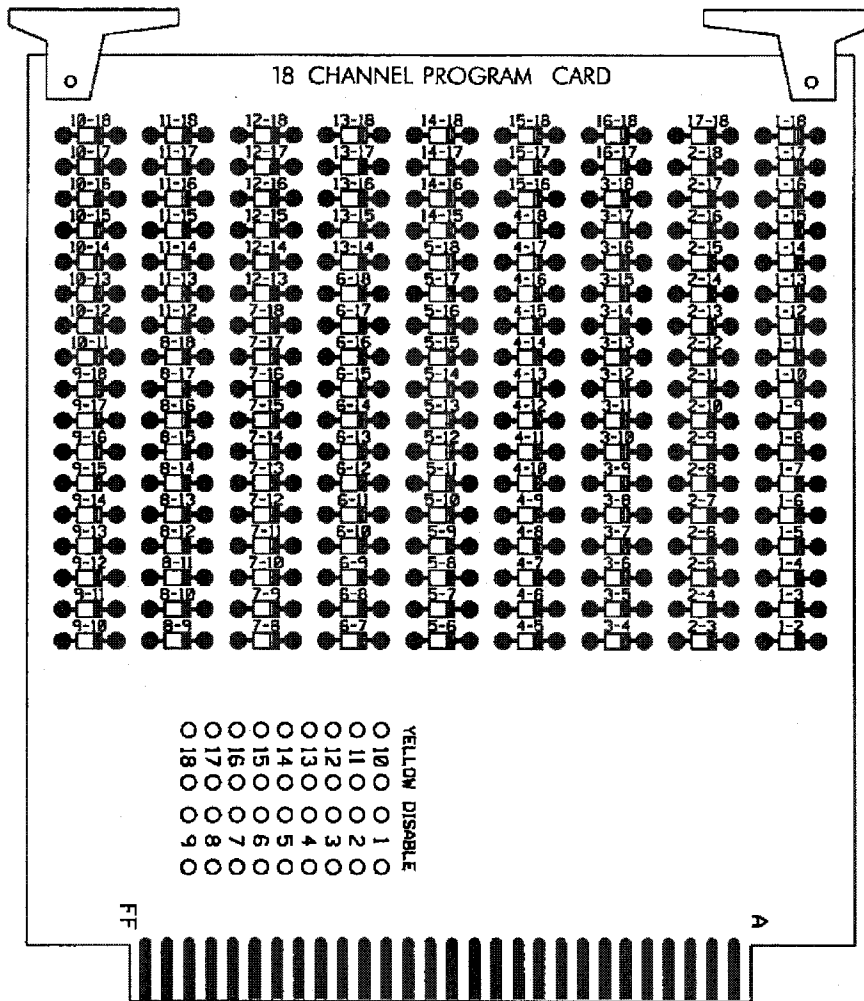
Pin #	Function (Back Side)	Pin #	Function (Component Side)
1	Channel 2 Green	A	Channel 2 Yellow
2	Channel 13 Green	B	Channel 6 Green
3	Channel 6 Yellow	C	Channel 15 Green
4	Channel 4 Green	D	Channel 4 Yellow
5	Channel 14 Green	E	Channel 8 Green
6	Channel 8 Yellow	F	Channel 16 Green
7	Channel 5 Green	H	Channel 5 Yellow
8	Channel 13 Yellow	J	Channel 1 Green
9	Channel 1 Yellow	K	Channel 15 Yellow
10	Channel 7 Green	L	Channel 7 Yellow
11	Channel 14 Yellow	M	Channel 3 Green
12	Channel 3 Yellow	N	Channel 16 Yellow
13	Channel 9 Green	P	Channel 17 Yellow
14	Channel 17 Green	R	Channel 10 Green
15	Channel 11 Yellow	S	Channel 11 Green
16	Channel 9 Yellow	T	Channel 18 Yellow
17	Channel 18 Green	U	Channel 10 Yellow
--		--	
18	Channel 12 Yellow	V	Channel 12 Green
19	Channel 17 Red	W	Channel 18 Red
20	Chassis Ground	X	Not Assigned
21	AC-	Y	DC Common
22	Watchdog Timer	Z	External Test Reset
23	+24VDC	AA	+24VDC
24	Tied to Pin 25	BB	Stop Time (Output)
25	Tied to Pin 24	CC	Not Assigned
26	Not Assigned	DD	Not Assigned
27	Relay Output, Side #3, N.O.	EE	Relay Output, Side #2, Common
28	Relay Output, Side #1, N.C.	FF	AC+

— Slotted for keying between Pins 17/U and 18/V

CONFLICT PROGRAM CARD PIN ASSIGNMENTS

Pin #	Function (Back Side)	Pin #	Function (Component Side)
1	Channel 2 Green	A	Channel 1 Green
2	Channel 3 Green	B	Channel 2 Green
3	Channel 4 Green	C	Channel 3 Green
4	Channel 5 Green	D	Channel 4 Green
5	Channel 6 Green	E	Channel 5 Green
6	Channel 7 Green	F	Channel 6 Green
7	Channel 8 Green	H	Channel 7 Green
8	Channel 9 Green	J	Channel 8 Green
9	Channel 10 Green	K	Channel 9 Green
10	Channel 11 Green	L	Channel 10 Green
11	Channel 12 Green	M	Channel 11 Green
12	Channel 13 Green	N	Channel 12 Green
13	Channel 14 Green	P	Channel 13 Green
14	Channel 15 Green	R	Channel 14 Green
15	Channel 16 Green	S	Channel 15 Green
16	N/C	T	PC AJAR
17	Channel 1 Yellow	U	Channel 9 Yellow
18	Channel 2 Yellow	V	Channel 10 Yellow
19	Channel 3 Yellow	W	Channel 11 Yellow
20	Channel 4 Yellow	X	Channel 12 Yellow
21	Channel 5 Yellow	Y	Channel 13 Yellow
22	Channel 6 Yellow	Z	Channel 14 Yellow
23	Channel 7 Yellow	AA	Channel 15 Yellow
24	Channel 8 Yellow	BB	Channel 16 Yellow
--		--	
25	Channel 17 Green	CC	Channel 17 Yellow
26	Channel 18 Green	DD	Channel 18 Yellow
27	Channel 16 Green	EE	PC AJAR (Program Card)
28	Yellow Inhibit Common	FF	Channel 17 Green

-- Slotted for keying between Pins 24/BB and 25/CC



E. Preemption and Sign Control Box

Provide preemption and sign control box to operate in a Model 332 and Model 336S cabinet. Provide hardware to mount the box to the cage of the cabinet to ensure the front side is facing the opposite side of the cabinet. Furnish the material of the box from a durable finished metallic or thermoplastic case. Ensure the size of the box is not greater than 7(l) x 5(w) x 5(d) inches. Ensure that no modification is necessary to mount the box on the cabinet cage.

Provide the following components in the preemption and sign control box: relays, fuses, terminal blocks, MOVs, resistor, RC network, lamp, and push button switch.

Provide UL Listed or Recognized relay K1 as a DPDT enclosed relay (120 VAC, 60 Hz coil) with an 8-pin octal-style plug and associated octal base. Provide contact material made of AgCdO with a 10 amp, 240 VAC rating. Ensure the relay has a specified pickup voltage of 102 VAC.

Provide relay SSR1 as a Triac SPST normally open solid state relay that is rated for 120 VAC input and zero-crossing (resistive load) 25 amp @ 120 VAC output. Ensure the relay turns on at 90 Vrms within 10 ms and turns off at 10 Vrms within 40 ms. Ensure the relay has physical

Signals & Intelligent Transportation Systems

characteristics as shown in the wiring detail in Figure 1. Provide 4 terminal screws with saddle clamps.

Provide fuses F1 and F2 as a UL Listed ¼" x 1-1/4" glass tube rated at 250 volts with a 10kA interrupting rating. Ensure F1 non-delay (fast-acting) and F2 slow-blow (time-delay) fuses have a maximum opening times of 60 minutes and 120 seconds for currents of 135 and 200 percent of the ampere rating, respectively. Ensure F2 slow-blow (time-delay) fuses have a minimum opening times of 12 seconds at 200 percent of the ampere rating. Provide fuse holders that are UL Recognized panel-mounted holders rated 250V, 15 ampere minimum with bayonet-type knobs which accept ¼" x 1-1/4" glass tube fuses.

Provide terminal blocks that are rated for 300V and are made of electrical grade thermoplastic or thermosetting plastic. Ensure each terminal block is of closed back design and has recessed-screw terminals with molded barriers between terminals. Ensure each terminal block is labeled with a block designation. Ensure each terminal is labeled with the function and a number.

Provide 3/4-inch diameter radial lead UL-recognized metal oxide varistors (MOVs) that have electrical performance as outlined below.

PROPERTIES OF MOV SURGE PROTECTOR	
Maximum Continuous Applied Voltage at 185° F	150 VAC (RMS) 200 VDC
Maximum Peak 8x20µs Current at 185° F	6500 A
Maximum Energy Rating at 185° F	80 J
Voltage Range 1 mA DC Test at 77° F	212-268 V
Max. Clamping Voltage 8x20µs, 100A at 77° F	395 V
Typical Capacitance (1 MHz) at 77° F	1600 pF

Provide resistor R1 as a 2K ohm, 12 watt, wirewound resistor with tinned terminals and attaching leads. Ensure the resistor is spaced apart from surrounding wires.

Provide a LED or incandescent lamp that has a voltage rating of 120 VAC with a minimum life rating at 50,000 hours.

Wire the preemption and sign control box as shown in Figure 1.

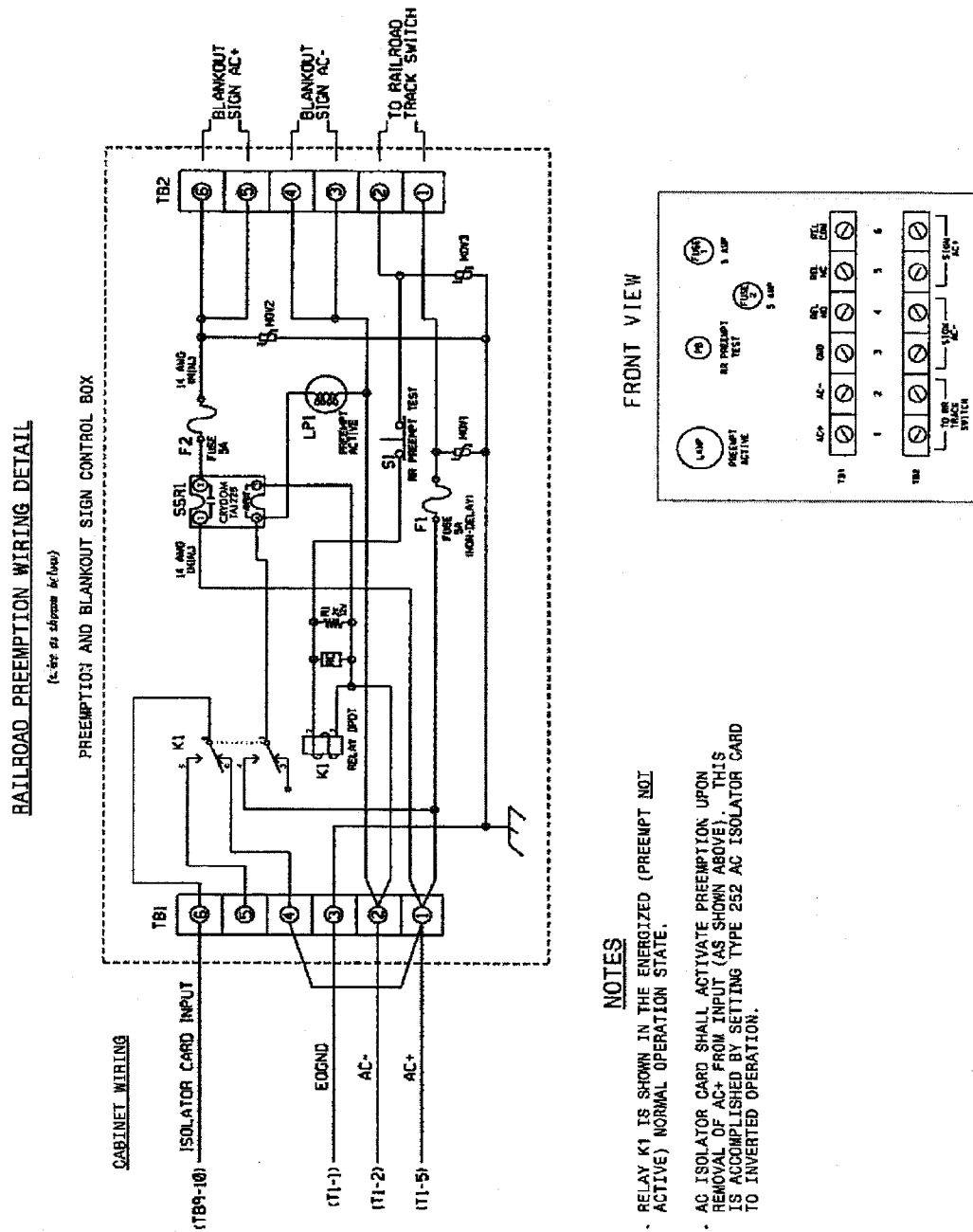


Figure 1

5.4. MATERIALS – TYPE 170 DETECTOR SENSOR UNITS

Furnish detector sensor units that comply with Chapter 5 Section 1, "General Requirements," and Chapter 5 Section 2, "Model 222 & 224 Loop Detector Sensor Unit Requirements," of the CALTRANS "Transportation Electrical Equipment Specifications" dated March 12, 2009 with Erratum 1.

5.5. MATERIALS – TYPE 2070E CONTROLLERS

Conform to CALTRANS *Transportation Electrical Equipment Specifications* (TEES) (dated March 12, 2009, plus Errata 1 dated January 21, 2010) except as required herein.

Furnish Model 2070E controllers. Ensure that removal of the CPU module from the controller will place the intersection into flash.

The Department will provide software at the beginning of the burning-in period. Contractor shall give 5 working days notice before needing software. Program software provided by the Department.

Provide Model 2070E controllers with the latest version of OS9 operating software and device drivers, composed of the unit chassis and at a minimum the following modules and assemblies:

- MODEL 2070-1E, CPU Module, Single Board, with 8Mb Datakey (blue in color)
- MODEL 2070-2A or approved MODEL 2070-2E, Field I/O Module (FI/O)
 - Note: Configure the Field I/O Module to disable both the External WDT Shunt/Toggle Switch and SP3 (SP3 active indicator is "off")
- MODEL 2070-3B, Front Panel Module (FP), Display B (8x40)
- MODEL 2070-4, Power Supply Module, 10 AMP
- MODEL 2070-7A, Async Serial Com Module (9-pin RS-232)

Furnish one additional MODEL 2070-7A, Async Serial Com Module (9-pin RS-232) for all master controller locations.

For each master location and central control center, furnish a U.S. Robotics V.92 or approved equivalent auto-dial/auto-answer external modem to accomplish the interface to the Department-furnished microcomputers. Include all necessary hardware to ensure telecommunications.

6. BACK PULL FIBER OPTIC CABLE**6.1. DESCRIPTION**

Back pull and store or back pull and reinstall existing communications cable.

6.1. CONSTRUCTION

During project construction where instructed to back pull existing aerial sections of fiber optic communications cable, de-lash the cable from the messenger cable and back pull the cable to a point where it can be stored or re-routed as shown on the plans. If instructed, remove and discard the existing messenger cable and pole mounting hardware once the cable is safely out of harm's way.

During project construction where instructed to back pull existing underground sections of fiber optic communications cable, back pull the cable to a point where it can be stored or re-routed as shown on the plans. If instructed, remove abandoned junction boxes and backfill with a suitable material to match the existing grade. Leave abandoned conduits in place unless otherwise noted.

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Where instructed, re-pull the fiber optic cable back along messenger cable or through conduit systems.

6.2. MEASUREMENT AND PAYMENT

Back Pull Fiber Optic Cable will be paid for as the actual linear feet of fiber optic cable back pulled and either stored or back pulled and rerouted. Payment is for the actual linear feet of cable back pulled.

No payment will be made for removing messenger cable and pole mounting hardware or removing junction boxes and back filling to match the surrounding grade as these items of work will be considered incidental to back pulling the fiber optic cable.

Payment will be made under:

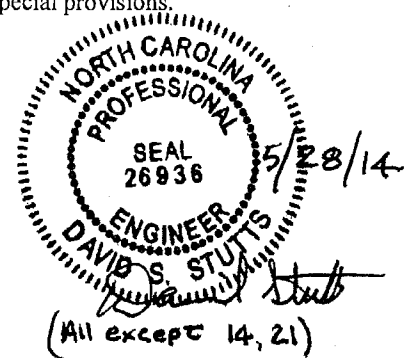
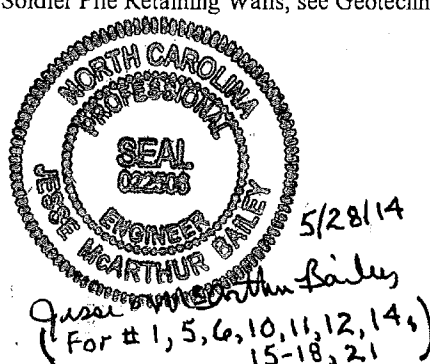
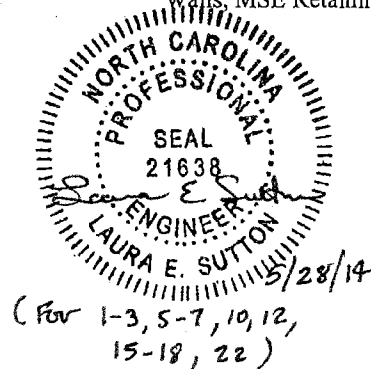
Back Pull Fiber Optic Cable Linear Feet

**Project Special Provisions
Structures**

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For Continuous Flight Auger Piles for Sound Barrier Walls, Continuous Flight Auger Piles for Visual Barrier Walls, MSE Retaining Walls, and Soldier Pile Retaining Walls, see Geotechnical special provisions.



PROJECT SPECIAL PROVISIONS
STRUCTURES

PROJECT U-2519CB

CUMBERLAND COUNTY

MAINTENANCE AND PROTECTION OF TRAFFIC
BENEATH PROPOSED STRUCTURE

(SPECIAL)

1.0 GENERAL

Maintain traffic on the travelways listed in Table 1 as shown in Traffic Control Plans and as directed by the Engineer.

Provide a minimum temporary vertical clearance as shown in Table 1 at all times during construction.

Table 1

STATION	OVER	MIN. VERT. CLR.
765+27.44 -L-	Cliffdale Rd.	17'-7 3/4" LT LN 16'-0 13/16" RT LN
969+51.52 -L-	N. Reilly Rd.	15'-0" LT 15'-0" RT
94+24.58 -L-	All American Freeway	19'-1" LT LN 17'-7" RT LN
57+07.00 -RP1DB-	-LP1D- -COL2- / -LP1B-	27'-3" 21'-11"
94+43.84 -COL1-	All American Freeway	17'-0"
42+10.23 -RP1B-	Tank Trail 3	17'-11"

Submit plans and calculations for review and approval for protecting traffic and bracing girders, as described herein, at the above station before beginning work at this location. Have the drawings and design calculations prepared, signed, and sealed by a North

Carolina Registered Professional Engineer. The approval of the Engineer will not relieve the Contractor of the responsibility for the safety of the method or equipment.

2.0 PROTECTION OF TRAFFIC

Protect traffic from any operation that affords the opportunity for construction materials, equipment, tools, etc. to be dropped into the path of traffic beneath the structure. Based on Contractor means and methods determine and clearly define all dead and live loads for this system, which, at a minimum, shall be installed between beams or girders over any travelway or shoulder area where traffic is maintained. Install the protective system before beginning any construction operations over traffic. In addition, for these same areas, keep the overhang falsework in place until after the rails have been poured.

3.0 BRACING GIRDERS

Brace girders to resist wind forces, weight of forms and other temporary loads, especially those eccentric to the vertical axis of the member during all stages of erection and construction. Before casting of intermediate diaphragms, decks, or connecting steel diaphragms do not allow the horizontal movement of girders to exceed ½ inch.

4.0 BASIS OF PAYMENT

Payment at the contract unit prices for the various pay items will be full compensation for the above work.

CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY (12-12-13)
ACCESS AT STATION 826+15.00 -L-, 898+20.00 -L-, 94+24.58 -L-,
57+07.00 -RP1DB-, 94+43.84 -COL1-, 45+07.87 -RP1C-

1.0 GENERAL

Construct, maintain, and remove the temporary access required to provide the working area necessary for construction of the new bridge, construction of the temporary detour structure, or for the removal of an existing bridge, as applicable. Temporary access may involve the use of a work bridge or other methods; however, all types of temporary access are required to meet the requirements of all permits, the Standard Specifications, and this Special Provision.

2.0 TEMPORARY WORK BRIDGE

At the contractor's option, construction of a temporary work bridge within the limits shown on the plans is permitted. The temporary work bridge shall have a minimum span length of 20 feet. Submit details of the temporary work bridge to the Engineer prior to constructing the work bridge to ensure conformance with the plans and all permits. Completely remove the temporary bridge prior to final acceptance or as otherwise required by the permits.

3.0 BASIS OF PAYMENT

The lump sum price bid for "Construction, Maintenance and Removal of Temporary Access at Station _____" will be full compensation for the above work, or other methods of access, including all material, work bridge components, equipment, tools, labor, disposal, and incidentals necessary to complete the work.

TEMPORARY BENTS**(9-30-11)**

When girder erection requires the use of temporary bents, design, construct, maintain and afterwards remove the temporary bents in accordance with the Standard Specifications and this Special Provision. For the purpose of this Special Provision, the term "temporary bents" includes girder erection temporary bents, vertical shoring and proprietary shoring systems.

Temporary bents for structures over railroads shall maintain a minimum horizontal clearance of 25' from center of track.

Design temporary bents in accordance with the 1995 AASHTO Guide Design Specification for Bridge Temporary Works (including the 2008 Interim Revisions) and the Project Special Provision entitled "Falsework and Formwork". The design calculations and detailed drawings of the structural components shall be signed and sealed by a North Carolina Registered Professional Engineer.

Submit design calculations and detailed drawings of temporary bents to the Engineer for review and approval. The detailed drawings shall show the position of the temporary bents in relationship to the existing travel way, the location of the temporary bents with respect to the ends of the girders, the top of support elevations for setting girders in the cambered position, and a girder erection procedure. For stream crossings, determine the bent stability assuming a scour depth equal to 250% of the pile diameter or width below the existing bed elevation. The Engineer may require a more detailed analysis of scour depth for temporary bents containing more than a single row of piles.

Include all material specifications for new and used materials in the detail drawings. In addition, show the location of the used materials indicating condition of the material, the location and geometry of existing but unused holes, attachments left over from previous use and any other irregularities in the material. Account for the condition of all used materials in the design calculations.

For all manufactured components, provide engineering data supplied by the manufacturer. For proprietary shoring systems, evaluate differential leg loading.

Provide access to all new and used materials for inspection prior to assembly.

Before the temporary bent is loaded, the contractor shall inspect the bent in the presence of the Engineer, and submit a written statement certifying that the erected bent complies with the approved detailed drawings. Any condition or material that does not comply with the accepted

drawings, or any other condition deemed unsatisfactory by the Engineer, is cause for rejection until corrections are made.

Remove temporary bents in such a manner as to permit the structure to uniformly and gradually take the stresses due to its own weight. During removal do not disturb or otherwise damage the finished work.

Unless otherwise specified, temporary bents will not be directly measured. Payment will be full compensation at the contract unit prices for the various pay items requiring temporary bents.

BRIDGE DECK RIDEABILITY AND GROOVING
AT STATION 57+07.00 -RP1BD-

(9-30-11)

1.0 GENERAL

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

2.0 TESTING REQUIREMENTS

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

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

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

At the beginning and end of each day's testing, and at other times determined to be necessary by the Engineer, operate the profilograph over a calibration strip so the Engineer can verify correct operation of the profilograph. The calibration strip shall be a 100 foot section of pavement that is reasonably level and smooth. Submit each day's calibration graphs with that day's test section graphs to the Engineer. Calibrate the profilograph in

accordance with the current NCDOT procedure entitled "Determination of Profile Index". Copies of this procedure may be obtained from the NCDOT Construction Unit.

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

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

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

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

3.0 DIAMOND GRINDING

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

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

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

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

Continuously remove all slurry or other debris resulting from the grinding operations by vacuum pick-up or other approved methods. Prevent the slurry from flowing into floor

drains, onto the ground or into the body of water under the bridge. Dispose of all residues off the project.

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

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

4.0 GROOVING BRIDGE FLOORS

After the concrete surface profile has been accepted by the Engineer, the concrete blockouts poured, and the joints installed, groove the bridge deck in accordance with Article 420-14(B) of the Standard Specifications. If a substantial amount of bridge deck surface has been diamond ground and/or the concrete cover over the slab reinforcement has been reduced to the minimum, the Engineer may delete all or a portion of the requirement of grooving in that area. In this instance, no additional compensation shall be made for underruns in grooving.

5.0 BASIS OF PAYMENT

No separate payment will be made for profilograph testing or diamond grinding of the bridge deck. The cost of the testing procedure, equipment, grinding operation, and removal and disposal of slurry resulting from the grinding operation is considered incidental to the contract bid price for "Reinforced Concrete Deck Slab".

PLACING LOAD ON STRUCTURE MEMBERS

(11-27-12)

The 2012 Standard Specifications shall be revised as follows:

In **Section 420-20 – Placing Load on Structure Members** replace the first sentence of the fifth paragraph with the following:

Do not place vehicles or construction equipment on a bridge deck until the deck concrete develops the minimum specified 28 day compressive strength and attains an age of at least 7 curing days.

STEEL REINFORCED ELASTOMERIC BEARINGS

(11-27-12)

The 2012 Standard Specifications shall be revised as follows:

In **Section 1079-1 – Preformed Bearing Pads** add the following after the second paragraph:

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

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

DISC BEARINGS

(2-3-14)

1.0 GENERAL

This item consists of furnishing, fabrication and installation of disc bearings in accordance with AASHTO LRFD Bridge Design Specifications, the Standard Specifications, the recommendations of the manufacturer, the details shown on the plans and as specified herein. Disc Bearings consist of a polyether urethane structural element (elastomeric disc) confined by upper and lower steel bearing plates. Equip disc bearings with a shear restriction mechanism (shear pin) to prevent movement of the disc. Supply disc bearings as fixed bearings and guided expansion bearings as designated by the Contract Documents.

Fixed disc bearings allow rotation but no longitudinal or transverse movement in the bearing plane. Fixed bearings consist of a steel sole plate, an elastomeric disc, a shear pin, a steel upper bearing plate, a steel lower bearing plate, a steel masonry plate, a preformed bearing pad, anchor bolts, nuts and washers.

Guided expansion disc bearings allow rotation and only longitudinal movement in the bearing plane. Guided expansion disc bearings consist of a steel sole plate, a polished stainless steel sheet welded to the bottom of the sole plate within the sliding region, a steel upper bearing plate, a layer of virgin polytetrafluoroethylene (PTFE) material bonded to the top and sides of the upper plate within the sliding regions, guide bars welded to the bottom of the sole plate surrounding the sliding region to restrict transverse movement, polished stainless steel sheets welded to the sides of the guide bars within the sliding regions, an elastomeric disc, a shear pin, a steel lower bearing plate, a steel masonry plate, a preformed bearing pad, anchor bolts, nuts, washers, pipe sleeves, a closure plate, grout and various sizes of standard pipe, and any other necessary material as detailed on the plans. Align the stainless steel sheet on the bottom of the sole plate with the PTFE material on the top of the upper bearing plate. Align the PTFE material on the sides of the upper bearing plate with the stainless steel sheets on the sides of the guide bars.

2.0 MATERIALS

Use disc bearings produced by the same manufacturer.

Use AASHTO M270 Grade 50W (345W) or Grade 50 (345) for all steel plates except the stainless steel sheets in the disc bearings. Clean, coat, and seal the plates in the disc bearing assemblies except for the areas with special facings and the areas that come in contact with the elastomer disc, in accordance with the Special Provision for "Thermal

Sprayed Coatings (Metallization)". The surfaces shall be coated to a thickness of 8 mils minimum on all external parts. Repair surfaces that are abraded or damaged after the application of metallizing in accordance with the Special Provision for "Thermal Sprayed Coatings (Metallization)".

Provide anchor bolts and nuts in accordance with the Standard Specifications.

When the maximum plan dimension of the sheet is 12" or less, provide a stainless steel sheet in expansion disc bearings that is at least 16 gage or 1/16". When the maximum plan dimension is greater than 12", provide a stainless steel sheet that is at least 11 gage or 1/8". Ensure that all stainless steel sheets are in conformance with ASTM A240/A167 Type 304 and polished to a minimum #8 mirror surface finish.

Blast clean the surfaces of the steel sole plate and the steel guide bars that will be attached to the stainless steel sheets to a near white condition in accordance with the Standard Specifications. Position and clamp the back of the stainless steel sheets in contact with the steel sole plate and the steel guide bars. Apply the stainless steel sheets to the blast cleaned surfaces of the steel sole plate and the steel guide bars as soon as possible after blasting and before any visible oxidation of the blast cleaned surfaces occurs. Weld the stainless steel sheets continuously around the perimeter using a tungsten inert gas, wire-fed welder.

For the PTFE sheets bonded to the top and side sliding surfaces of the steel upper bearing plate, used as mating surfaces for the stainless steel sheets attached to the steel sole plate and the guide bars, provide an unfilled virgin PTFE sheet (recessed) or a glass-fiber filled PTFE sheet, resulting from skiving billets formed under hydraulic pressure and heat. Provide resin that conforms to the requirements of ASTM D4894 or D4895.

To bond the PTFE sheets and the steel upper bearing plate, use heat cured high temperature epoxy capable of withstanding temperature of -320°F to 500°F.

Weld the guide bars in expansion bearings to the bottom of the sole plate. Alternatively, integrate the guide bars and sole plate from the same piece of steel, ensuring that the required dimensions are provided. Provide 1/16" clearances between the stainless steel sheets attached to the side sliding surfaces of the guide bars and the PTFE sheet attached to the side sliding surface of the steel upper bearing plate.

Mold the polyether urethane structural element (elastomeric disc) from a polyether urethane compound. The top and bottom surfaces of the disc shall be roughened. Ensure that the physical properties of the polyether urethane conform to the following requirements:

Physical Property	ASTM Test Method	Requirements	
		Min.	Max.
Hardness, Type D Durometer	D2240	60	64
Tensile Stress psi At 100% elongation At 200% elongation	D412	2000 3700	-----
Tensile Strength psi	D412	5000	-----
Ultimate Elongation %	D412	220	-----
Compression Set % 22 hrs. at 158°F	D395	-----	40

3.0 DESIGN

Design the disc bearings for the loads and movements shown on the contract plans. However, use the anchor bolt size, length, spacing and masonry plate thickness as shown on the contract plans and provide an overall bearing height within ½ inch of the bearing assembly height shown on the contract plans. Either combine and cast the sole plate and upper bearing plate (for fixed bearings), the sole plate and guide bars (for expansion bearings), and the lower bearing plate and masonry plate (for fixed and expansion bearings) as a single unit or weld together prior to the installation of the disc.

Ensure access and removal of anchor bolt nut is not in conflict with the upper bearing plate, guide bars or sole plate.

When designing the bearings, use the following allowable bearing stresses:

On polyether urethane structural element: 5000 psi

On PTFE Sliding Surface, filled or unfilled PTFE (recessed): 3500 psi

Submit eight sets of shop drawings and one set of design calculations for review, comments and acceptance. Have a North Carolina Registered Professional Engineer check and seal the shop drawings and design calculations.

After the Engineer reviews the drawings and, if necessary, corrections are made, submit one 22" x 34" reproducible set of the working drawings.

4.0 SAMPLING AND TESTING

A. Sampling

The manufacturer is responsible for randomly selecting and testing sample bearings from completed lots of bearings. The manufacturer is also responsible for certifying that the completed bearings and their components have been tested and are in compliance with the requirements of this Special Provision. The manufacturer shall furnish the results of the tests to the Materials and Tests Engineer.

B. Testing

1. Proof Load Test

Load a test bearing to 150% of the bearing's rated design capacity and simultaneously subject it to a rotational range of 0.02 radians (1.146°) for a period of 1 hour.

Have the bearing visually examined both during the test and upon disassembly after the test. Any resultant visual defects, such as extruded or deformed elastomer or PTFE, damaged seals or rings, or cracked steel is cause for rejection.

Keep continuous and uniform contact between the polyether urethane element and the bearing plates and between the stainless steel sheets and the PTFE sheets (for expansion bearings) for the duration of the test. Any observed lift-off or separation is cause for rejection.

2. Sliding Coefficient of Friction

For all guided expansion bearings, measure the sliding coefficient of friction at the bearing's design capacity in accordance with the test method described below, and on the fifth and fiftieth cycles, at a sliding speed of 1 in/min.

Calculate the sliding coefficient of friction as the horizontal load required to maintain continuous sliding of one bearing, divided by the bearing's vertical design capacity.

The test results are evaluated as follows:

A maximum measured sliding coefficient of friction of 3%.

A visual examination both during and after the test. Any resultant visual defects, such as bond failure, physical destruction, cold flow of PTFE to the point of debonding, or damaged components is cause for rejection of the lot.

Using undamaged test bearings in the work is permitted.

3. Test Method

The test method and equipment shall meet the following requirements:

- a. Arrange the test to determine the coefficient of friction on the first movement of the manufactured bearing.
- b. Clean the bearing surface prior to testing.
- c. Conduct the test at maximum working stress for the PTFE surface with the test load applied continuously for 12 hours prior to measuring friction.
- d. Determine the first movement static and dynamic coefficient of friction of the test bearing at a sliding speed of less than 1 in/min, not to exceed:

0.04	unfilled PTFE
0.08	filled PTFE
- e. Subject the bearing specimen to 100 movements of at least 1 inch of relative movement and, if the test facility permits, the full design movement at a speed of less than 1 ft/min. Following this test determine the static and kinetic coefficient of friction again. The specimen is considered a failure if it exceeds the values measured in (d) above or if it shows any signs of bond failure or other defects.

Bearings represented by test specimens passing the above requirements are approved for use in the structure subject to on-site inspection for visible defects.

5.0 INSTALLATION

Store disc bearings delivered to the bridge site upright and under cover on a platform above the ground surface. Protect the bearings from injury at all times and, before placing the bearings, dry and clean all dirt, oil, grease or other foreign substances from the bearing. Do not disassemble the bearings during installation, except at the manufacturer's direction. Lift bearing assemblies by their bottom surfaces only, unless lifting brackets that have been designed and approved by the manufacturer are used. Ensure that the polyether urethane disc is not exposed to direct flame or sparks. Place the bearings in accordance with the recommendations of the manufacturer, Contract Drawings, and as directed by the Engineer. If there is any discrepancy between the recommendations of the manufacturer, Special Provisions, and Contract Drawings, the Engineer is the sole judge in reconciling any such discrepancy.

Provide preformed bearing pads under the masonry plates in accordance with Article 1079-1 of the Standard Specifications.

Do not install any bearing before the Engineer approves it.

6.0 BASIS OF PAYMENT

Payment for all disc bearings will be at the lump sum contract price bid for "Disc Bearings" which includes full compensation for furnishing all disc bearings, labor,

materials, tools, equipment, testing and incidentals required to complete the work in accordance with the Standard Specifications, this Special Provision, the manufacturer's requirements and as directed by the Engineer.

POT BEARINGS

(9-30-11)

1.0 GENERAL

This item consists of furnishing, fabrication and installation of pot bearings in accordance with AASHTO LRFD Bridge Design Specifications, the Standard Specifications, the recommendations of the manufacturer and the details shown on the plans and as specified herein.

Fixed pot bearings consist of a sole plate, a disc of elastomer in a steel cylinder with a snug fitting steel piston, masonry plate, anchor bolts, nuts and washers. Expansion pot bearings consist of a sole plate, a top steel plate with a polished stainless steel sheet facing bearing on a fixed pot bearing with a layer of virgin polytetrafluoroethylene (PTFE) material on its top, masonry plate, anchor bolt assembly which includes anchor bolts, nuts, washers, pipe sleeves, a closure plate, grout and various sizes of standard pipe and any other necessary material as detailed on the plans.

2.0 MATERIALS

Use pot bearings produced by the same manufacturer.

Use AASHTO M270 Grade 50W (345W) for all steel in the pot bearings. Clean, coat, and seal the plates in the pot bearing assemblies except for the areas with special facings and the internal surfaces of pot, in accordance with the Special Provision for "Thermal Sprayed Coatings (Metallization)". Metallization of the internal surfaces of the pot is permitted provided these surfaces are then polished to a surface smoother than 60 micro inches. The surfaces shall be coated to a thickness of 8 mils minimum on all external parts. Repair surfaces that are abraded or damaged after the application of metallizing in accordance with the Special Provision for "Thermal Sprayed Coatings (Metallization)".

Galvanize all fill plates specified on the plans. Provide anchor bolts and nuts in accordance with the Standard Specifications.

When the maximum plan dimension of the sheet is 12" or less, provide a stainless steel sheet in expansion pot bearings that is at least 16 gage or 1/16". When the maximum plan dimension is greater than 12", provide a stainless steel sheet that is at least 11 gage or 1/8". Ensure that all stainless steel sheets are in conformance with ASTM A240/A167 Type 304 and polished to a minimum #8 mirror surface finish.

Blast clean the surface of the plate that will be attached to the stainless sheet to a near white condition in accordance with the Standard Specifications. Position and clamp the back of the stainless sheet that is to be in contact with the steel plate on the steel plate. Apply the

stainless steel to the blast cleaned surface of the steel plate as soon as possible after blasting and before any visible oxidation of the blast cleaned surface occurs. Weld the stainless sheet continuously around its perimeter using a tungsten inert gas, wire-fed welder.

For the PTFE sheet, used as a mating surface for the stainless sheet, provide an unfilled virgin PTFE Sheet (Recessed) or a glass-fiber filled PTFE sheet, resulting from skiving billets formed under hydraulic pressure and heat. Provide resin that conforms to the requirements of ASTM D4894 or D4895.

To bond the PTFE and the piston, use heat cured high temperature epoxy capable of withstanding temperature of -320°F to 500°F.

Provide a neoprene or natural rubber elastomer with a durometer hardness of 50 that allows for a minimum rotation of 0.02 radians. Place a 1/64" thick unfilled PTFE disc or other approved lubricant that is not detrimental to the elastomer on either side of the elastomer inside the bearing. Use a brass sealing ring with the neoprene or natural rubber elastomer.

3.0 DESIGN

Have the manufacturer design the pot bearings for the loads and movements shown on the contract plans. However, use the anchor bolt size, length, spacing and masonry plate thickness as shown on the contract plans and provide an overall height of the bearing assembly that is at least the height shown on the contract plans, but no more than 1/2 inch greater than this height. Either combine, cast as a single piece, or weld together the sole plate and top plate/piston and the cylinder with the masonry plate.

When designing the bearings, use the following allowable bearing stresses:

- On confined elastomer: 3500 psi
- On PTFE Sliding Surface, filled or unfilled PTFE (recessed): 3500 psi

Submit eight sets of shop drawings and one set of design calculations for review, comments and acceptance. Have a North Carolina Registered Professional Engineer check and seal the shop drawings and design calculations.

After the Engineer reviews the drawings and, if necessary, corrections are made, submit one 22" x 34" reproducible set of the working drawings.

4.0 SAMPLING AND TESTING

A. Sampling

The manufacturer is responsible for randomly selecting and testing sample bearings from completed lots of bearings. The manufacturer is also responsible for certifying that the completed bearings and their components have been tested and are in compliance with the requirements of this Special Provision. The manufacturer shall furnish results of the tests to the Materials and Tests Engineer.

B. Testing

1. Proof Load Test

Load a test bearing to 150% of the bearing's rated design capacity and simultaneously subject it to a rotational range of 0.02 radians (1.146°) for a period of 1 hour.

Have the bearing visually examined both during the test and upon disassembly after the test. Any resultant visual defects, such as extruded or deformed elastomer or PTFE, damaged seals or rings, or cracked steel is cause for rejection.

Keep the steel bearing plate and steel piston in continuous and uniform contact for the duration of the test. Any observed lift-off is cause for rejection.

2. Sliding Coefficient of Friction

For all guided and non-guided expansion type bearings, measure the sliding coefficient of friction at the bearing's design capacity in accordance with the test method described below, and on the fifth and fiftieth cycles, at a sliding speed of 1 in/min.

Calculate the sliding coefficient of friction as the horizontal load required to maintain continuous sliding of one bearing, divided by the bearing's vertical design capacity.

The test results are evaluated as follows:

- A maximum measured sliding coefficients of friction of 3%.
- A visual examination both during and after the test. Any resultant visual defects, such as bond failure, physical destruction, cold flow of PTFE to the point of debonding, or damaged components is cause for rejection of the lot.

Using undamaged test bearings in the work is permitted.

3. Test Method

For the test method and equipment, meet the following requirements:

- f. Arrange the test to determine the coefficient of friction on the first movement of the manufactured bearing.
- g. Clean the bearing surface prior to testing.
- h. Conduct the test at maximum working stress for the PTFE surface with the test load applied continuously for 12 hours prior to measuring friction.

- i. Determine the first movement static and dynamic coefficient of friction of the test bearing at a sliding speed of less than 1 in/min, not to exceed:
0.04 unfilled PTFE
0.08 filled PTFE
- j. Subject the bearing specimen to 100 movements of at least 1 inch of relative movement and, if the test facility permits, the full design movement at a speed of less than 1 ft/min. Following this test determine the static and kinetic coefficient of friction again. The specimen is considered a failure if it exceeds the values measured in (d) above or if it shows any signs of bond failure or other defects.

Bearings represented by test specimens passing the above requirements are approved for use in the structure subject to on-site inspection for visible defects.

5.0 INSTALLATION

Prior to shipment, seal the joint between the steel piston and the steel cylinder with a bead of caulk. Store pot bearings delivered to the bridge site under cover on a platform above the ground surface. Protect the bearings from injury at all times and, before placing the bearings, dry and clean all dirt, oil, grease or other foreign substances from the bearing. Do not disassemble the bearings during installation, except at the manufacturer's direction. Place the bearings in accordance with the recommendations of the manufacturer, Contract Drawings, and as directed by the Engineer. If there is any discrepancy between the recommendations of the manufacturer, Special Provisions, and Contract Drawings, the Engineer is the sole judge in reconciling any such discrepancy.

Provide preformed bearing pads under the masonry plates in accordance with Article 1079-1 of the Standard Specifications.

Do not install any bearing before the Engineer approves it.

6.0 BASIS OF PAYMENT

Payment will be at the lump sum contract price bid for "Pot Bearings" which price will be full compensation for furnishing all labor, materials, tools, equipment and incidentals required to complete the work in accordance with the Standard Specifications, this Special Provision, the manufacturer's requirements and as directed by the Engineer.

OPTIONAL DISC BEARINGS

(9-30-11)

1.0 GENERAL

This item consists of furnishing, fabrication and installation of disc bearings in accordance with AASHTO LRFD Bridge Design Specifications, the Standard Specifications, the recommendations of the manufacturer and as specified herein. In addition, all plan notes

pertaining to furnishing and installing pot bearing assemblies shall also apply to disc bearing assemblies, except as noted herein.

Disc Bearings consist of a polyether urethane structural element (disc) confined by upper and lower steel bearing plates. Equip disc bearings with a shear restriction mechanism to prevent movement of the disc. Supply disc bearings as fixed bearings and guided expansion bearings as designated by the Contract Documents.

Fixed disc bearings allow rotation but no longitudinal or transverse movement in the bearing plane. Fixed bearings consist of a sole plate, an elastomer disc, upper bearing plate, lower bearing plate, masonry plate, anchor bolts, nuts and washers.

Guided expansion disc bearings allow rotation and only longitudinal movement in the bearing plane. Guided expansion disc bearings consist of a sole plate, a top steel plate with a polished stainless steel sheet facing bearing on a fixed disc bearing with a layer of virgin polytetrafluoroethylene (PTFE) material on its top, masonry plate, anchor bolt assembly which includes anchor bolts, nuts, washers, pipe sleeves, a closure plate, grout and various sizes of standard pipe and any other necessary material as detailed on the plans. To allow longitudinal movement, bond a polytetrafluoroethylene (PTFE) sheet to the upper steel bearing plate. Support a sliding steel top bearing plate with the upper steel bearing plate. Face the mating surface of the sliding steel top bearing plate with polished stainless steel. Use either a guide bar or keyway system to restrict transverse movement. Face the sliding surfaces of the guide bar or keyway systems with either PTFE sheets or stainless steel.

2.0 MATERIALS

Use disc bearings produced by the same manufacturer.

Use AASHTO M270 Grade 50W (345W) for all steel in the disc bearings. Clean, coat, and seal the plates in the disc bearing assemblies except for the areas with special facings and the areas that come in contact with the elastomer disc, in accordance with the Special Provision for "Thermal Sprayed Coatings (Metallization)". The surfaces shall be coated to a thickness of 8 mils minimum on all external parts. Repair surfaces that are abraded or damaged after the application of metallizing in accordance with the Special Provision for "Thermal Sprayed Coatings (Metallization)".

Provide anchor bolts and nuts in accordance with the Standard Specifications.

When the maximum plan dimension of the sheet is 12" or less, provide a stainless steel sheet in expansion disc bearings that is at least 16 gage or 1/16". When the maximum plan dimension is greater than 12", provide a stainless steel sheet that is at least 11 gage or 1/8". Ensure that all stainless steel sheets are in conformance with ASTM A240/A167 Type 304 and polished to a minimum #8 mirror surface finish.

Blast clean the surface of the plate that will be attached to the stainless sheet to a near white condition in accordance with the Standard Specifications. Position and clamp the back of the stainless sheet that is to be in contact with the steel plate on the steel plate. Apply the stainless steel to the blast cleaned surface of the steel plate as soon as possible after blasting

and before any visible oxidation of the blast cleaned surface occurs. Weld the stainless sheet continuously around its perimeter using a tungsten inert gas, wire-fed welder.

For the PTFE sheet, used as a mating surface for the stainless sheet, provide an unfilled virgin PTFE Sheet (Recessed) or a glass-fiber filled PTFE sheet, resulting from skiving billets formed under hydraulic pressure and heat. Provide resin that conforms to the requirements of ASTM D4894 or D4895.

To bond the PTFE and the bearing plate, use heat cured high temperature epoxy capable of withstanding temperature of -320°F to 500°F.

Mold the polyether urethane structural element from a polyether urethane compound. Conform the physical properties of the polyether urethane to the following requirements:

Physical Property	ASTM Test Method	Requirements	
		Min.	Max.
Hardness, Type D Durometer	D2240	60	64
Tensile Stress psi At 100% elongation At 200% elongation	D412	2000 3700	-----
Tensile Strength psi	D412	5000	-----
Ultimate Elongation %	D412	220	-----
Compression Set % 22 hrs. at 158°F	D395	-----	40

3.0 DESIGN

Design the disc bearings for the loads and movements shown on the contract plans. However, use the anchor bolt size, length, spacing and masonry plate thickness as shown on the contract plans and provide an overall height of the bearing assembly that is at least the height shown on the contract plans, but no more than 1/2 inch greater than this height. Either combine and cast the sole plate and top plate/upper bearing plate and the lower bearing plate and masonry plate as a single unit or weld together prior to the installation of the disc.

When designing the bearings, use the following allowable bearing stresses:

- On polyether urethane structural element: 5000 psi
- On PTFE Sliding Surface, filled or unfilled PTFE (recessed): 3500 psi

Submit eight sets of shop drawings and one set of design calculations for review, comments and acceptance. Have a North Carolina Registered Professional Engineer check and seal the shop drawings and design calculations.

After the Engineer reviews the drawings and, if necessary, corrections are made, submit one 22" x 34" reproducible set of the working drawings.

4.0 SAMPLING AND TESTING

A. Sampling

The manufacturer is responsible for randomly selecting and testing sample bearings from completed lots of bearings. The manufacturer is also responsible for certifying that the completed bearings and their components have been tested and are in compliance with the requirements of this Special Provision. The manufacturer shall furnish the results of the tests to the Materials and Tests Engineer.

B. Testing

1. Proof Load Test

Load a test bearing to 150% of the bearing's rated design capacity and simultaneously subject it to a rotational range of 0.02 radians (1.146°) for a period of 1 hour.

Have the bearing visually examined both during the test and upon disassembly after the test. Any resultant visual defects, such as extruded or deformed elastomer or PTFE, damaged seals or rings, or cracked steel is cause for rejection.

Keep continuous and uniform contact between the polyether urethane element and the bearing plates and between the sliding steel top plate and the upper bearing plate for the duration of the test. Any observed lift-off is cause for rejection.

2. Sliding Coefficient of Friction

For all guided and non-guided expansion type bearings, measure the sliding coefficient of friction at the bearing's design capacity in accordance with the test method described below, and on the fifth and fiftieth cycles, at a sliding speed of 1 in/min.

Calculate the sliding coefficient of friction as the horizontal load required to maintain continuous sliding of one bearing, divided by the bearing's vertical design capacity.

The test results are evaluated as follows:

- A maximum measured sliding coefficient of friction of 3%.

- A visual examination both during and after the test. Any resultant visual defects, such as bond failure, physical destruction, cold flow of PTFE to the point of debonding, or damaged components is cause for rejection of the lot.

Using undamaged test bearings in the work is permitted.

3. Test Method

The test method and equipment shall meet the following requirements:

- k. Arrange the test to determine the coefficient of friction on the first movement of the manufactured bearing.
- l. Clean the bearing surface prior to testing.
- m. Conduct the test at maximum working stress for the PTFE surface with the test load applied continuously for 12 hours prior to measuring friction.
- n. Determine the first movement static and dynamic coefficient of friction of the test bearing at a sliding speed of less than 1 in/min, not to exceed:
 - 0.04 unfilled PTFE
 - 0.08 filled PTFE
- o. Subject the bearing specimen to 100 movements of at least 1 inch of relative movement and, if the test facility permits, the full design movement at a speed of less than 1 ft/min. Following this test determine the static and kinetic coefficient of friction again. The specimen is considered a failure if it exceeds the values measured in (d) above or if it shows any signs of bond failure or other defects.

Bearings represented by test specimens passing the above requirements are approved for use in the structure subject to on-site inspection for visible defects.

5.0 INSTALLATION

Store disc bearings delivered to the bridge site under cover on a platform above the ground surface. Protect the bearings from injury at all times and, before placing the bearings, dry and clean all dirt, oil, grease or other foreign substances from the bearing. Do not disassemble the bearings during installation, except at the manufacturer's direction. Place the bearings in accordance with the recommendations of the manufacturer, Contract Drawings, and as directed by the Engineer. If there is any discrepancy between the recommendations of the manufacturer, Special Provisions, and Contract Drawings, the Engineer is the sole judge in reconciling any such discrepancy.

Provide preformed bearing pads under the masonry plates in accordance with Article 1079-1 of the Standard Specifications.

Do not install any bearing before the Engineer approves it.

6.0 BASIS OF PAYMENT

Payment for all optional disc bearings will be at the lump sum contract price bid for "Pot Bearings" which includes full compensation for furnishing all disc bearings, labor, materials, tools, equipment, testing and incidentals required to complete the work in accordance with the Standard Specifications, this Special Provision, the manufacturer's requirements and as directed by the Engineer.

THERMAL SPRAYED COATINGS (METALLIZATION)

(9-30-11)

1.0 DESCRIPTION

Apply a thermal sprayed coating (TSC) and sealer to metal surfaces as specified herein when called for on the plans or by other Special Provisions, or when otherwise approved by the Engineer in accordance with the SSPC-CS 23.00/AWS C2.23/NACE No. 12 Specification. Only Arc Sprayed application methods are used to apply TSC coatings, the Engineer must approve other methods of application.

2.0 QUALIFICATIONS

Only use NCDOT approved TSC Contractors meeting the following requirements:

1. The capability of blast cleaning steel surfaces to SSPC SP-5 and SP-10 Finishes.
2. Employ Spray Operator(s) qualified in accordance with AWS C.16/C2.16M2002 and Quality Control Inspector(s) who have documented training in the applicable test procedures of ASTM D-3276 and SSPC-CS 23.00.

A summary of the contractor's related work experience and the documents verifying each Spray Operator's and Quality Control Inspector's qualifications are submitted to the Engineer before any work is performed.

3.0 MATERIALS

Provide wire in accordance with the metallizing equipment manufacturer's recommendations. Use the wire alloy specified on the plans which meets the requirements in Annex C of the SSPC-CS 23.00 Specification. Have the contractor provide a certified analysis (NCDOT Type 2 Certification) for each lot of wire material.

Apply an approved sealer to all metallized surfaces in accordance with Section 9 of SSPC-CS 23. The sealer must either meet SSPC Paint 27 or is an alternate approved by the Engineer.

4.0 SURFACE PREPARATION AND TSC APPLICATION

Grind flame cut edges to remove the carbonized surface prior to blasting. Bevel all flame cut edges in accordance with Article 442-10(D) regardless of included angle. Blast clean

surfaces to be metallized with grit or mineral abrasive in accordance with Steel Structures Painting Council SSPC SP-5/10(as specified) to impart an angular surface profile of 2.5 - 4.0 mils. Surface preparation hold times are in accordance with Section 7.32 of SSPC-CS 23. If flash rusting occurs prior to metallizing, blast clean the metal surface again. Apply the thermal sprayed coating only when the surface temperature of the steel is at least 5°F above the dew point.

At the beginning of each work period or shift, conduct bend tests in accordance with Section 6.5 of SSPC-CS 23.00. Any disbonding or delamination of the coating that exposes the substrate requires corrective action, additional testing, and the Engineer's approval before resuming the metallizing process.

Apply TSC with the alloy to the thickness specified on the plans or as provided in the table below. All spot results (the average of 3 to 5 readings) must meet the minimum requirement. No additional tolerance (as allowed by SSPC PA-2) is permitted. (For Steel Beams: For pieces with less than 200 ft² measure 2 spots/surface per piece and for pieces greater than 200 ft² add 1 additional spots/surface for each 500 ft²).

Application	Thickness	Alloy	Seal Coat
Pot Bearings	8 mil	85/15 Zinc (W-Zn-Al-2)	0.5 mil
Armored Joint Angles	8 mil	85/15 Zinc (W-Zn-Al-2)	0.5 mil
Modular Joints	8 mil	99.99% Zn (W-Zn-1)	0.5 mil
Expansion Joint Seals	8 mil	99.99% Zn (W-Zn-1)	0.5 mil
Optional Disc Bearings	8 mil	85/15 Zinc (W-Zn-Al-2)	0.5 mil

When noted on the plans or as specified in the above chart, apply the sealer to all metallized surfaces in accordance with the manufacturer's recommendations and these provisions. Apply the seal coat only when the air temperature is above 40°F and the surface temperature of the steel is at least 5°F above the dew point. If the sealer is not applied within eight hours after the final application of TSC, the applicator verifies acceptable TSC surfaces and obtains approval from the Engineer before applying the sealer.

5.0 INSPECTION FREQUENCY

The TSC Contractor must conduct the following tests at the specified frequency and the results documented in a format approved by the Engineer.

Test/Standard	Location	Frequency	Specification
Ambient Conditions	Site	Each Process	5°F above the dew point
Abrasive Properties	Site	Each Day	Size, angularity, cleanliness
Surface Cleanliness SSPC Vis 1	All Surfaces	Visual All Surfaces	SSPC-SP-10 Atmospheric Service SSPC-SP - 5 Immersion Service
Surface Profile ASTM D-4417 Method C	Random Surfaces	3 per 500 ft ²	2.5 - 4.0 mils
Bend Test SSPC-CS 23.00	Site	5 per shift	Pass Visual
Thickness SSPC PA-2R SSPC-CS 23.00	Each Surface	Use the method in PA-2 Appendix 3 for Girders and Appendix 4 for frames and miscellaneous steel. See Note 1.	Zn - 8 mils minimum Al - 8 mils minimum Zn Al - 8 mils minimum Areas with more than twice the minimum thickness are inspected for compliance to the adhesion and cut testing requirements of this specification.
Adhesion ASTM 4541	Random Surfaces Splice Areas	1 set of 3 per 500 ft ²	Zn > 500 psi Al > 1000 psi Zn Al > 750 psi
Cut Test - SSPC-CS 23.00	Random Surfaces	3 sets of 3 per 500 ft ²	No peeling or delamination
Job Reference Std. SSPC-CS 23.00	Site	1 per job	Meets all the above requirements

6.0 REPAIRS

All Repairs are to be performed in accordance with the procedures below, depending on whether the repair surface is hidden or exposed. As an exception to the following, field welded splices on joint angles and field welding bearing plates to girders may be repaired in accordance with the procedures for hidden surfaces.

For hidden surfaces (including but not limited to interior girders, interior faces of exterior girders, and below-grade sections of piles):

1. Welding of metallized surfaces may be performed only if specifically permitted by the Engineer. Remove metallizing at the location of field welds by blast cleaning (SSPC SP-6 finish), or hand (SSPC SP-2 finish) or power tool cleaning (SSPC SP-3 finish) just prior to welding. Clean sufficiently to prevent contamination of the weld. All repairs to welded connections are metallized in accordance with SSPC CS 23.00.
2. Minor areas less than or equal to 0.1 ft^2 exposing the substrate are metallized in accordance with SSPC CS 23.00 or painted in accordance with ASTM A780, "Repair of Damaged and Uncoated Areas of Hot Dip Galvanized Coatings."
3. Large areas greater than 0.1 ft^2 exposing the substrate are metallized in accordance with SSPC CS 23.00.
4. Damaged (burnished) areas not exposing the substrate with less than the specified coating thickness are metallized in accordance with SSPC CS 23.00 or painted in accordance with ASTM A780, "Repair of Damaged and Uncoated Areas of Hot Dip Galvanized Coatings."
5. Damaged (burnished) areas not exposing the substrate with more than the specified coating thickness are not repaired.
6. Defective coating is repaired by either method 2 or 3 depending on the area of the defect.

For Exposed Surfaces (including but not limited to exterior faces of exterior girders and above-grade sections of piles):

1. Welding of metallized surfaces may be performed only if specifically permitted by the Engineer. Remove metallization at the location of field welds by blast cleaning (SSPC SP-6 finish), or hand (SSPC SP-2 finish) or power tool cleaning (SSPC SP-3 finish) just prior to welding. Clean sufficiently to prevent contamination of the weld. All repairs to welded connections are metallized in accordance with SSPC CS 23.00.
2. All areas exposing the substrate are metallized in accordance with SSPC CS 23.00
3. Defective coating is repaired by either method 2 or 3 depending on the area of the defect.

7.0 TWELVE MONTH OBSERVATION PERIOD

The contractor maintains responsibility for the coating system for a twelve (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 must guarantee the coating system under the payment and performance bond (refer to Article 109-10). To successfully complete the observation period, the coating system must meet the following requirements after twelve(12) months service:

- No visible rust, contamination or application defect is observed in any coated area.

- Painted surfaces have a uniform color and gloss.
- Surfaces have an adhesion of no less than 500 psi when tested in accordance with ASTM D-4541.

8.0 BASIS OF PAYMENT

The contract price bid for the bridge component to which the coating is applied will be full compensation for the thermal sprayed coating.

CONCRETE WEARING SURFACE

(9-30-11)

1.0 GENERAL

This Special Provision governs materials, forming, and all other related work in the construction of a reinforced concrete wearing surface in accordance with applicable parts of the Standard Specifications, the details shown on the plans, and as outlined in these Special Provisions.

2.0 MATERIALS

Unless otherwise noted on the plans, use class AA concrete and a coarse aggregate gradation of 78M. The Class AA concrete shall contain fly ash or ground granulated blast furnace slag at the substitution rate specified in Article 1024-1 and in accordance with Articles 1024-5 and 1024-6 of the Standard Specifications. Place the wearing surface according to the grades, thicknesses and cross sections shown on the plans.

3.0 PREPARATION OF SURFACE

Prepare all surfaces to be overlayed using the equipment specified herein and prior to placing the epoxy coated reinforcing steel. Additionally, clean the surface within 48 hours prior to placing the overlay unless otherwise approved.

Thoroughly soak the cleaned surface for at least 12 hours prior to placing the concrete wearing surface. While soaking the surface, cover it with a layer of white opaque polyethylene film that is at least 4 mils thick. Immediately prior to placing the concrete wearing surface, remove standing water from the surface.

4.0 EQUIPMENT

Prior to beginning any work, obtain approval for all equipment to be used for deck preparation, placing, finishing, and curing the concrete wearing surface.

For surface preparation, use sandblasting or pressure washing equipment capable of removing all foreign matter. If using high pressure water blast, a minimum nozzle pressure of 3000 psi is required.

5.0 PLACING AND FINISHING

Follow the placing, finishing, and curing requirements of Article 420-14 (A) and (B). Construction Joints other than those shown on the plans are not permitted.

6.0 LIMITATIONS OF OPERATIONS

The requirements of Article 420-20 will apply to placing vehicles and construction equipment on the finished concrete wearing surface.
Use insulation that meets the requirements of Article 420-7(C), and if required, place it on the concrete wearing surface as soon as the initial set permits.

7.0 METHOD OF MEASUREMENT

The quantity of concrete wearing surface to be paid for is the actual number of square feet of concrete wearing surface as provided on the plans.

8.0 BASIS OF PAYMENT

The quantity for which payment is made will be that quantity shown in square feet on the plans. Where the plans have been revised, the quantity to be paid for will be the quantity shown on the revised plans.

The unit bid per square foot will be full compensation for all work covered by this Special Provision and applicable parts of the Standard Specifications, but not limited to furnishing and placing concrete, epoxy coated reinforcing steel, joint filler and sealer, deck drains, bridge scuppers, and any other material; erecting and removing all forms, curing concrete, protecting concrete in wind, rain, low humidity, high temperatures or other unfavorable weather.

Payment will be made under:

Concrete Wearing Surface Square Foot

EXPANSION JOINT SEALS

(9-30-11)

1.0 GENERAL

The work covered by this Special Provision consists of furnishing and installing the expansion joint seals as shown on the contract drawings. All materials, labor, equipment and incidentals necessary for the proper installation of the expansion joint seals are included.

2.0 MATERIAL

Provide expansion joint seals capable of accommodating a total movement measured parallel to the centerline of the roadway as shown on plans.

Provide an elastomeric component for each expansion joint seal that is a continuous unit for the entire length of the joint. Do not field splice the elastomeric component. Only vulcanized shop splicing of the elastomeric component is permitted. The minimum length of an elastomeric component before shop splicing is 20 feet. However, one piece shorter than 20 feet is permitted. Provide an elastomeric component that is clearly shop marked to indicate the top side and joint location of the elastomeric component. On skewed bridges, or under unsymmetrical conditions, clearly mark the left side of the elastomeric component. Left is defined as being on the left when facing in the direction of increasing station. Inspect the seals upon receipt to ensure that the marks are clearly visible upon installation.

Make sure the convolution of the gland does not project above the top of the hold-down plates when the joint opening is in the most compressed condition. Use either elastic polychloroprene (neoprene) or ethyl propylene diene monomer (EPDM) for the elastomer that meets the following minimum properties:

	ASTM TEST METHOD	REQUIREMENTS
Hardness, Durometer - Shore A	D2240	60 \pm 5, Neoprene (upward corrugated shape - fabric reinforced) 75 \pm 5, EPDM and Neoprene (upward non-corrugated shape) 80 \pm 5, EPDM (upward corrugated shape-fabric reinforced)
Tensile Strength	D412	2000 psi (min.)
Elongation at Break	D412	250% (min.)
Width of Gland in Relaxed Condition	N/A	10" \pm 0.25"
Thickness of Upturned portion of gland	N/A	0.25" non-corrugated shape, -0.032" to +0.032"
Thickness of Upturned portion of gland	N/A	0.1875" corrugated shape, -0.032" to +0.032"
Thickness of Flat portion of gland	N/A	0.1563", -0.032" to +0.032"

For fabric reinforced glands, submit one unreinforced sample per lot number, up to 500 feet of Expansion Joint Seal, to the Engineer for testing.

Only field splice hold-down plates at crown points, at abrupt changes in the deck slab cross slope, and on lane lines. Splicing within travel lanes is not permitted and splicing on edge lines is not required. Field splice hold-down plates between the edge line and gutter upturn and where necessary for proper installation and alignment is permitted. Show all splice locations on the working drawings for approval. For the location of lane markings at the expansion joint seal, see the Structure plans. At the splice locations, locate the hold-down bolts 3 inches from the end of the hold-down plate. At splice locations where changes in deck slab cross slope occur, cut the ends of hold-down plates parallel to the bridge centerline for skews less than 80° and greater than 100°.

Do not use welded shop splices in hold-down plates.

3.0 SHOP DRAWINGS

Submit nine sets of working drawings to the Engineer for review, comments and acceptance. Show complete details drawn to scale and include:

- The proposed template details including the makeup of the template
- The proposed method of holding the base angle assembly in place while concrete is cast around it
- The proposed procedure to correct for the effects of beam movement and rotation when setting width of joint opening
- The proposed chronology of installation including the sequence and direction of the concrete casting
- The details of cross connectors between base angles, such as steel bars with slots bolted to angles, to maintain evenness between the adjacent base angles while accommodating movement that occurs when concrete is cast. Indicate when bolts are loosened to allow movement.
- The proposed method for removing the hold-down plate
- A section detail through the joint showing horizontal offset dimensions of the base angles from the centerline joint. This detail is required when the vertical face of the joint opening is not perpendicular to the roadway surface (e.g. when the roadway grade is significant).

Have someone other than the one who prepares the drawing check all detailed drawings and include the signatures of both the drafter and checker on each sheet of the drawings. The Engineer returns unchecked drawings to the Contractor. Provide all completed drawings well in advance of the scheduled installation time for the expansion joint seal.

4.0 INSTALLATION

Provide supports for the base angle assembly at a maximum spacing of 9 feet. Place supports near field splices of base angles to ensure that field splices are straight and even. Provide base angles with ½" diameter weep holes at 12 inch centers to allow bleeding of trapped air and/or water. Do not obstruct the weep holes with falsework. Make the bottom of the trough parallel to grade and the sides parallel to the sides of the expansion joint seal.

For damaged areas, depressions, spalls, cracks, or irregularities of curbs or decks adjacent to the expansion joint, submit a proposed method of repair and repair material specifications for approval.

If the Engineer deems any aspects of the expansion joint seals unacceptable, make necessary corrections.

5.0 INSPECTION

When concrete is cast, use a non-aluminum, 10 foot, true to line straight edge to check and grade the top of the slab on each side of the joint to ensure smooth transition between spans.

Watertight Integrity Test

- Upon completion of an expansion joint seal, perform a water test on the top surface to detect any leakage. Cover the roadway section of the joint from curb to curb, or barrier rail to barrier rail, with water, either ponded or flowing, not less than 1 inch above the roadway surface at all points. Block sidewalk sections and secure an unnozzled water hose delivering approximately 1 gallon of water per minute to the inside face of the bridge railing, trained in a downward position about 6 inches above the sidewalks, such that there is continuous flow of water across the sidewalk and down the curb face of the joint.
- Maintain the ponding or flowing of water on the roadway and continuous flow across sidewalks and curbs for a period of 5 hours. At the conclusion of the test, the underside of the joint is closely examined for leakage. The expansion joint seal is considered watertight if no obvious wetness is visible on the Engineer's finger after touching a number of underdeck areas. Damp concrete that does not impart wetness to the finger is not a sign of leakage.
- If the joint system leaks, locate the place(s) of leakage and take any repair measures necessary to stop the leakage at no additional cost to the Department. Use repair measures recommended by the manufacturer and approved by the Engineer prior to beginning corrective work.
- If measures to eliminate leakage are taken, perform a subsequent water integrity test subject to the same conditions as the original test. Subsequent tests carry the same

responsibility as the original test and are performed at no extra cost to the Department.

6.0 BASIS OF PAYMENT

Basis of payment for all expansion joint seals will be at the lump sum contract price for "Expansion Joint Seals" which price and payment will be full compensation for furnishing all material, including any steel accessory plates for sidewalks, medians and rails, labor, tools, and incidentals necessary for installing the expansion joint seal in place and including all materials, labor, tools and incidentals for performing the original watertight integrity test.

MODULAR EXPANSION JOINT SEALS

(9-30-11)

1.0 GENERAL

Furnish and install modular expansion joint seals within the limits indicated on the plans.

Obtain modular expansion joint seals from Fabricators that are AISC certified in Category I.

Use a modular expansion joint seal that is a waterproof system such as WABOMODULAR as manufactured by Watson Bowman and Acme Corporation of Amherst New York, BROWN/MAURER as manufactured by the D. S. Brown Company of North Baltimore, Ohio or an approved equal. Do not use aluminum components in the modular expansion joint. Use a modular expansion joint seal consisting of three or more transverse rails holding two or more elastomeric seals in place and a support mechanism that ensures the rails maintain parallel and equidistant spacing. Do not use bolts to connect the rails to the support mechanism.

Provide an elastomeric component for each modular expansion joint seal that is one continuous unit for the entire length of the joint. Do not field splice the elastomeric component. Only vulcanized shop splicing of the elastomeric component is permitted. Provide an elastomeric component that is clearly shop marked to indicate the top side and joint location of the elastomeric component. On skewed bridges, or under unsymmetrical conditions, clearly mark the left side of the elastomeric component also. Left is defined as being on the left when facing in the direction of increasing station. Inspect the seals upon receipt to ensure that the marks are clearly visible upon installation.

Provide modular expansion joint seals capable of handling a total movement measured parallel to the centerline of the roadway as shown on plans. Limit clear distance between centerbeams, and edgebeams and centerbeams, to 3½". Limit centerbeam spans to approximately 48".

2.0 DRAWING AND SPECIFICATION SUBMITTAL

Submit Shop Drawings for Fabrication and Installation Procedure and Revised Contract Plan Sheets, showing revised details of the Structure contract plans.

A. Shop Fabrication and Installation Procedure Drawings

The deck slab is detailed in the contract plans with a required full depth transverse construction joint separating the main slab pour from the blockout area for the modular joint assembly. Position the modular joint assembly in the blockout area only after the main slab pours adjacent to the blockout area have been made and the girder rotation, deflection, and longitudinal movement due to slab pours have occurred.

Detail the method of positioning and securing the modular assembly in the blockout prior to the closure pour on the working drawings.

Submit two complete sets of working drawings for review. Submit these drawings well in advance of the scheduled installation time for the modular expansion joint seals. Include material requirements and installation procedures and specifications in the drawings.

After the drawings have been reviewed and, if necessary, corrections have been made, submit nine additional sets of the working drawings.

B. Revised Contract Plan Sheets

Concurrent with the submission of the working drawings, submit two sets of revised Structure plans for review. In the revised plans, include necessary changes in dimensions, reinforcing steel, and concrete blockouts to accommodate modular expansion joint seals. Have a North Carolina Registered Professional Engineer prepare and seal the revised plans. No adjustment will be made in the contract price for any bid item due to revisions necessary to accommodate the modular expansion joint seals. This cost is included in the lump sum price bid for furnishing and installing the modular expansion joint seal.

After the revised plans have been reviewed and, if necessary, corrections have been made, submit one 22" x 34" reproducible set of revised structure contract plans.

3.0 FABRICATION AND INSTALLATION

Protect the components of the modular expansion joint seal in the following manner. Upon completion of any shop fabrication, commercially blast clean (SP-6) all steel components, excluding stainless steel parts. Metallize to a minimum thickness of 8 mils on these surfaces. Metallize in accordance with the Special Provision for "Thermal Sprayed Coatings (Metallization)". Repair abraded or damaged coated surfaces anytime after applying the coating as specified for repair of galvanizing in the Standard Specifications. As an alternative to Metallizing, galvanizing in accordance with the Standard Specifications is permitted.

Install the modular expansion joint seals according to the procedures and recommendations of the manufacturer, except as amended in the next paragraph.

Limit modular expansion joint seal splices to crown points, abrupt changes in deck slab cross slope, lane lines, or as necessary for proper installation and alignment. All splice locations and details must be shown on the submitted working drawings and are subject to the Engineer's approval. For shop splices, full penetration welds are required for centerbeam splices. For shop splices, partial penetration welds are not allowed for centerbeam splices, except at barrier rail upturns or sidewalk upturns. For field splices, partial penetration welds are not allowed for centerbeam splices. Show and submit for approval all splice locations on the working drawings. For location of lane markings at the modular expansion joint seals, see the Structure plans.

When indicated on the plans, provide special snowplow protection, such as a snowplow blade guide or steel ribs, to prevent the blade from entering the joint recess.

If the Engineer deems any aspects of the modular expansion joint seals unacceptable, make necessary corrections.

Watertight Integrity Test

Upon completion of each modular expansion joint seal, perform a water test on the top surface to detect any leakage. Cover the roadway section of the joint from curb to curb, or barrier rail to barrier rail, with water, either ponded or flowing, not less than 1 inch above the roadway surface at all points. Block sidewalk sections and secure an unnozzled water hose delivering approximately 1 gallon of water per minute to the inside face of the bridge railing, trained in a downward position about 6 inches above the sidewalk, such that there is continuous flow of water across the sidewalk and down the curb face of the joint.

Maintain the ponding or flowing of water on the roadway and continuous flow across sidewalks and curbs for a period of 5 hours. At the conclusion of the test, the underside of the joint is closely examined for leakage. The modular expansion joint seal is considered watertight if no obvious wetness is visible on the Engineer's finger after touching a number of underdeck areas. Damp concrete that does not impart wetness to the finger is not considered a sign of leakage.

If the joint system leaks, locate the place(s) of leakage and take any repair measures necessary to stop the leakage at no additional cost to the Department. Use repair measures recommended by the manufacturer and approved by the Engineer prior to beginning corrective work.

If measures to eliminate leakage are taken, perform a subsequent water integrity test subject to the same conditions as the original test. Subsequent tests carry the same responsibility as the original test and are performed at no additional cost to the Department.

4.0 BASIS OF PAYMENT

Basis of payment for all modular expansion joint seals will be at the lump sum contract price for "Modular Expansion Joint Seals" which price and payment will be full compensation for furnishing all material, including steel accessory plates for sidewalks, medians and rails, labor, tools, and incidentals necessary for installing the modular expansion joint seals in place and including all materials, labor, tools and incidentals for performing the original watertight integrity test.

SOUND BARRIER WALL

(12-12-13)

1.0 DESCRIPTION

This work consists of furnishing precast panels, structural steel, concrete, and all other materials; handling, transporting, fabricating, galvanizing, and storing materials; furnishing erection drawings, pile excavation, backfilling, erecting and installing the sound barrier wall members and all other materials as required by the plans, Standard Specifications and this Special Provision.

The Standard Plans allow a pile spacing of 10, 15 or 20 feet. Pile spacing greater than 15 feet will not be allowed for standard precast concrete panels. Provide consistent pile spacing the entire length of the wall. Use odd pile spacing, if necessary, only at the ends of the wall and at turning points as approved by the Engineer.

A maximum one foot drop or rise in elevation between wall sections is permitted. Elevation changes greater than one foot, if necessary, will be allowed only at the end of the wall. Top of wall elevation changes that result in a jagged appearance will not be allowed.

2.0 ALTERNATE PILE SPACING FOR STANDARD PRECAST PANELS

As an alternate, the Contractor may submit plans for pile spacing greater than 10 feet and less than 15 feet for review and approval. The excavated diameter, excavation depth and reinforcing steel shall be equal to the amount shown on the existing plans for the 15 feet pile spacing. A variance in the reinforcing steel will be allowed for the length of horizontal and number of vertical reinforcement bars in the precast panel for the alternate pile spacing.

Submit two sets of detailed plans for review. Include all details in the plans, including the size and spacing of required reinforcement necessary to fabricate the precast panels. Have a North Carolina Registered Professional Engineer check, seal and date the plans. After the plans are reviewed and, if necessary, the corrections made, submit one set of reproducible tracings on 22" x 34" sheets to become part of the contract plans.

3.0 ALTERNATE WALL TYPE

Walls that have been assigned "Approved" or "Approved for Provisional Use" status by the Product Evaluation Program will be considered for substitution to the detailed Standard Sound Barrier Wall only when noted on the plans. Alternate wall types, piles and pile spacing must meet the design and construction requirements of the project. Pile spacing greater than 20 feet will not be permitted. Alternate pile and wall structural stability and connection details shall conform to the current edition of the AASHTO LRFD Bridge Design Specifications.

Prior to submittal of Working Drawings, as described herein, submit a copy of the signed NCDOT Product Status Notification Letter and two sets of preliminary plans for review and approval. Include material specifications for all components. Once preliminary plans are approved, submit Working Drawings in accordance with all applicable portions of the requirements herein, including details necessary to fabricate and construct the proposed alternate.

Have a North Carolina Registered Professional Engineer check, seal and date the plans and, when requested, calculations. After the plans are reviewed and, if necessary, corrections made, submit one set of reproducible tracings on 22" x 34" sheets to become part of the contract plans.

4.0 MATERIALS AND FABRICATION OF STANDARD PRECAST PANELS

Provide materials and fabricate members in accordance with the requirements of Division 10 of the Standard Specifications for Roads and Structures.

Provide precast panels that are 4 inches \pm ¼ inch thick with an exposed aggregate finish on one face. The panel face with the aggregate finish shall be installed facing the roadway. The depth of the exposure is required to range from 0 to ¼ inch. Furnish three 12" x 12" samples for approval which establish the acceptable variations in color, texture, and uniformity. After the color, texture, and uniformity of the furnished samples are approved, produce a full scale panel unit meeting design requirements. This mock-up and the furnished samples establish the standard quality for determining acceptance of the panels. When producing the final installed panels, use fine and coarse aggregate, retarder, and cement from the same source as those used in the approved sample panels.

5.0 CONSTRUCTION METHODS

Complete the final survey of existing ground profile after clearing the wall area but prior to submitting any working drawings. Submit the final groundline survey with the working drawings.

If the Department is responsible for the survey, the Engineer field verifies the existing ground profile along the sound barrier wall. Contact the Engineer to obtain the survey information. Otherwise, complete the existing ground survey prior to submittal of working drawings.

Excavate holes with the diameters shown on the plans. Perform pile excavation to the depths shown on the plans and install piles as shown on the plans or in the accepted submittals with a tolerance of 1/2 inch per foot from vertical. Backfill excavations with concrete after placing piles.

A. Pile Excavation

Use equipment of adequate capacity and capable of drilling through soil and non-soil including rock, boulders, debris, man-made objects and any other materials encountered. Blasting is not permitted to advance the excavation. Blasting for core removal is only permitted when approved by the Engineer. Dispose of drilling spoils in accordance with Section 802 of the Standard Specifications and as directed by the Engineer. Drilling spoils consist of all excavated material including water removed from the excavation either by pumping or drilling tools.

If unstable, caving or sloughing soils are anticipated or encountered, stabilize excavations with either slurry or steel casing. When using slurry, submit slurry details including product information, manufacturer's recommendations for use, slurry equipment information and written approval from the slurry supplier that the mixing water is acceptable before beginning drilling. When using steel casing, use either the sectional type or one continuous corrugated or non-corrugated piece. Steel casings should consist of clean watertight steel of ample strength to withstand handling and driving stresses and the pressures imposed by concrete, earth or backfill. Use steel casings with an outside diameter equal to the hole size and a minimum wall thickness of 1/4 inch.

B. Concrete Placement

Before placing concrete, center and support the pile in the excavation and check the water inflow rate in the excavation after any pumps have been removed. If the inflow rate is less than 6 inches per half hour, remove any water and free fall the concrete into the excavation. Ensure that concrete flows completely around the pile. If the water inflow rate is greater than 6 inches per half hour, propose a concrete placement procedure to the Engineer. The Engineer shall approve the concrete placement procedure before placing concrete.

Fill the excavation with Class A concrete in accordance with Section 1000 of the Standard Specifications except as modified herein. Provide concrete with a slump of 6 to 8 inches. Use an approved high-range water reducer to achieve this slump. Place concrete in a continuous manner and remove all casings.

6.0 WORKING DRAWINGS

Submit casting drawings for the precast face panels for approval in accordance with Article 1077-2 of the Standard Specifications prior to casting. Show the inserts, method of handling, and support details used for transportation on casting drawings. Submit metalwork fabrication drawings for approval prior to fabrication of steel wall components. Submit an erection plan and concrete face panel placing plan, including location of various

heights of panels, for review and acceptance prior to fabrication of metalwork. Submit five sets of detail drawings.

7.0 METHOD OF MEASUREMENT

The quantity of sound barrier wall to be paid for will be the actual square feet of precast panels used in the completed and accepted wall. Measurement will be made of the total area of precast panels used in the wall.

8.0 BASIS OF PAYMENT

The quantity of sound barrier wall, measured as provided above, will be paid for at the contract unit price bid per square foot for "Sound Barrier Wall".

The unit price bid per square foot will be full compensation for all work covered by this Special Provision including, but not limited to, furnishing precast panels, structural steel, concrete, and all other materials; handling, transporting, fabricating, galvanizing, and storing materials; furnishing erection drawings, backfilling, pile excavation including any casing or slurry, and erecting and installing the sound barrier wall members.

Payment will be made under:

Sound Barrier Wall.....Square Foot

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 1/2" from the edge of the top flange. Hanger hardware and rods must have a minimum safe working load of 6,000 lbs.

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

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

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

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

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

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

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

1. Wind Loads

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

Table 2.2 - Wind Pressure Values

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

2. Time of Removal

The following requirements replace those of Article 3.4.8.2.

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

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

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

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

B. Review and Approval

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

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

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

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

4.0 CONSTRUCTION REQUIREMENTS

All requirements of Section 420 of the Standard Specifications apply.

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

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

A. Maintenance and Inspection

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

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

B. Foundations

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

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

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

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

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

5.0 REMOVAL

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

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

6.0 METHOD OF MEASUREMENT

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

7.0 BASIS OF PAYMENT

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

SUBMITTAL OF WORKING DRAWINGS**(8-9-13)****1.0 GENERAL**

Submit working drawings in accordance with Article 105-2 of the *Standard Specifications* and this provision. For this provision, "submittals" refers to only those listed in this provision. The list of submittals contained herein does not represent a list of required submittals for the project. Submittals are only necessary for those items as required by the

contract. Make submittals that are not specifically noted in this provision directly to the Resident Engineer. Either the Structure Design 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 Resident 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 Resident Engineer, Structure Design Unit contacts or the Geotechnical Engineering Unit contacts noted below.

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

2.0 ADDRESSES AND CONTACTS

For submittals to the Structure Design Unit, use the following addresses:

Via US mail:

Mr. G. R. Perfetti, 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.

Via other delivery service:

Mr. G. R. Perfetti, 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, P. E.

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)

jlbolden@ncdot.gov (James Bolden)

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 Structure Design Unit can be viewed from the Unit's web site, via the "Contractor Submittal" link.

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

Primary Structures Contact:

Paul Lambert (919) 707 – 6407
(919) 250 – 4082 facsimile
plambert@ncdot.gov

Secondary Structures Contacts:

James Gaither (919) 707 – 6409
James Bolden (919) 707 – 6408

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

ewilliams@ncdot.gov

3.0 SUBMITTAL COPIES

- Furnish one complete copy of each submittal, including all attachments, to the Resident Engineer. At the same time, submit the number of hard copies shown below of the same complete submittal directly to the Structure Design Unit and/or the Geotechnical Engineering Unit.
- The first table below covers “Structure Submittals”. The Resident Engineer will receive review comments and drawing markups for these submittals from the Structure Design Unit. The second table in this section covers “Geotechnical Submittals”. The Resident 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 Structure Design 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 Structure Design 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
Optional Disc Bearings ⁴	8	0	"Optional 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
Pot Bearings ⁴	8	0	"Pot Bearings"
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"
Visual Barrier Wall (precast items)	10	0	Article 1077-2 & "Visual Barrier Wall"
Visual Barrier Wall Steel Fabrication Plans ⁵	7	0	Article 1072-8 & "Visual Barrier Wall"
Structural Steel ⁴	2, then 7	0	Article 1072-8
Temporary Detour Structures	10	2	Article 400-3 & "Construction, Maintenance and Removal of Temporary Structure at Station ____"
TFE Expansion Bearings ⁴	8	0	Article 1072-8

FOOTNOTES

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

GEOTECHNICAL SUBMITTALS

Submittal	Copies Required by Geotechnical Engineering Unit	Copies Required by Structure Design 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

- References are provided to help locate the part of the contract where the submittals are required. References in quotes refer to the provision by that name. Subarticles refer to the *Standard Specifications*.
- Submit one hard copy of submittal to the Resident or Bridge Maintenance 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.
- The Pile Driving Equipment Data Form is available from:
https://connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
See second page of form for submittal instructions.
- Electronic copy of submittal is required. See referenced provision.

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.
- D. **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.

STRUCTURAL STEEL

(SPECIAL)

1.0 GENERAL

High performance steel shall be produced and fabricated in accordance with ANSI/AASHTO/AWS Bridge Welding Code D1.5-02, applicable portions of the Standard Specifications, and these Special Provisions.

2.0 MATERIAL PROPERTIES

Structural steel designated on the plans as Grade HPS 70W shall conform to the requirements of ASTM A709-04a.

3.0 WELDING

A. General

All welding procedures for HPS 70W Steel shall be qualified in accordance with AWS D1.5 unless otherwise modified within this Special Provision.

Butt welds of flanges and webs and fillet welds of web to flanges of plate girders shall be made using the Submerged Arc Welding process. Only Submerged Arc

Welding (SAW) or Shielded Metal Arc Welding (SMAW) may be used for all other connections involving HPS 70W steel.

The maximum level of diffusible hydrogen in deposited weld metal shall be 4 mL/100g. The level of diffusible hydrogen may be raised to 8mL/100g for SMAW only, provided that the higher preheat temperatures of Table 1 are attained.

B. Filler Metal Requirements

1. Filler metals for use in connecting Grade HPS 70W plates using the SAW process shall be as follows:
 - a. LA85 electrode with Mil800HPNi flux, by Lincoln Electric Company, 22801 St. Clair Avenue, Cleveland, Ohio 44117-1199; (216) 481-8100
 - b. ENi4 electrode, by ESAB, 801 Wilson Avenue, Hanover, PA 17331-1058; (800) 933-7070, combined with Mil800H flux by Lincoln Electric Company
 - c. In lieu of the above consumable combinations, the contractor may request approval of alternate consumables from the Engineer. Alternate manufacturer specific filler metals, both electrode and flux, shall meet the AWS Electrode/Flux Classification F9A4 EXXX-X, with supplementary moisture resistance designators H4 or H2, as per AWS A5.23, with 1% Nickel minimum in the weld deposit.

When using alternate consumables, the fabricator is required to perform the full range of weld tests as required by AWS D1.5 Section 12.6.

When using alternate consumables, diffusible hydrogen (H_d) tests shall be performed on the weld metal. Minimum preheat and interpass temperatures to be used with alternate consumables shall be in accordance with AWS D1.5, Table 4.4. The deposited weld metal shall have a diffusible hydrogen level equivalent to 4 mL/100g or less. H_d test specimens are to be prepared at the fabrication plant. Specimens are to be tested in accordance with AWS A4.3. Test results in excess of 4 mL/100g are unacceptable, and a retest is required, with or without revised welding procedures. AWS D1.5 Section 5.7.6 is applicable, but WPS or H_d results are not transferable from fabricator to fabricator. Fabricators with multiple plants under a common umbrella of welding equipment, welding training, and supervision are required to perform the H_d testing only once per combination of consumables for each location. Plants audited as a single facility by the American Institute of Steel Construction (AISC) as a part of their Quality Certification Program, or other owner approved equal Quality Assurance Program, are considered one location. Multiple plants not falling under the AISC, or other 'single facility' audit definition, are

considered separate facilities and additional WPS and H_d tests are required.

SAW consumables shall meet the hydrogen control level of H4 as per AWS D1.5, Section VIII6.2.2.1(1).

2. Filler metals for all welds connecting a Grade HPS 70W plate to a Grade 50W plate shall conform to the requirements for Grade 50W base metal as listed in AWS D1.5, Table 4.1 (H8 maximum). At the fabricator's option, the consumable combinations of Section 3.0(B)(1)(a) or 3.0(B)(1)(b) may be used provided the hydrogen control level of H4 is met as per AWS D1.5, Section VIII6.2.2.1(1). Electrodes for use in connecting Grade HPS 70W plates to Grade 50W plates using the SMAW process shall have the designator 'R' for moisture resistant coating. The designator 'HZ' shall be either H4 or H8, depending upon the level of preheat used.
3. SAW consumables and SMAW electrodes shall produce weld deposits that meet the requirements of AWS D1.5 Table 4.3.
4. Filler Metal Qualification Test Requirements for welding of HPS 70W plates together are as listed in AWS D1.5, Table 4.1, for Grade 70W base metal. Qualification, Pretest and Verification Test Requirements for welding HPS 70W plates as determined using WPS Test Plates shall provide properties equal to or greater than the base metal requirements as specified in ASTM A709-04a.

C. Preheat and Interpass Temperature

The maximum interpass temperature for welding HPS 70W steel is 450°F.

The minimum preheat and interpass temperatures for welding of HPS 70W steel plates using the electrodes of Section 3.0(B)(1)(a) or 3.0(B)(1)(b) shall be in accordance with Table 1.

Table 1**Minimum Preheat and Interpass Temperature, °F, for HPS 70W**

Welding Process	H _d maximum	Thickness, t, (inch) of Thickest Part at Point of Welding			
		$t \leq \frac{3}{4}"$	$\frac{3}{4}" < t \leq 1 \frac{1}{2}"$	$1 \frac{1}{2}" < t \leq 2 \frac{1}{2}"$	$t > 2 \frac{1}{2}"$
SAW/SMAW*	4 mL/100g	70	70	70	125
SMAW	8 mL/100g	100	125	175	225
<p>If satisfactory results are not achieved with the above minimum preheat and interpass temperatures during development of the Welding Procedure Specifications (WPS), and an increased preheat temperature is used to provide a satisfactory Procedure Qualification Record (PQR), the higher preheat temperature shall be used during bridge fabrication as the required minimum.</p> <p>The minimum preheat or interpass temperature required for a joint composed of different base metals and/or thicknesses, shall be based on the highest of the minimum preheat from AWS D1.5, Table 4.4 or the table above.</p> <p>* Diffusible hydrogen or filler metal tested by manufacturer shall not exceed a H4 classification. Heat input shall be limited as indicated below.</p>					

For all other consumable combinations:

The preheat and interpass temperature requirements shall be in accordance with AWS D1.5, Table 4.4. When welding two pieces of Grade HPS 70W steel, the temperature requirements of Table 4.4, Group IV shall be used. When welding Grade HPS 70W steel to Grade 50W steel, the temperature requirements of Table 4.4, Group I/II shall be used.

D. Heat Input

The minimum amount of heat input shall be 40 kilojoules per inch (kJ/in.) and the maximum shall be 90 kJ/in. determined using AWS D1.5, Section 5.12.

E. Backing

Steel backing material for Welding Procedure Specification test plates may be composed of Grade 50W (Sulfur = 0.025 maximum) or HPS 70W material.

4.0 AISC CERTIFICATION

Only fabricators meeting the requirements of the AISC Quality Certification Program for "Major Steel Bridges" may be used to fabricate HPS 70W steel.

5.0 BASIS OF PAYMENT

Structural steel will be paid for at the contract lump sum price for "Approximately _____ LBS Structural Steel". No separate payment will be made for HPS 70W Steel. The approximate quantity shown in the contract pay item is an estimate based on the computed weight of the structural steel necessary to complete the work. No measurement for payment will be made for this pay item, and no adjustment in the contract lump sum price will be made for any variation from the approximate quantity shown except for revisions in the plans which affect the quantity of structural steel necessary to complete the work.

When revisions in the plans have been made which affect the quantities of structural steel, adjustments in compensation will be made by supplemental agreement.

Payment at the contract lump sum price for "Approximately _____ LBS Structural Steel" will be full compensation for shop painting.

The above prices and payments will be full compensation for all work covered by this section including but not limited to furnishing, fabricating, delivering, placing, erecting, cleaning, and shop painting; furnishing, erecting, and removing falsework; setting bearings and anchorages; welding; and assembling all structural joints.

Payment will be made under:

Approximately _____ LBS Structural Steel.....Lump Sum

CHARPY V-NOTCH TESTS**(SPECIAL)**

All structural steel furnished for main beam and girder members (for girder members see plans) shall meet the longitudinal Charpy V-Notch Tests specified in the supplementary requirements in ASTM A709-04a for zone 1. Unless otherwise noted on the plans, the material shall be marked and tested as non-fracture critical. Sampling and testing procedures shall be in accordance with AASHTO T243M (ASTM A673M). The (P) frequency of heat testing shall be used. For grade or grades of structural steel required, see Structure plans.

Obtain and submit certified mill test reports to the Materials and Tests Unit to show the results of each test required by this specification.

Material failing to meet the qualification requirements outlined above is unacceptable for use on this project.

VISUAL BARRIER WALL

(SPECIAL)

1.0 DESCRIPTION

This work consists of furnishing precast panels, structural steel, concrete, and all other materials; handling, transporting, fabricating, galvanizing, and storing materials; furnishing erection drawings, pile excavation, backfilling, erecting and installing the visual barrier wall members and all other materials as required by the plans, Standard Specifications and this Special Provision.

The Standard Plans allow a pile spacing of 10, 15 or 20 feet. Pile spacing greater than 15 feet will not be allowed for standard precast concrete panels. Provide consistent pile spacing the entire length of the wall. Use odd pile spacing, if necessary, only at the ends of the wall and at turning points as approved by the Engineer.

A maximum one foot drop or rise in elevation between wall sections is permitted. Elevation changes greater than one foot, if necessary, will be allowed only at the end of the wall. Top of wall elevation changes that result in a jagged appearance will not be allowed.

2.0 ALTERNATE PILE SPACING FOR STANDARD PRECAST PANELS

As an alternate, the Contractor may submit plans for pile spacing greater than 10 feet and less than 15 feet for review and approval. The excavated diameter, excavation depth and reinforcing steel shall be equal to the amount shown on the existing plans for the 15 feet pile spacing. A variance in the reinforcing steel will be allowed for the length of horizontal and number of vertical reinforcement bars in the precast panel for the alternate pile spacing.

Submit two sets of detailed plans for review. Include all details in the plans, including the size and spacing of required reinforcement necessary to fabricate the precast panels. Have a North Carolina Registered Professional Engineer check, seal and date the plans. After the plans are reviewed and, if necessary, the corrections made, submit one set of reproducible tracings on 22" x 34" sheets to become part of the contract plans.

3.0 ALTERNATE WALL TYPE

Walls that have been assigned "Approved" or "Approved for Provisional Use" status by the Product Evaluation Program will be considered for substitution to the detailed Standard Visual Barrier Wall only when noted on the plans. Alternate wall types, piles and pile spacing must meet the design and construction requirements of the project. Pile spacing greater than 20 feet will not be permitted. Alternate pile and wall structural stability and connection details shall conform to the current edition of the AASHTO LRFD Bridge Design Specifications.

Prior to submittal of Working Drawings, as described herein, submit a copy of the signed NCDOT Product Status Notification Letter and two sets of preliminary plans for review and approval. Include material specifications for all components. Once preliminary plans are approved, submit Working Drawings in accordance with all applicable portions of the requirements herein, including details necessary to fabricate and construct the proposed alternate.

Have a North Carolina Registered Professional Engineer check, seal and date the plans and, when requested, calculations. After the plans are reviewed and, if necessary, corrections made, submit one set of reproducible tracings on 22" x 34" sheets to become part of the contract plans.

4.0 MATERIALS AND FABRICATION OF STANDARD PRECAST PANELS

Provide materials and fabricate members in accordance with the requirements of Division 10 of the Standard Specifications for Roads and Structures.

Provide precast panels that are 4 inches \pm ¼ inch thick with an exposed aggregate finish on one face. The panel face with the aggregate finish shall be installed facing the roadway. The depth of the exposure is required to range from 0 to ¼ inch. Furnish three 12" x 12" samples for approval which establish the acceptable variations in color, texture, and uniformity. After the color, texture, and uniformity of the furnished samples are approved, produce a full scale panel unit meeting design requirements. This mock-up and the furnished samples establish the standard quality for determining acceptance of the panels. When producing the final installed panels, use fine and coarse aggregate, retarder, and cement from the same source as those used in the approved sample panels.

5.0 CONSTRUCTION METHODS

Complete the final survey of existing ground profile after clearing the wall area but prior to submitting any working drawings. Submit the final groundline survey with the working drawings.

If the Department is responsible for the survey, the Engineer field verifies the existing ground profile along the visual barrier wall. Contact the Engineer to obtain the survey information. Otherwise, complete the existing ground survey prior to submittal of working drawings.

Excavate holes with the diameters shown on the plans. Perform pile excavation to the depths shown on the plans and install piles as shown on the plans or in the accepted submittals with a tolerance of 1/2 inch per foot from vertical. Backfill excavations with concrete after placing piles.

A. Pile Excavation

Use equipment of adequate capacity and capable of drilling through soil and non-soil including rock, boulders, debris, man-made objects and any other materials encountered. Blasting is not permitted to advance the excavation. Blasting for core

removal is only permitted when approved by the Engineer. Dispose of drilling spoils in accordance with Section 802 of the Standard Specifications and as directed by the Engineer. Drilling spoils consist of all excavated material including water removed from the excavation either by pumping or drilling tools.

If unstable, caving or sloughing soils are anticipated or encountered, stabilize excavations with either slurry or steel casing. When using slurry, submit slurry details including product information, manufacturer's recommendations for use, slurry equipment information and written approval from the slurry supplier that the mixing water is acceptable before beginning drilling. When using steel casing, use either the sectional type or one continuous corrugated or non-corrugated piece. Steel casings should consist of clean watertight steel of ample strength to withstand handling and driving stresses and the pressures imposed by concrete, earth or backfill. Use steel casings with an outside diameter equal to the hole size and a minimum wall thickness of 1/4 inch.

B. Concrete Placement

Before placing concrete, center and support the pile in the excavation and check the water inflow rate in the excavation after any pumps have been removed. If the inflow rate is less than 6 inches per half hour, remove any water and free fall the concrete into the excavation. Ensure that concrete flows completely around the pile. If the water inflow rate is greater than 6 inches per half hour, propose a concrete placement procedure to the Engineer. The Engineer shall approve the concrete placement procedure before placing concrete.

Fill the excavation with Class A concrete in accordance with Section 1000 of the Standard Specifications except as modified herein. Provide concrete with a slump of 6 to 8 inches. Use an approved high-range water reducer to achieve this slump. Place concrete in a continuous manner and remove all casings.

6.0 WORKING DRAWINGS

Submit casting drawings for the precast face panels for approval in accordance with Article 1077-2 of the Standard Specifications prior to casting. Show the inserts, method of handling, and support details used for transportation on casting drawings. Submit metalwork fabrication drawings for approval prior to fabrication of steel wall components. Submit an erection plan and concrete face panel placing plan, including location of various heights of panels, for review and acceptance prior to fabrication of metalwork. Submit five sets of detail drawings.

7.0 METHOD OF MEASUREMENT

The quantity of visual barrier wall to be paid for will be the actual square feet of precast panels used in the completed and accepted wall. Measurement will be made of the total area of precast panels used in the wall.

8.0 BASIS OF PAYMENT

The quantity of visual barrier wall, measured as provided above, will be paid for at the contract unit price bid per square foot for "Visual Barrier Wall".

The unit price bid per square foot will be full compensation for all work covered by this Special Provision including, but not limited to, furnishing precast panels, structural steel, concrete, and all other materials; handling, transporting, fabricating, galvanizing, and storing materials; furnishing erection drawings, backfilling, pile excavation including any casing or slurry, and erecting and installing the visual barrier wall members.

Payment will be made under:

Visual Barrier Wall Square Foot

MASS CONCRETE**(SPECIAL)**

This special provision applies to the following elements:

- Structure 10 at Station 94+24.58 -L- (Bridge over Beaver Creek and All American Freeway on Fayetteville Outer Loop between SR 1415 and NC24, Right Lane): The footings of Interior Bents 1 and 2 are mass concrete elements.
- Structure 13 at Station 57+07.00 -RP1DB- (Bridge on -RP1DB- in Interchange Connecting Fayetteville Outer Loop and All American Freeway between SR 1415 and NC24): The footings, columns, and caps of Interior Bents 1, 2, 3, 4, 5, 6, 7, 8, and 9) are mass concrete elements.
- Structure 14 at Station 94+43.84 -COL1- (Bridge over Beaver Creek and All American Freeway on Fayetteville Outer Loop between SR 1415 and NC24): The footings of Interior Bents 1, 2, 3, 4, and 5 are mass concrete elements.
- Structure 16 at Station 45+07.87 -RP1C- (Bridge over Beaver Creek on Ramp 1C between Fayetteville Outer Loop Connector and SR 1007): The footings of Interior Bents 1 and 2 are mass concrete elements.

The Contractor shall provide an analysis of the anticipated thermal developments in the mass concrete elements using his proposed mix design, casting procedures, and materials. Additionally, the Contractor shall describe the measures and procedures he intends to use to limit the temperature differential to 35°F or less between the interior and exterior of the designated mass concrete elements during curing. The proposed plan to control the temperature differential shall be submitted to the Department for review and comments at the time approval is requested for the mass concrete mix design.

Maintenance of the specified thermal differential may be accomplished through a combination of the following:

- A. Selection of concrete ingredients to minimize the heat generated by hydration of the cement.
- B. Cooling component materials to reduce the temperature of the concrete while in its plastic state.
- C. Controlling the rate of placing the concrete.
- D. Providing internal cooling pipes.
- E. Insulating the surface of the concrete to prevent heat loss.
- F. Providing supplemental heat at the surface of the concrete to prevent heat loss.
- G. Other acceptable methods which may be developed by the Contractor.

Mass concrete shall be Class A or 6000 PSI Concrete as shown on the plans, vibrated, air-entrained, and shall contain an approved set-retarding, water-reducing admixture, and 30% flyash by weight of the total cementitious material. The total cementitious material shall not exceed 690 lbs. per cubic yard of concrete. The maximum water-cementitious material ratio shall be 0.366 for rounded aggregate and 0.410 for angular aggregate. The slump of the concrete shall not exceed six inches. The Contractor shall submit compressive strength results, the average of at least three cylinders made in the laboratory, of his proposed mix design. These cylinders shall show a minimum strength of 3500 psi at 28 days for Class A concrete and 6500 psi at 28 days for 6000 PSI Concrete.

The minimum compressive strength at 28 days of field placed Class A concrete shall be 3000 psi, and the minimum compressive strength at 28 days of field placed 6000 PSI Concrete shall be 6000 psi.

The Contractor shall meet the temperature monitoring requirements listed below for all elements designated as mass concrete. At the discretion of the Engineer, all temperature monitoring requirements may be waived provided the Contractor has proven to the satisfaction of the Engineer that he can limit the temperature differential to 35°F or less between the interior and exterior of given mass concrete element.

The Contractor shall provide and install a minimum of six temperature sensing devices in each mass concrete pour to monitor temperature differentials between the interior and exterior of the pour unless otherwise directed by the Engineer. These devices shall be accurate within $\pm 2^\circ\text{F}$ within the temperature range of 40°F to 180°F. One temperature sensing probe shall be placed near the center of mass of the pour, and another temperature sensing probe shall be placed at approximately two inches clear from the surface of the concrete furthest from the center of mass. The Engineer shall approve the locations of the other temperature sensing probes.

The monitoring devices shall be read and readings recorded at one-hour intervals, beginning when casting is complete to continuing until the maximum temperature is reached and two consecutive readings indicate a temperature differential decrease between the interior and exterior of the element. At the option of the Contractor, an approved strip-chart recorder furnished by the Contractor may record the temperature. If monitoring indicates the 35°F differential has been exceeded, the Contractor shall make the necessary revisions to the approved plan to reduce the differential on any remaining placements to 35°F or less. The Department must approve any revisions to the plan prior to implementations.

Flyash used in the mass concrete mix shall meet the requirements of Articles 1024-5 and 1024-7 of the Standard Specifications. Portland Cement shall meet requirements of AASHTO M85 for Portland Cement Type II.

The temperature of mass concrete at the time of placement shall not be less than 40°F nor more than 75°F.

The placement of the mass concrete shall be continuous until the work is completed and the resulting structures shall be monolithic and homogeneous.

The entire cost of this work shall be included in the unit contract prices bid for Class A Concrete or 6000 PSI Concrete, respectively.

POST-TENSIONING TENDONS

(SPECIAL)

1.0 DESCRIPTION

Post-Tensioning consists of furnishing, installing, stressing and grouting all post-tensioning systems. In this process, prestressing steel, which may be strands or wires, is installed through ducts in the steel girder webs and the concrete, stressed to a predetermined load, and anchored directly against the steel girder webs and the hardened concrete. Grout is then injected into the ducts to completely fill all remaining voids, and to seal the permanently stressed tendons.

Post-Tensioning Tendons also includes furnishing and installing all the hardware and any other appurtenant items necessary for the particular prestressing system used, including but not limited to ducts, anchorage assemblies, supplementary steel reinforcing bars, local zone reinforcement, and grout used for pressure grouting ducts and all associated operations. Post-Tensioning Tendons also includes any and all required inspection and testing, including providing access to the post-tensioned structure for such inspection and testing.

2.0 TERMINOLOGY

Anchorage: An assembly of various hardware components which secures a tendon at its ends after it has been stressed, and imparts the tendon force into the concrete.

Anchor Plate or Bearing Plate: That part of the anchorage which transfers the tendon force directly into the structure.

Anticipated Set: The wedge set assumed to occur in the design calculation of the post-tensioning forces at the time of load transfer.

Bleed: The autogenous flow of mixing water within or its emergence from, newly placed grout, caused by the settlement of the solid materials within the mass.

Coupler: A device used to transfer the prestressing force from one partial length prestressing tendon to another. (Strand couplers are not permitted.)

Duct: Material forming a conduit to accommodate prestressing steel installation and provide an annular space for the grout which protects the prestressing steel.

Fluidity: A measure of time, expressed in seconds necessary for a stated quantity of grout to pass through the orifice of a flow cone.

Grout: A mixture of cementitious materials and water with or without mineral additives or admixtures, proportioned to produce a pumpable consistency without segregation of the constituents, when injected into the duct to fill the space around the prestressing steel.

Grout Cap: A device that contains the grout and forms a protective cover sealing the post-tensioning steel at the anchorage.

Inlet: Tubing or duct used for injection of the grout into the duct.

Outlet: Tubing or duct to allow the escape of air, water, grout and bleed water from the duct.

Post-Tensioning: A method of prestressing where tensioning of the tendons occurs after the concrete has been cast and cured. The force in the stressed tendons is transferred to the concrete by means of anchorages.

Post-Tensioning Scheme or Layout: The pattern, size and locations of post-tensioning tendons provided by the Designer on the Contract Plans.

Post-Tensioning System: An assembly of proprietary hardware, including but not limited to anchorage assembly, local zone reinforcement, wedge plate, wedges, inlet, outlet, couplers, duct, duct connections, and grout cap, used to install a tendon of a particular size and type, and supplied by a particular manufacturer or manufacturers of post-tensioning components.

Pressure Rating: The estimated maximum pressure that water in a duct or in a duct component can exert continuously with a high degree of certainty that failure of the duct or duct component will not occur (commonly referred to as working pressure).

Set (Also Anchor Set or Wedge Set): Set is the total movement of a point on the strand just behind the anchoring wedges during load transfer from the jack to the permanent anchorages. Set movement is the sum of slippage of the wedges with respect to the anchorage head and the elastic deformation of the anchor components.

Strand: An assembly of several high strength steel wires wound together. Strands usually have six outer wires helically wound around a single straight wire of a similar diameter.

Tendon: A single or group of prestressing steel elements and their anchorage assemblies imparting prestress forces to a structural member or the ground. Also, included are ducts, grouting attachments, grout and corrosion protection filler materials or coatings.

Tendon Size: The number of individual strands or wires of a certain diameter in a tendon, or the diameter of a bar.

Tendon Type: The relative location of the tendon to the concrete shape, internal or external.

Thixotropic: The property of a material that enables it to stiffen in a short time while at rest, but to acquire a lower viscosity when mechanically agitated.

Wedge Plate: The hardware that holds the wedges of a multi-strand tendon and transfers the tendon force to the anchorage assembly. (Commonly referred to as anchor head)

Wedge: A conically shaped device that anchors the strand in the wedge plate.

3.0 ALTERNATE POST-TENSIONING DESIGNS

Alternative designs using a post-tensioning scheme other than that shown on the plans may be submitted by the Contractor for the Engineer's approval provided that the proposed alternative scheme fulfills the following requirements:

- (1) The prestress system is a type described in Section 4 of this Special Provision.
- (2) The net compressive stress in the concrete after all losses is no less than that provided by the post-tensioning scheme shown on the Plans, and no more than 110% greater than that provided by the scheme shown on the Plans.
- (3) The distribution of individual tendons at each cross section generally conforms to the distribution shown on the Plans.
- (4) The ultimate strength of the structure with the proposed post-tensioning scheme meets the requirements of Section 5 of the "AASHTO LRFD Bridge Design Specifications, Sixth Edition" and shall be equivalent to or greater than the ultimate strength provided by the original design.

- (5) Stresses in the concrete and prestressing steel at all sections and at all stages of construction meet the requirements of the Design Criteria noted on the Plans.
- (6) All provisions of the Design Criteria noted on the Plans shall be satisfied.
- (7) The Contractor fully redesigns and details, as required, the elements where the alternate post-tensioning scheme is proposed to be used.
- (8) The Contractor submits complete shop drawings, including post-tensioning scheme and system, reinforcing steel and concrete cover, for the Engineer's approval.
- (9) The Contractor submits design calculations, including short and long term prestress losses, for the Engineer's approval.
- (10) Any alternate post-tensioning scheme or system approved by the Engineer will result in no additional costs to the Department.
- (11) Any alternative post-tensioning scheme or system shall be designed and sealed by a responsible Specialty Engineer, licensed in the State of North Carolina.

4.0 MATERIALS

4.1 Prestressing Material:

4.1.1 Prestressing Steel:

- a) Strand: Unless otherwise noted on the plans, strand shall be uncoated, Grade 270, low relaxation 7-wire strand conforming to the requirements of ASTM A 416.
- b) Wires: Unless otherwise noted on the plans, wire shall be uncoated, low relaxation wire conforming to the requirements of ASTM A 421.

The proper use of strand and wires is predicated upon the use of suitable accessory materials. Details for the use of these materials shall be furnished by the manufacturer in connection with shop and working drawing submittals.

4.1.2 Post-Tensioning System: All post-tensioning systems are subject to the approval of the Engineer. All components of a post-tensioning system shall be from a single supplier. Prestressing steel meeting the above requirements may be obtained from another supplier.

4.1.3 Prestress Anchorages: All prestressing steel shall be secured at the ends by anchoring devices meeting the approval of the Engineer. The anchorages shall develop at least 100% of the minimum specified ultimate tensile strength of the prestressing steel, tested in an unbonded state without exceeding the anticipated set.

Certified copies of test results for the anchorage system shall be supplied to the Engineer at no additional cost. The anchorage shall be so arranged that the prestressing force in the tendon may be verified prior to the removal of the stressing equipment.

Galvanize the embedded body of the anchorage in accordance with ASTM 123. Other components of the anchorage including wedges, wedge plate and local zone reinforcement are not required to be galvanized. Construct the bearing plate and wedge plate from ferrous metal. Equip all anchorages with a permanent grout cap that is vented and bolted to the anchorage.

Cast anchorages with grout outlets suitable for inspection from either the top or front of the anchorage. The grout outlet will serve a dual function of grout outlet and postgrouting inspection access. The geometry of the grout outlets must facilitate being drilled using a 3/8" diameter straight bit to facilitate endoscope inspection directly behind the anchor plate. Anchorages may be fabricated to facilitate both inspection locations or may be two separate anchorages of the same type each providing singular inspection entry locations.

Two part wedges shall not be used. The Contractor shall furnish and use acceptable three part wedges with appropriate anchorage discs for anchoring post-tensioning strands. Provide wedge plates with centering lugs or shoulders to facilitate alignment with the bearing plate.

The anchoring devices shall effectively distribute tendon forces to the concrete. Such devices shall conform to the following requirements:

- a) Article 5.10.9.7.2 of the AASHTO LRFD Bridge Design Specifications. The nominal concrete compressive strength at time of application of the post-tensioning tendon force used to determine bearing resistance shall be limited to 4,500 psi as the absolute maximum value, even if the actual concrete strength determined through testing is in excess of 4,500 psi at the time of transfer (load application).
- b) Bending stresses in the plates or assemblies induced by the pull of the prestressing steel shall not exceed the yield point of the material or cause visible distortion of the anchorage plate when 100% of the ultimate strength of the tendon is applied. Certified test reports from an approved independent testing laboratory, verifying compliance with this requirement, shall be provided to the Engineer for each type and/or size of anchoring device.

Alternatively, anchorage devices which do not meet with either or both of the above requirements [(a) and (b)] may be accepted based upon previously approved usage in the State of North Carolina or on the basis of new or previous test performed in accordance with and meeting the requirements of articles 10.3.2 and 10.3.2.3.10 of the AASHTO LRFD Bridge Construction Specifications, all at no cost to the Department. Also, in such cases, any additional confinement reinforcement or

modification to existing reinforcement required for satisfactory performance of the anchorage devices shall be incorporated in the structure at no additional cost.

4.1.4 Inlets, Outlets, Valves and Plugs: Provide permanent grout inlets, outlets, and threaded plugs made of ASTM A 240 Type 316 stainless steel, nylon or polyolefin materials. For products made from nylon, the cell class of the nylon according to ASTM D5989 shall be S-PA0141 (weather resistant), S-PA0231 or S-PA0401 (ultimate strength not less than 10,000 psi with UV stabilizer added). Products made from polyolefin shall contain antioxidant(s) with a minimum Oxidation Induction Time (OIT) according to ASTM D 3895 of not less than 20 minutes. Perform OIT test on samples taken from the finished product. Test the remolded finished polyolefin material for stress crack resistance using ASTM F 2136 at an applied stress of 348 psi resulting in a minimum failure time of 3 hours.

All inlets and outlets will be equipped with pressure rated mechanical shut-off valves or plugs. Inlets, outlets, valves and plugs will be rated for a minimum pressure rating of 150 psi. Use inlets and outlets with a minimum inside diameter of 3/4 inch for strand and 3/8 inch for single bar tendons and four-strand duct.

All grout vents, injection and ejection pipes shall be shown on working drawings.

4.1.5 Permanent Grout Caps: Use permanent grout caps made from ASTM A 240 Type 316L stainless steel. Seal the cap with "O" ring seals or precision fitted flat gaskets placed against the bearing plate. Place a grout vent on the top of the cap. Grout caps must be rated for a minimum pressure rating of 150 psi. Use ASTM A 240 Type 316L stainless steel bolts to attach the cap to the anchorage. Provide certified test reports documenting the chemical analysis of the steel.

4.1.6 Ducts:

- a) **General:** Unless specifically noted on the Plans or otherwise approved by the Engineer, ducts for post-tensioning shall conform to the requirements of this specification. Ducts embedded in the concrete for prestressing steel shall be galvanized ferrous metal.
- b) **Size of Ducts:** Ducts for multi-strand tendons shall have a minimum size which provides an inside area at least 2.5 times the net area of the prestressing steel.
- c) **Corrugated Metal Ducts:** Corrugated metal ducts shall be galvanized. Rigid metal ducts may be fabricated with either welded or interlocked seams. Ducts shall bend without crimping or flattening and shall have sufficient strength to maintain their correct alignment during placing of concrete. Joints between sections of ducts shall have positive metallic connections, which do not result in angle changes at the joints.
- d) **Epoxy Coated Metal Ducts:** Epoxy Coated Metal Ducts shall not be used.

- e) **Polyethylene (P.E.) Ducts and Pipes:** Polyethylene (P.E.) Ducts and Pipes shall not be used.

4.1.7 Grout:

- a) **General:** The Contractor shall use a Department approved pre-packaged grout in lieu of an on site batch mix. It is the Contractor's responsibility to consult the manufacturer to determine if the pre-packaged grout selected is suitable for grouting post-tensioning ducts.
- b) **Materials:** Contractor shall contact the Materials and Test Unit for a list of approved pre-packaged grouts.

Water shall comply with Section 1024 of the Standard Specifications and shall be potable, clean, and free of injurious quantities of substances known to be harmful to the prestressing steel or pre-packaged grout.

Admixtures, if approved by the Department, shall impart the properties of low water content, good flowability, minimum bleed and expansion if desired. Its formulation shall contain no chemicals in quantities that may have harmful effects on the prestressing steel or grout. Admixtures containing chlorides in excess of 0.5% by weight of admixture (assuming 1.0 lb. of admixture per sack (95 lb.) of grout), fluorides, sulfites and nitrates shall not be used.

Aluminum powder of proper fineness and quantity or other approved gas evolving material that is well dispersed through the mixture may be used to obtain expansion of the grout.

All admixtures shall be used in accordance with the instructions of the manufacturer. The date of manufacture shall be clearly stamped on each container. No admixture for which the shelf life recommended by the manufacturer has expired shall be used.

- c) **Requirements:** If no compressive strength or volume change is specified on the plans or in the applicable section of the Standard Specifications or special provision for the structure, provide non-metallic, non-shrink grout with minimum compressive strengths and volume changes as follows:

Property	Requirement
Compressive Strength @ 7 days	3000 psi
Compressive Strength @ 28 days	5000 psi
Volume Change @ 24 hours	0.0% to < 0.10%
Volume Change @ 28 days	< or = to +0.20%

A testing laboratory approved by the Department shall be used to test pre-packaged grout. Provide laboratory test results for setting time, volume change, compressive strength and fluidity with the grouting of each post-tensioning duct. Submit compressive strength for at least two 2 in. cube specimens at the age of 3, 7, 14, and 28 days for a total of at least eight cube specimens tested. Perform laboratory tests in accordance with the following:

Property	Test Method
Setting Time	ASTM C953
Volume Change	ASTM C1090
Compressive Strength	ASTM C942
Fluidity	ASTM C939

Unless otherwise required in the Contract or by the Engineer, a grout mix design submittal is not required when using an approved pre-packaged grout. The Contractor shall not use the pre-packaged grout until written acceptance has been received. Acceptance of approved pre-packaged grout does not relieve the Contractor of the responsibility to furnish a product that meets the Contract requirements.

- d) **Sampling and Placement:** The applicable section of the Standard Specifications or special provision for the structure and 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 two cube specimens at 28 days.

Contractor is responsible for the placement of grout in accordance with the manufacturer's recommendations unless directed otherwise by the Engineer.

Grout samples for testing shall be furnished by the Contractor at no cost to the Department.

4.2 Samples for Testing:

4.2.1 General: Testing shall conform to the applicable ASTM Specifications for the prestressing material used.

All material samples for testing shall be furnished by the Contractor at no cost to the Department.

Job site or site referred to herein shall be considered the location where the prestressing steel is to be installed whether at the bridge site or a removed casting yard.

4.2.2 Prestressing Steel and Components: Samples for testing shall be furnished as described below for each manufacturer of prestressing strand, wire, and anchorage assemblies to be used on the project.

A certification stating the manufacturer's minimum guaranteed ultimate tensile strength shall be submitted for each sample of prestressing steel strand or wires furnished for testing.

The following samples of materials selected by the Engineer at the plant or job site from the prestressing steel used for post-tensioning operations shall be furnished by the Contractor to the Engineer well in advance of anticipated use:

- a) For strand: three randomly selected samples, 5 feet long, per manufacturer, per size of stand, per shipment, with a minimum of one sample for every ten reels delivered.
- b) For wire: three randomly selected samples, 5 feet long, per manufacturer per size of wire per heat of steel, per shipment, with a minimum of one sample for every ten coils delivered.
- c) For anchorage assemblies: two samples of each size, per manufacturer, per heat of steel.

One of each of the samples furnished to represent a lot shall be tested. The remaining sample(s), properly identified and tagged, shall be stored by the Engineer for future testing in the event of loss or failure of the component represented to meet minimum strength requirements. For acceptance of the lot represented, test results shall show that 100% of the minimum guaranteed ultimate tensile strength has been met.

4.2.3 Lots and Identification: A lot is that parcel of components as described herein. All anchorage assemblies of each size from each mill heat of steel, all wire from each manufactured coil and all strand from each manufactured reel to be shipped to at the site shall be assigned an individual lot number and shall be tagged in such a manner that each such lot can be accurately identified at the job site. Records shall be submitted to the Engineer identifying assigned lot numbers with the heat, coil or reel of material represented. All unidentified prestressing steel or anchorage assemblies received at the site will be rejected. Also, loss of positive identification of these items at any time will be cause for rejection.

4.3 Approval of Materials: The approval of any material by the Engineer shall not preclude subsequent rejection if the material is damaged in transit or later damaged or found to be defective.

5.0 TESTING BY THE CONTRACTOR

5.1 Tendon Modulus of Elasticity: This test will not be required if the Contractor can demonstrate to the satisfaction of the Engineer, valid results for the tendon modulus of elasticity from previous projects. Such results must be for the same type of strand, size, material and complement of strands per tendon as required for this project and must have been performed under test conditions equal to or better than those described below.

For the purpose of accurately determining the tendon elongations while stressing, the Contractor shall bench test two samples of each size and type of tendon to determine the modulus of elasticity prior to stressing the initial tendon.

For the purpose of this test, the bench length between anchorages shall be at least 30 feet and the tendon duct shall be at least 2 inch clear of the tendon all around. The test procedure shall consist of stressing the tendon at an anchor assembly with a load cell at the dead end. The test specimen shall be tensioned to 80% of ultimate in ten increments and then detensioned from 80% of ultimate to zero in ten decrements. For each increment and decrement, the gauge pressure, elongations and load cell force shall be recorded. Elongations of the tendon shall be noted for both ends and the central 26 feet, and shall be measured to an accuracy of 1/32 inch. The elongations shall be corrected for the actual anchorage set of the dead end.

The modulus shall be calculated as follows:

$$E = \frac{PL}{Adl}$$

Where;

P = force in tendon.

L = distance between pulling wedges and dead end wedges or exact length in center 26 feet of the tendon.

A = cross sectional area of the tendon based on nominal area.

dl = strand elongation for load P.

The theoretical elongation shown on the post-tensioning shop or working drawings shall be reevaluated by the Contractor using the results of the test. When the modulus of elasticity from the bench test varies from the modulus of elasticity used for shop or working drawings by more than 1%, the Contractor shall submit revisions to the theoretical elongations, using the Modulus of Elasticity determined through testing, to the Engineer for approval.

When the observed elongations of the tendons in the erected structure fall outside the acceptable tolerances or to otherwise settle disputes, additional Tendon Modulus of Elasticity Tests may be required to the satisfaction of the Engineer.

If the source of prestressing steel changes during the project, additional test series or substantiation from previous projects, not to exceed two per source shall be required.

The apparatus and methods used to perform the test shall be proposed by the Contractor and be subject to the approval of the Engineer. Furthermore, this test shall be conducted by the Contractor in the presence of the Engineer.

5.2 In Place Friction Test: This test is intended to demonstrate that the friction characteristics, losses and resulting tendon forces are in agreement with the design assumptions.

For tendons in excess of 33 feet long, the Contractor shall test in place a minimum of one tendon in each tendon group performing the same function. Functional tendon groups are cantilever tendons, continuity tendons, draped external tendons or continuous profiled tendons passing through one or more spans. The selected tendon shall be representative of the size and length of the group of tendons being tested. In this respect, the function of two or more tendons may be the same even though their actual profiles and lengths differ.

The test procedure shall consist of stressing the tendon at an anchor assembly with a load cell or a second certified jack at the dead end. The test specimen shall be tensioned to 80% of ultimate tendon strength in eight equal increments, and detensioned in eight equal decrements. For each increment and decrement, the gauge pressure, elongations and load cell force shall be recorded. Account shall be taken of any wedge seating in both the live end (i.e., back of jack) and the dead end (i.e., back of load cell), and of any friction within the anchorages, wedge plates and jack as a result of slight deviations of the strands through these assemblies. For long tendons requiring multiple jack pulls with intermediate temporary anchoring, care shall be taken to keep an accurate account of the elongation at the jacking end allowing for intermediate wedge seating and slip of the jacks' wedges.

The test shall be conducted using Engineer approved lubricants, if required, to meet the expected friction coefficient.

If the elongations fall outside the $\pm 5\%$ range when compared to the anticipated elongations, the Contractor will be required to investigate the reason, and make revisions to his post-tensioning operations or provide detailed calculations confirming the final tendon forces are in agreement with the Plans.

In reconciling theoretical and actual elongations, the value of the expected friction and wobble coefficients shall not be varied by more than $\pm 10\%$. Significant shortfall in elongations is indicative of poor duct alignments and/or obstructions. The Contractor shall be required to correct or compensate for such elongations in a manner to be proposed by the Contractor and reviewed and approved by the Engineer at no additional cost to the Department.

One successful friction test for each type and size of tendon (tendon group) will be required for the project.

If, during the course of routine stressing operations, there are irreconcilable differences between forces and elongations, or other difficulties, the Engineer reserves the right to require additional in place friction testing at no additional cost to the Department.

The apparatus and methods used to perform the test shall be proposed by the Contractor and be submitted to the Engineer for approval. Furthermore, this test shall be conducted by the Contractor in the presence of the Engineer.

Correction or adjustment of elongations as a consequence of the results of the friction test is the responsibility of the originator of the stressing and elongation calculations.

5.3 Test Reports Required: Two test reports of the "Tendon Modulus of Elasticity Test" shall be submitted to the Engineer at least 30 days prior to installing the tendon.

Two test reports of the "In Place Friction Test" shall be submitted to the Engineer within two weeks after successful installation of the test tendon.

5.4 Payment for Testing: Testing by the Contractor will not be paid for separately but shall be incidental to the price paid for the post-tensioning tendons.

5.5 Application of Test Results: The theoretical elongations shown on the post-tensioning shop or working drawings shall be reevaluated by the Contractor using the results of the tests for Tendon Modulus of Elasticity and In Place Friction as appropriate and corrected as necessary. Revisions to the theoretical elongations shall be submitted to the Engineer for approval.

6.0 PROTECTION OF PRESTRESSING STEEL

6.1 Shipping, Handling and Storage: All prestressing steel shall be protected against physical damage and corrosion at all times from manufacturer to final grouting or encasing in the concrete. Prestressing steel that has sustained physical damage at any time shall be rejected. Any reel that is found to contain broken wires shall be carefully inspected during use and lengths of strand containing broken wires shall be removed and discarded. The wire shall be bright and uniformly colored, having no foreign matter or pitting on its surface.

Prestressing steel shall be packaged in containers or shipping forms for protection of the steel against physical damage and corrosion during shipping and storage. A corrosion inhibitor which prevents rust or other results of corrosion shall be placed in the package or form, or shall be incorporated in a corrosion inhibitor carrier type packaging material, or when permitted by the Engineer, may be applied directly to the steel. The corrosion inhibitor shall have no deleterious effect on the steel or the concrete or bond strength of steel to concrete. Inhibitor carrier type packaging material shall conform to the

provisions of Federal Specification MIL-P-3420. Packaging or forms damaged from any cause shall be immediately replaced or restored to the original condition.

The shipping package or form shall be clearly marked with a statement that the package contains high-strength prestressing steel, the care to be used in handling, and the type, kind and amount of corrosion inhibitor used, including the date when placed, safety orders and instructions for use. Low relaxation (stabilized) strand shall be specifically designated per requirements of ASTM A 416. All strands not so designated shall be rejected.

6.2 During Installation in the Structure: When acceptable prestressing steel for post-tensioning is installed in the ducts after completion of concrete curing and if stressing and grouting are completed within 7 calendar days after the installation of the prestressing steel, rust which may form during these 7 days will not be cause for rejection of the steel. Post-tensioning steel installed, tensioned and grouted in this manner, all within 7 calendar days, will not require the use of a corrosion inhibitor in the duct following installation of the prestressing steel.

Post-tensioning steel installed as above but not grouted within 7 calendar days shall be protected from corrosion. The method of protection shall be determined by the Contractor and shall be approved by the Engineer. Water soluble oil shall not be allowed as a corrosion inhibitor or friction reducer.

Exposure of the post-tensioning steel, from removal of protective packaging of the strands to grouting of the strand in the post-tensioning duct in accordance with these specifications, shall be limited to 30 calendar days. Except when approved by the Engineer in writing, failure to grout tendons within the 30 calendar days specified shall result in stoppage of the affected work and no invoices shall be processed for payment of that affected work.

7.0 FABRICATION

7.1 General: All post-tensioning anchorages, ducts, vent pipes, miscellaneous hardware, reinforcing bars, and other embedments shall be accurately and securely fastened at the locations shown on the Plans or on the approved Shop or Working Drawings or as otherwise approved by the Engineer.

7.2 Ducts: Ducts shall be accurately aligned and positioned at the locations shown on the Plans or according to the approved Shop or Working Drawings or as otherwise approved by the Engineer. All internal ducts shall be securely fastened in position at regular intervals not exceeding 1'-6" to prevent movement, displacement or damage from concrete placement and consolidation operations. The method and spacing of duct supports shall be shown on appropriate Shop Drawings.

All alignments, including curves and straight portions, shall be smooth and continuous with no lips, kinks or dents.

All ducts shall be carefully checked and repaired as necessary before the placing of any concrete commences. If a duct requires repair, the repair method shall be subject to approval by the Engineer. The use of any tape to repair or seal a duct shall not be permitted.

The tolerance on the location of the ducts for the tendons shall be as specified in section 7.5.

After installing the ducts in the forms and until final tendon grouting is complete, all ends of ducts, connections to anchorages, splices, inlets, outlets, and the like shall be sealed at all times to prevent the entry of water and debris. An absolute seal of anchorage and duct termination locations shall be provided by using plumber's plugs or equal. Grout inlets and outlets shall be installed with plugs or valves in the closed position, but low point outlets may be open. The use of duct tape shall not be permitted.

7.3 Splices and Joints: All splices, joints, couplings, connections (inlet and outlet) and valves shall be part of the approved post-tensioning system. At splices and joints, and connections to anchorages, ducts shall be smoothly aligned and secured with no lips or kinks. They shall be joined in a manner which positively prevents the entrance of cement paste and water from the concrete or unwanted leakage of grout during subsequent grouting operations. The use of any tape shall not be permitted as a method to seal or join splices, joints, or connections.

7.4 Grout Vents, Injection and Ejection Pipes: All ducts or anchorage assemblies for permanent post-tensioning shall be provided with pipes or other suitable connections at locations as shown on the Plans and shop drawings. As a minimum, ducts shall be vented in the following positions:

- a) Top of the tendon anchorage
- b) Top of the grout cap
- c) At the high points of the duct when the vertical distance between the highest and lowest point is more than 6 inches
- d) At all low points
- e) At other locations required by the Engineer

All connections to ducts shall be made with metallic or plastic structural fasteners.

Vent and grouting pipes shall be mortar tight and shall provide means for injection of grout through the vents and for sealing the vents. Duct tape shall not be used to join or repair ducts or make connections.

Grout injection pipes shall be fitted with positive mechanical shut-off valves. Vents and ejection pipes shall be fitted with valves, caps or other devices capable of withstanding the grout pumping pressures. Grout tubes shall be extended a sufficient distance out of the concrete member to allow for proper closing of the valves.

All grout caps used must be installed to prevent entrapment of air or water voids and must provide 100% coverage of all tendons.

7.5 Tolerances: Post-tensioning duct tolerance shall be $\pm 1/4$ inch in the horizontal direction and $\pm 1/2$ inch in the vertical direction.

Entrance and exit angles of tendon paths at anchorages and/or at faces of concrete shall be within ± 2 degrees of desired angle measured in any direction, and shall be accomplished with smooth transitions without any kinks.

Angle changes at duct joints shall not be greater than $\pm 1/2$ degrees in any direction, and shall be accomplished with smooth transitions without any kinks.

Anchorage shall be located within $\pm 1/4$ inch of desired position laterally and ± 1 inch along the tendon, except that all minimum cover and clearance requirements must be maintained.

Anchorage confinement reinforcement in the form of spirals, multiple U shaped bars or links, shall be positioned to start within $1/2$ inch of the inside face of the steel girder web, and shall be properly centered around the duct.

In the event of conflicts between the reinforcement and post-tensioning duct, in general, the position of the post-tensioning duct shall prevail and the reinforcement shall be adjusted locally with the approval of the Engineer.

8.0 PLACING CONCRETE

8.1 Precautions: The Contractor shall exercise great care when placing and consolidating concrete so as not to displace or damage any of the post-tensioning ducts, anchorage assemblies, splices and connections, reinforcement or other embedments.

8.2 Proving of Post-Tensioning: Upon completion of concrete placement the Contractor shall prove that the post-tensioning ducts are free and clear of any obstructions or damage and will be able to accept the intended post-tensioning tendons by passing a torpedo through the ducts. The torpedo shall have the same cross-sectional shape as the duct, and be $1/4$ inch smaller all around than the clear, nominal inside dimensions of the duct. No deductions to the torpedo section dimensions shall be made for tolerances allowed in the manufacture or fixing of the ducts. For curved ducts, the length shall be determined by the Contractor such that when both ends touch the outermost wall of the duct, the torpedo is $1/4$ inch clear of the innermost wall; it need not be longer than 2 ft. If the torpedo will not travel completely through the duct, the member shall be rejected, unless a workable repair can be made to clear the duct, all to the satisfaction of the Engineer. The torpedo shall be passed through the duct easily, by hand, without resorting to excessive effort or mechanical assistance.

8.3 Problems and Remedies: If the ducts or any part of the work is found to be deficient, it shall be rejected. No remedial or repair work shall be permitted without the approval of the Engineer.

9.0 INSTALLING TENDONS

Post-tensioning strands may be pushed or pulled through the ducts to make up a tendon. Pushing shall be done with care so as to avoid snagging on any lips or joints in the ducts. The Contractor shall take precautions by rounding off the end of the strand or fitting it with a smooth protective cap. During the installation of the post-tensioning strand into the duct, the strand shall not be intentionally rotated by any mechanical device.

Alternatively, strands may be assembled into the tendon which then may be pulled through the duct together using a special steel wire sock ("Chinese finger") or other device attached to the end. The ends of the strands may not be electric arc welded together for this purpose. Strands may be brazed together for pulling as long as 3 feet of strand from the brazed end is removed after installation. The end of the pre-assembled tendon shall be rounded for smooth passage through the duct. Cutting shall be done with an abrasive saw or similar. Flame cutting shall not be allowed.

Installation of tendons in ducts prior to concrete placement shall not be allowed.

No permanent tendons shall be installed prior to the completion of testing as required by these specifications or Plans, except for the "In Place Friction Test" where only the tendon to be tested may be installed prior to successful completion of the test.

10.0 POST-TENSIONING OPERATIONS

10.1 General: Post-tensioning forces shall not be applied until the concrete has attained the specified compressive strength as determined by cylinder tests.

10.2 Stressing Tendons: All post-tensioning steel shall be tensioned by means of hydraulic jacks. The post-tensioning force shall not be less than that required by the plans or approved shop drawings, or as otherwise approved by the Engineer. Monostrand jacks shall not be utilized for stressing tendons.

10.2.1 Maximum Stress at Jacking: The maximum temporary stress (jacking stress) in the post-tensioning steel shall not exceed 81% of its specified minimum ultimate tensile strength. Tendons shall not be overstressed to achieve the expected elongation.

10.2.2 Initial and Permanent Stresses: The post-tensioning steel shall be anchored at initial stresses that will result in the long term retention of permanent stresses or forces of not less than those shown on the Plans or the approved shop drawings.

Unless otherwise approved by the Engineer, the initial stress after anchor set shall not exceed 70% of the specified ultimate tensile strength of the post-tensioning steel.

Permanent stress and permanent force are the stress and force remaining in the post-tensioning steel after all losses, including long term creep and shrinkage of concrete, elastic shortening of concrete, relaxation of steel, losses in the post-tensioning steel from the sequence of stressing, friction and unintentional wobble of the ducts, anchor set, friction in the anchorages and all other losses peculiar to the post-tensioning system.

10.2.3 Stressing Sequence: Stressing of all tendons shall take place from the same end of the bent cap. Any exception must be approved by the Engineer. The sequence of installation and stressing shall be in accordance with the Plans or approved shop drawings or as otherwise approved by the Engineer.

10.3 Stressing Equipment: Equipment for tensioning the tendons shall be furnished by the manufacturer of the post-tensioning system (tendons, hardware, anchorages, etc.).

10.3.1 Stressing Jacks and Gauges: Each jack used to stress tendons shall be equipped with a pressure gauge for determining the jacking pressure. The pressure gauge shall have an accurately reading dial at least 6 inches in diameter.

10.3.2 Calibration of Jacks and Gauges: Each jack and its gauge shall be calibrated as a unit, with the cylinder extension in the approximate position it will be in at the final jacking force. Calibration shall be done when the jack is connected to the equipment (pumps and gauges) in the identical configuration as will be used on the job site (e.g. with the same length hydraulic lines). Initial calibration of the jacks and gauges shall be performed by the post-tensioning supplier or an independent laboratory. A proven load cell, calibrated within the past 12 months, shall be used to calibrate the stressing equipment. For each jack and gauge unit used on the project, the Contractor shall furnish certified calibration charts and curves to the Engineer prior to stressing the first tendon.

Certified calibration charts and curves shall be provided to the Engineer prior to the start of the work and at every 6 months thereafter, or as requested by the Engineer. At the option of the Contractor, calibrations subsequent to the initial calibration with a load cell may be accomplished by the use of a master gauge. The master gauge shall be supplied by the Contractor in a protective waterproof container capable of protecting the calibration of the master gauge during shipment to a laboratory. The Contractor shall provide a quick-attach coupler next to the permanent gauge in the hydraulic lines which enables the quick and easy installation of the master gauge to verify the permanent gauge readings. The master gauge shall be calibrated and provided to the Engineer. The master gauge shall remain in the possession of the Engineer for the duration of the project.

Any repair of the jacks, such as replacing seals or changing the length of the hydraulic lines, shall be cause for recalibration of the jacks using a load cell.

No extra compensation shall be allowed for the initial or subsequent calibrations, or for the use and required calibrations of the master gauge.

10.4 Stand-by Equipment: During post-tensioning operations, the Contractor shall provide a stand-by stressing jack with gauges located on the job site. The stand-by stressing jack and gauges shall be calibrated as described in Section 10.3 of this Special Provision. The stand-by equipment will be provided at no additional cost to the Department.

10.5 Elongations and Agreement Forces: The post-tensioning operation shall be so conducted such that the forces being applied to the tendon and the elongation of the post-tensioning tendon can be measured at all times.

Elongations shall be measured to the nearest 1/16 inch.

For the required tendon force, the observed elongation shall agree within 5% of the theoretical elongation or the entire operation shall be checked and the source of error determined and remedied to the satisfaction of the Engineer before proceeding further. The tendon shall not be overstressed to achieve the theoretical elongation.

In the event that agreement between the observed and theoretical elongations at the required force falls outside the acceptable tolerances, the Engineer may, at his discretion and without additional compensation to the Contractor, require additional test for "Tendon Modulus of Elasticity" and/or "In-Place Friction" in accordance with 5.1 and 5.2 of this Special Provision.

10.6 Friction: The Contract Plans were prepared based on the assumed friction and wobble coefficients and anchor set noted on the Plans. The Contractor shall submit calculations and show a typical tendon force diagram, after friction, wobble and anchor set losses, on the shop drawings based upon the expected actual coefficients and values for the post-tensioning system to be used. These coefficients and values shall be shown on the shop drawings.

If, in the opinion of the Engineer, the actual friction significantly varies from the expected friction, the Contractor shall revise the post-tensioning operations such that the final tendon force is in agreement with the Plans.

If friction must be reduced, the Contractor shall submit a plan of friction reduction to the Engineer for approval. Lubricants shall be flushed from the duct as soon as possible after stressing is completed by use of oil-free air. The ducts shall be flushed again just prior to the grouting operations. Water soluble oil shall not be used as a lubricant.

10.7 Wire Failures in Post-Tensioning Tendons: Multi strand post-tensioning tendons having wires which failed by breaking or slippage during stressing may be accepted provided the following conditions are met:

- (a) The completed structure shall have a final post-tensioning force of at least 98% of the design total post-tensioning force.
- (b) Any single tendon shall have no more than 5 % reduction in cross-sectional area of post-tensioning steel due to wire failure.

As an exception, any of the above conditions may be waived with the approval of the Engineer, when conditions permit the Contractor to propose acceptable alternative means of restoring the post-tensioning force lost due to wire failure.

10.8 Cutting of Post-Tensioning Steel: Post-tensioning steel shall be cut by an abrasive saw within $\frac{3}{4}$ inch to $1\frac{1}{2}$ inches away from the anchoring device. Flame cutting of post-tensioning steel is not allowed.

10.9 Record of Stressing Operations: The Contractor shall keep a record of the following post-tensioning operations for each tendon installed:

- (a) Project name, number.
- (b) Contractor and/or subcontractor.
- (c) Tendon location, size and type.
- (d) Date tendon was first installed in ducts.
- (e) Coil/reel number for strands or wires
- (f) Assumed and actual tendon cross-sectional area.
- (g) Assumed and actual tendon modulus of elasticity.
- (h) Date stressed.
- (i) Jack and gauge numbers per end of tendon.
- (j) Required jacking force.
- (k) Gauge pressures.
- (l) Elongations (theoretical and actual).
- (m) Anchor sets (anticipated and actual).
- (n) Stressing sequence (i.e. tendons to be stressed before and after).
- (o) Stressing mode (one end/ two ends/ simultaneous).
- (p) Witnesses to stressing operation (Contractor and inspector).
- (q) Date grouted, days from stressing to grouting, grouting pressure applied, and injection end.

Any other relevant information shall also be recorded. The Contractor shall provide the Engineer with a complete copy of all stressing and grouting operations

10.10 Tendon Protection: The Contractor shall install grout caps and seal all other tendon openings within four hours of stressing. If acceptance of the tendon is delayed, all tendon openings shall be sealed and the open ends of the anchorage(s) shall be

temporarily weatherproofed. If tendon contamination occurs, the tendon shall be removed and replaced at no additional cost to the Department.

11.0 GROUTING OPERATIONS

- 11.1 General:** Within 30 calendar days after first exposure of the post-tensioning steel, ducts shall be grouted in accordance with these specifications. Except when approved by the Engineer in writing, failure to grout tendons within the 30 calendar days specified shall result in stoppage of the affected work and no invoices shall be processed for payment of that affected work.

After stressing and prior to grouting, tendons shall be protected against corrosion or harmful effects of debris, by temporarily plugging or sealing all openings and vents until the tendon is grouted.

When stressing has been completed and the stressed tendons have been accepted by the Engineer, the annular space between the tendons and the duct shall be grouted.

- 11.2 Equipment:** The grout mixer shall be a colloidal mixer capable of continuous mechanical mixing and shall produce a grout free of lumps and undispersed cement. The equipment shall be able to pump and mix grout in a manner which will comply with all the provisions specified herein. Accessory equipment which will provide for accurate solid and liquid measures shall be provided to batch all materials.

Grout pumps shall be positive displacement type and shall be able to produce an outlet pressure of at least 145 psi. Pumps shall have seals adequate to prevent oil, air or other foreign substances from entering into the grout and to prevent loss of grout or water. A pressure gauge having a full scale reading of no more than 300 psi shall be placed at some point in the grout line between the pumping outlet and the duct inlet. The grouting equipment shall contain a screen having clear opening of 1/8 in. maximum size to screen the grout prior to its introduction into the grout pump. If grout with an additive is used, a screen opening of 3/16 in. is satisfactory. This screen shall be easily accessible for inspection and cleaning. The grouting equipment shall utilize a gravity feed to the pump inlet from a hopper attached to and directly over it. The hopper must be kept at least partially full at all times during the pumping operation to prevent air from being drawn into the post-tensioning duct. Under normal conditions, the grout equipment shall be capable of continuously grouting the longest tendon on the project in not more than 20 minutes.

- 11.3 Stand-by Equipment:** During grouting operations, the Contractor shall provide a stand-by grout mixer and pump. Where water is not supplied through the public water supply system, a water storage tank of sufficient capacity must be provided.

Stand-by equipment shall be provided at no additional cost to the Department.

- 11.4 Field Trial Tests:** Field trial batching and testing shall be performed with the same materials, personnel, and equipment used in production grouting. Field trial tests shall be conducted at least 1 week prior to initiation of production grouting.

Chloride ion content shall be independently tested on a trial batch to be shown it is below the limits of this specification for the mixed grout. All materials, including the water, shall be the same source as will be used for the production grouting.

One chloride ion concentration test shall be performed on the mixed grout per project at a minimum prior to start of grouting operations, with an additional test for each 40,000 lb. of dry weight material.

Reject all bags of grout that contain clumps.

The weight of the grout bags shall be verified prior to beginning grouting operations and monitored throughout. After initial approval of an average weight by the Engineer, grout bags may be monitored at the frequency of one bag per day. If irregularities are determined during the initial weighing or monitoring, the water content of the grout should be adjusted accordingly.

- 11.5 Mixing:** Water shall be added to the mixer first, followed by pre-packaged grout and admixture, or as required by the admixture manufacturer. Mixing shall be of such duration as to obtain a uniform thoroughly blended grout, without excessive temperature increase or loss of properties of the admixture. The grout shall be continuously agitated until it is pumped. Water shall not be added to increase flowability that has decreased by delayed use of the grout. Proportions of the materials shall be based on manufacturer's recommendations. The water content shall be the minimum necessary for proper placement and shall not exceed the water-cement ratio of 0.45 or approximately 5 gal. of water per sack (95 lb.) of grout. The pumpability of the grout may be determined by the Engineer in accordance with ASTM C939 "Standard Test Method for Flow of Grout." When this method is used, the efflux time of the grout sample immediately after mixing should be between 11 and 30 seconds. The flow cone test may not be suitable for a grout that incorporates a thixotropic additive.

- 11.6 Grout Injection:** All grout vents and high point vent openings shall be open when grouting starts. Injection and ejection vents shall be provided with positive shutoffs. Grout shall be allowed to flow from the first vent after the injection vent until any residual water or entrapped air has been removed, at which time the vent shall be closed. Remaining vents shall be closed in sequence in the same manner.

The pumping pressure at the injection vent shall not exceed 145 psi. Normal operations shall be performed at approximately 75 psi. If the actual grouting pressure exceeds the maximum allowed, the injection vent shall be closed and the grout shall be injected at the next vent which has been, or is ready to be, closed as long as a one way flow is

maintained. Grout shall not be injected into a succeeding vent from which grout has not yet flowed. If this procedure is used, then the vent which is to be used for injection shall be fitted with a positive shut-off.

When one-way flow of grout cannot be maintained as outlined above, the grouting operation shall be stopped and continued immediately from the next available outlet with adequate outflow. After at least twenty four (24) hours, the standpipe shall be removed and the duct shall be inspected for voids following the post-grouting operations and inspections below. All voids shall be measured and filled using volumetric measuring vacuum grouting.

Grout shall be pumped through the duct and continuously wasted at the ejection vent unit no visible slugs of water or air are ejected. To ensure that the tendon remains filled with grout, the ejection and injection vents shall be closed in sequence, respectively, under pressure when the tendon duct is completely filled with grout. If no leaks are present, bleed the pressure to 5 psi and wait a minimum of ten minutes for any entrapped air to flow to the high points. After the minimum ten minute period has expired, increase the pressure as needed and discharge grout at each high point outlet to eliminate any entrapped air or water. The ejection and injection vents shall then be reclosed in sequence. The positive shut-offs at the injection and ejection vents shall not be removed or opened until the grout has set.

11.7 Temperature Restrictions: In temperatures below 32°F, ducts shall be kept free of water to avoid damage due to freezing. The temperature of the concrete shall be 36°F or higher from the time of grouting until job cured 2 in. cubes of grout reach a minimum compressive strength of 800 psi. Grout shall not be above 90°F during mixing or pumping. If necessary, the mixing water shall be cooled.

11.8 Finishing: Valves, caps and vent pipes shall not be removed or opened until the grout has set. The ends of steel vents shall be removed at least 1 in. below the concrete surface after the grout has set. Ends of plastic vents shall be removed to the surface of the concrete after the grout has set. All miscellaneous material used for sealing grout caps shall be removed prior to carrying out further work to protect end anchorages or filling in concrete anchorage blockouts and the like. Miscellaneous materials include paper, tie wire, etc.

11.9 Post-Grouting Operations and Inspection: Do not remove or open inlets and outlets until the grout has cured for 24 to 48 hours. Remove all outlets located at anchorages and high points along the tendon to facilitate inspection and perform inspections within one hour after the removal of the inlet/outlet. Drill and inspect all high points along the tendon as well as the inlets or outlets located at the anchorages. Depending on the geometry of the grout inlets, drilling may be required to penetrate to the inner steel surface of the trumpet or duct. Use drilling equipment that will automatically shut-off when steel is encountered. Unless grout caps are determined to have voids by sounding, do not drill into the cap. Perform inspections in the presence of the Engineer using endoscopes or probes. If unsuitable grout is observed by the Engineer, the Contractor shall submit a

repair procedure for approval by the Engineer. Within four hours of completion of the inspections or repairs, fill all duct and anchorage voids using the volumetric measuring vacuum grouting process.

Post-grouting inspection shall be performed for all tendons.

12.0 PROTECTION OF END ANCHORAGES (POST-TENSIONING ENCASEMENT)

After tendons have been stressed, grouted, inspected and approved, exposed end anchorages, strands and other metal accessories, and girder web and flange surfaces within the limits of the post-tensioning encasement shall be cleaned of rust, misplaced mortar, grout and other such materials. All cleaned surfaces shall be dried as part of the cleaning operation. Immediately following the cleaning operation, a heavy unbroken coating of an epoxy bonding compound shall be applied to all such metal surfaces. The cleaning of the girder surfaces and application of epoxy bonding compound to the girder surfaces shall be done in neat lines matching the final dimensions of the encasement. Epoxy bonding compound shall conform to AASHTO M 235, Type III. Within 24 hours following the cleaning and application of epoxy bonding compound, and within the recommended tack-time of the epoxy bonding compound application, encapsulate anchorage with post-tensioning encasement pour-back using an approved, high-strength, high-bond, low-shrinkage, sand-filled epoxy grout. Only non-chloride bearing non-shrink grout mixes shall be used for anchorage protection.

13.0 BASIS OF PAYMENT

- 13.1 Unless otherwise specified on the Plans, post-tensioning tendons will be paid for at the contract unit price for "Post-Tensioning Tendons" - lump sum, of steel tendon, complete and in place. Payment shall be full compensation for furnishing, installing, stressing and grouting all post-tensioning tendons. Payment shall also include anchorage assemblies and any other post-tensioning system hardware required to complete the work, grout and grouting, all testing, anchorage protection systems and all labor, materials, tools, equipment and incidentals necessary for completing the work in accordance with these specifications and the Plans. This payment shall also include Engineer approved lubricants in the tendon ducts for friction control and flushing the lubricant from the tendon ducts after stressing. Payment will be made under:

Post-Tensioning Tendons

Lump Sum

- 13.2 Payment for "Post-Tensioning Encasement" shall be full compensation for all labor, materials, tools and equipment necessary for the work listed in the section "Protection of End Anchorages (Post-Tensioning Encasement)." Payment will be made under:

Post-Tensioning Encasement

Lump Sum

6000 PSI CONCRETE

(SPECIAL)

6000 PSI concrete shall be in accordance with the Sections 1000 and 1078 of the Standard Specifications.

Payment will be made under:

6000 PSI Concrete.....Cu.Yds.

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.

<u>PERMIT</u>	<u>AUTHORITY GRANTING THE PERMIT</u>
Dredge and Fill and/or Work in Navigable Waters (404)	U. S. Army Corps of Engineers
Water Quality (401)	Division of Environmental Management, DENR 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.



REPLY TO
ATTENTION OF:

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
P.O. BOX 1890
WILMINGTON, NORTH CAROLINA 28402-1890
November 4, 2008

Regulatory Division

Action ID SAW-200801413

Dr. Gregory J. Thorpe, PhD, Manager
Project Development and Environmental Analysis Branch
N.C. Department of Transportation
Division of Highways
1589 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Dr. Thorpe:

Enclosed is a Department of the Army permit to directly discharge dredged and/or fill material into jurisdictional wetlands to facilitate the construction of Fayetteville Outer Loop, Transportation Improvements Project X-0002B & C and U-2159, State Project Number 8.2441301 and 8.T441302, Cumberland, Hoke and Robeson Counties, North Carolina. The proposed 27.8 mile controlled-access freeway is located beginning at an interchange with I-95 just south of SR 1718 (Green Spring Road) in Robeson County, continues north through Cumberland County, turns eastward along the southern boundary of the Fort Bragg Military Reservation, and ends just west of US 401 (Ramsey Street).

Any deviation in the authorized work will likely require modification of this permit. If a change in the authorized work is necessary, you should promptly submit revised plans to the Corps showing the proposed changes. You may not undertake the proposed changes until the Corps notifies you that your permit has been modified.

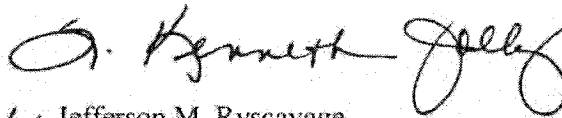
Carefully read your permit. The general and special conditions are important. Your failure to comply with these conditions could result in a violation of Federal law. Certain significant conditions require that:

- a. You must complete construction before December 31, 2011.
- b. You must allow representatives from this office to make periodic visits to your worksite as deemed necessary to assure compliance with permit plans and conditions.

You must notify this office in advance as to when you intend to commence and complete work.

You should address all questions regarding this authorization to Richard K. Spencer,
Wilmington Regulatory Field Office at (910) 251-4172.

Sincerely,


Jefferson M. Ryscavage
Colonel, U.S. Army
District Commander

Enclosures

Copy Furnished (with enclosures):

Chief, Source Data Unit
NOAA/National Ocean Service
ATTN: Sharon Tear N/CS261
1315 East-West Hwy., Rm 7316
Silver Spring, Maryland 20910-3282

Copies Furnished (with special conditions and plans):

Mr. Ronald J. Mikulak, Chief
Wetlands Regulatory Section
61 Forsyth Street
Atlanta, Georgia 30303

Mr. Pete Benjamin
U.S. Fish and Wildlife Service
Fish and Wildlife Enhancement
Post Office Box 33726
Raleigh, North Carolina 27636-3726

Mr. Ron Sechler
National Marine Fisheries Service
Pivers Island
Beaufort, North Carolina 28516

Mr. Doug Huggett
Division of Coastal Management
N.C. Department of Environment
and Natural Resources
400 Commerce Avenue
Morehead City, North Carolina 28557

Mr. David Rackley
National Marine Fisheries Service
219 Fort Johnson Road
Charleston, South Carolina 29412-9110

DEPARTMENT OF THE ARMY PERMIT

Permittee **NORTH CAROLINA DEPARTMENT OF TRANSPORTATION**

Permit No. **2008-01413**

Issuing Office **USAED, Wilmington**

RECEIVED

NOV 03 2008

**REGULATORY
WILM.FLD.OFC.**

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: **Directly discharge dredged or fill material into waters of the United States associated with construction of the Fayetteville Outer Loop from I-95 South of Fayetteville to NC 24/87 in Cumberland and Robeson Counties, North Carolina.**

Project Location: **In the Lumber River, Hydrologic Cataloging Unit 03040203 and the Cape Fear River, Hydrologic Cataloging Unit 03030004. The project is more specifically located starting at Latitude 34.89727 N, Longitude 78.95899 W and ending at Latitude 35.11051, Longitude 78.97456.**

a. Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on **December 31, 2011.** If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.
2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.
3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

P-5

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.
5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.
6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

SEE ATTACHED SPECIAL CONDITIONS

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:
 - () Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).
 - (X) Section 404 of the Clean Water Act (33 U.S.C. 1344).
 - () Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).
2. Limits of this authorization.
 - a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.
 - b. This permit does not grant any property rights or exclusive privileges.
 - c. This permit does not authorize any injury to the property or rights of others.
 - d. This permit does not authorize interference with any existing or proposed Federal project.
3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:
 - a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.
 - b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.
 - c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.
 - d. Design or construction deficiencies associated with the permitted work.
 - e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

- a. You fail to comply with the terms and conditions of this permit.
- b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).
- c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

E. P. Lusk for Dr. Gregory J. Thayer, PhD 10-29-08
(PERMITTEE) NORTH CAROLINA DEPARTMENT OF TRANSPORTATION (DATE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

J. Kenneth Kelly 11-4-08
(DISTRICT ENGINEER) JEFFERSON M. RYSCAVAGE, COLONEL (DATE)

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFeree) (DATE)

SPECIAL CONDITIONS
2008-01413

SPECIAL CONDITIONS (Action ID. 2008-01413, Fayetteville Outer Loop, Transportation Improvements Project . X-0002B & C and U-2519, State Project Number 8.2441301 and 8.T441302

1. Failure to institute and carry out the details of the following special conditions below will result in a directive to cease all ongoing and permitted work within waters of the United States, including wetlands, associated with the permitted project, or such other remedies and/or fines as the U.S. Army Corps of Engineers District Commander or his authorized representatives may seek.
2. All work authorized by this permit must be preformed in strict compliance with the attached plans, which are a part of this permit.
3. The permittee shall schedule a preconstruction meeting between its representatives, the contractor's representatives, and the Corps of Engineers, Mr. Richard Spencer, Wilmington Regulatory Field Office, prior to any work within jurisdictional waters and wetlands to ensure that there is a mutual understanding of all of the terms and conditions contained within this Department of the Army Permit. The permittee shall notify the Corps of Engineers Project Manager a minimum of thirty (30) days in advance of the scheduled meetings in order to provide that individual with ample opportunity to schedule and participate in the required meetings. One copy of the final half-size construction drawings shall be furnished to the Corps of Engineers, Mr. Richard Spencer, Wilmington Regulatory Field Office prior to the pre-construction meeting.
- * 4. The permittee shall ensure that the construction design plans for this project do not deviate from the permit plans attached to this authorization. Written verification shall be provided that the final construction drawings comply with the attached permit drawings prior to any active construction in waters of the United States, including wetlands. Any deviation in the construction design plans will be brought to the attention of the Corps of Engineers, Mr. Richard Spencer, Wilmington Regulatory Field Office prior to any active construction in waters or wetlands.
5. The permittee shall require its contractors and/or agents to comply with the terms and conditions of this permit in the construction and maintenance of this project, and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this permit and any authorized modifications. Copies of this permit and any modifications authorized by the USACE shall be available for review at the construction site at all times. All violations, including non-compliance of these conditions, of the authorized permit shall be reported to the District Engineer within 24 hours of the violation.
- * 6. Compensatory mitigation for the unavoidable impacts to 34.84 acres of riparian wetlands and 13.59 acres of non-riparian wetlands associated with the proposed project shall be provided by

debiting 104.52 acres of riparian wetlands and 40.77 acres of non-riparian wetlands from the Privateer Farms Mitigation Site. Compensatory mitigation for the unavoidable impacts to 12,346 linear feet of important stream reach associated with the proposed project shall be provided by debiting 18,519 linear feet of stream reach from the Privateer Farms Mitigation Site. The permittee shall maintain the Privateer Farms Mitigation Site in its natural condition, as altered by the mitigation plan, in perpetuity. Except as authorized or required by the mitigation plan, prohibited activities on the mitigation property include, but are not limited to, filling; grading; excavating; earth moving of any kind; construction of roads, walkways, buildings signs, or any other structure; any activity that may alter the drainage patterns on the property; destruction, mowing, or other alteration of vegetation on the property; disposal or storage of any garbage trash, or other waste material. In addition, the permittee shall take no action, whether on or off the mitigation property, which will adversely impact the wetlands on the mitigation property. This condition above, runs with the land. The permittee shall not sell, lease, or otherwise convey any interest in the mitigation property without subjecting the property to legally enforceable restrictions on the use of the property, to ensure its preservation, approved in writing by the Wilmington District Corps of Engineers.

7. Except as authorized by this permit or any USACE approved modification to this permit, no excavation, fill, or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, within waters or wetlands, or shall any activities take place that cause the degradation of waters or wetlands. There shall be no excavation from, waste disposal into, or degradation of, jurisdictional wetlands or waters associated with this permit without appropriate modification of this permit, including appropriate compensatory mitigation. This prohibition applies to all borrow and fill activities connected with this project. In addition, except as specified in the plans attached to this permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, in such a manner as to impair normal flows and circulation patterns within, into, or out of waters or wetlands or to reduce the reach of waters or wetlands.

8. This permit does not authorize temporary placement or double handling of excavated or fill material within waters or wetlands outside the permitted area.

9. To ensure that all borrow and waste activities occur on high ground and do not result in loss or the degradation of adjacent wetlands and streams, except as authorized by this permit, the permittee shall require its contractors and/or agents to identify all areas to be used to borrow material, or to dispose of dredged, fill, or waste material. The permittee shall ensure that all such areas comply with the preceding condition (#7) of this permit, and shall require and maintain documentation of the location and characteristics of all borrow and disposal sites associated with this project. This information will include data regarding soils, vegetation and hydrology sufficient to clearly demonstrate compliance with the preceding condition (#7). All information will be available to the Corps of Engineers upon request. NCDOT shall require its contractors to complete and execute reclamation plans for each waste and borrow site and provide written documentation that the reclamation plans have been implemented and all work is completed. This documentation will be provided to the Corps of Engineers within 30 days of the completion of the reclamation work.

10. The permittee shall comply with the conditions specified in the water quality certification, No. 3758, issued by the North Carolina Division of Water Quality on 6 October 2008.

11. The permittee shall abide by the conservation measures identified in the Biological Assessment prepared for the Red-cockaded Woodpecker, *Piocoides borealis*, dated 9 September 2004 and the conservation measures identified by the US Fish and Wildlife Service in the Biological Opinion dated 28 April 2005.

12. This Corps permit does not authorize you to take an endangered species, in particular the Red Cockaded Woodpecker. In order to legally take a listed species, you must have separate authorization under the ESA. (e.g., an ESA Section 10 permit, or a BO under the ESA Section 7, with "incidental take" provisions with which you must comply). The enclosed USFWS Biological Opinion, dated 28 April 2005, contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" that is also specified in the BO. Your authorization under this Corps permit is conditional upon your compliance with all the mandatory terms and conditions associated with incidental take of the attached BO, which terms and conditions are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of the BO, where a take of the listed species occurs, would constitute non-compliance with your Corps permit. The USFWS is the appropriate authority to determine compliance with the terms and conditions of its BO, and the ESA.

* 13. The permittee shall continue coordination of design for U-2519 Sections AA, AB, BA, BB, CA and CB through the NEPA/Section 404 Merger 01 Process – Concurrence points 2A, 4B and 4C. The final design shall incorporate appropriate avoidance, minimization and mitigation of aquatic resource impacts to the fullest extent practicable. The applicant shall not commence any work within waters of the United States within U-2519 Sections AA, AB, BA, BB, CA and CB until after the submittal of a modified application with final design plans reflecting the appropriate avoidance, minimization and mitigation within these sections and has received final approval from Wilmington District Corps of Engineers

14. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in disequilibrium of wetlands or streambeds or banks, adjacent to, upstream or downstream of the structures. Riprap armoring of streams at culvert outlets shall be minimized above the ordinary high water elevation in favor of bioengineering techniques such as bank sloping, erosion control matting and revegetation with deep-rooted, woody plants.

15. The permittee shall use appropriate sediment and erosion control practices which equal or exceed those outlined in the most recent version of the "North Carolina Sediment and Erosion Control Planning and Design Manual" to assure compliance with the appropriate turbidity water quality standard. 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 in order to assure compliance with the appropriate turbidity water quality standards. This shall include, but is not limited to, the immediate installation of silt fencing or similar appropriate devices around all areas subject to soil disturbance or the movement of earthen fill, and the immediate stabilization of all disturbed areas. Additionally, the project must remain in full compliance with all aspects of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statutes Chapter 113A Article 4). Adequate sedimentation and erosion control measures must be implemented prior to any ground disturbing activities to minimize impacts to downstream aquatic resources. These measures must be inspected and maintained regularly, especially following rainfall events. All fill material must be adequately stabilized at the earliest practicable date to prevent sediment from entering into adjacent waters or wetlands.

16. The permittee shall take appropriate measure to control any bottom sediment that may be sluiced by the draining of impacted ponds on the project site. Sediment sluicing from ponds is not authorized by this permit.

17. The permittee shall remove all sediment and erosion control measures placed in wetlands or waters, and shall restore natural grades in those areas, at project completion.

18. The permittee shall take measures to prevent live or fresh concrete from coming into contact with any surface waters until the concrete has hardened.

19. The permittee shall install barrier fencing or other acceptable forms of barrier around all wetlands that are not to be disturbed to make them readily visible and prevent construction equipment from inadvertently entering and disturbing the wetland areas that are to remain undisturbed.

20. 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. No equipment staging or storage of construction material will occur in wetlands. Hydro-seeding equipment will not be discharged or washed out into any surface waters or wetlands. 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) 733-5083 or (800) 662-7956 and provisions of the North Carolina Oil Pollution and Hazardous Substances Control Act will be followed.

21. The permittee shall abide by all project commitments identified in the FHWA/NCDOT EIS and ROD.

22. The permittee shall abide by all stipulations identified in the Memorandum of Agreement between the North Carolina Department of Transportation and the North Carolina State Historic Preservation Officer, executed 12 April 2005, and the stipulations identified in the Concurrence Form for Assessment of Effects, executed 11 January 2005.

23. If the permittee discovers any previously unknown historic or archeological sites while accomplishing the authorized work, he shall immediately stop work and notify the Wilmington District Engineer who will initiate the required State/Federal coordination.

24. The permittee shall maintain the authorized work in good condition and in conformance with the terms and conditions of this permit. The permittee is not relieved of this requirement if he abandons the permitted activity without transferring it to a third party.

25. Unless otherwise authorized by this permit, all fill material placed in waters or wetlands shall be generated from an upland source and will be clean and free of any pollutants except in trace quantities. Metal products, organic materials (including debris from land clearing activities), or unsightly debris will not be used.

26. This Department of the Army permit does not obviate the need to obtain other Federal, State, or local authorizations required by law.

27. In issuing this permit, the Federal Government does not assume any liability for:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future Federal activities initiated on behalf of the general public.

c. Damages to other permitted or un-permitted activities or structures caused by the authorized activity.

d. Design and construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

P-12REPLY TO
ATTENTION OF:

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
59 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

April 13, 2011

Regulatory Division

Subject: Action ID No. 2008-01413, TIP Nos. U-2519 and X-0002, Fayetteville, Cumberland, Robeson and Hoke Counties, North Carolina.

Dr. Gregory J. Thorpe, Ph.D.
Environmental Management Director
Project Development & Environmental Analysis
1598 Mail Service Center
Raleigh, N.C. 27699-1598

Dear Dr. Thorpe:

I am responding to your request dated March 28, 2011 for an extension of time modification to the existing Department of the Army (DA) permit issued for the above referenced project on November 4, 2008 and modified on December 21, 2010.

I have determined that the proposed project modification described above is not contrary to the public interest and therefore, the DA permit expiration date is hereby modified. The permit modification is as follows:

GENERAL CONDITION #1

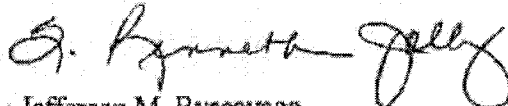
The time limit for completing the work authorized ends on December 31, 2014. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

Please note that all unmodified terms and conditions of your original Department of the Army permit and modifications of December 21, 2010 shall remain in effect.

P-13

Should you have any questions, please contact Mr. Ronnie Smith, Wilmington Field Office, Regulatory Division, at telephone (910) 251-4829.

Sincerely,


Jefferson M. Ryscavage
Colonel, U.S. Army
District Commander

Copies Furnished:

Mr. Greg Burns, PE
Division Engineer, Division 6
North Carolina Department of Transportation
Post Office Box 1150
Fayetteville, North Carolina 28302

Mr. Jim Rerko ✓
Division Environmental Officer, Division 6
North Carolina Department of Transportation
Post Office Box 1150
Fayetteville, North Carolina 28302

Mr. Brain Wrenn
NCDENR-DWQ
Wetlands Section
1650 Mail Service Center
Raleigh, North Carolina 27699-1650

Mr. Mason Herndon
NCDENR-DWQ
225 Green Street, Suite 214
Fayetteville, North Carolina 28301-5094

Mr. Travis W. Wilson
NC Wildlife Resource Commission
1142 I-85 Service Rd.
Creedmoor, North Carolina 27522

Mr. David Cox
North Carolina Wildlife Resources Commission
512 N. Salisbury Street
Raleigh, North Carolina 27604-1188

P-14

Pete Benjamin
U.S. Fish and Wildlife Service
Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

Mr. Chris Militcher
United States Environmental Protection Agency
c/o Federal Highway Administration
310 New Bern Avenue, Room 206
Raleigh, North Carolina 27601

Ms. Renee Giedhill-Early
North Carolina Department of Cultural Resources
4617 Mail Service Center
Raleigh, North Carolina 27699

P-14A



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

June 13, 2014

Regulatory Division

Action ID: SAW-2008-01413
NC DOT TIP: X-0002 B & C; U-2519

Richard W. Hancock, P.E.
Environmental Management Director, PDEA
North Carolina Department of Transportation
1598 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Mr. Hancock:

Reference the Department of the Army permit issued on November 4, 2008, for the discharge of fill material into waters and wetlands adjacent to various creeks, and their tributaries in order to construct X-0002 B & C and U-2519, in Cumberland, Hoke, and Robeson Counties, North Carolina. Reference is also made to subsequent permit modifications dated December 21, 2010, and April 13, 2011. The referenced section 404 permit authorizes impacts to 48.43 acres of jurisdictional wetlands, 12,346 linear feet of stream channel and 3.67 acres of open waters. The permit modification is proposed to include additional impact that were not authorized by the November 4, 2008 Department of the Army permit or the aforementioned permit modifications. The proposed modifications are based on final design plans for sections U-2519 CB and changes associated with U-2519 DA permit sites 18 (TT4DA), 19, and 20. Overall permanent impacts to wetlands have increased by 0.36 acre and decreased by 449 linear feet to stream channels.

I have determined that the proposed project modifications described above are not contrary to the public interest and consistent with the 404 (B)(1) and therefore, the Department of the Army permit is hereby modified and, as requested, the new expiration date is December 31, 2019. The following conditions specific to Section CB and DA have been added:

All original conditions in the November 4, 2014 permit remain valid and are enforceable with Section U-2519 CB and DA authorization. The Special Conditions for the permit modification are the following:

1. This permit modification only authorizes work on TIP U-2519 CB and section DA (permit sites 18, 19, & 20). Construction on Sections AA, AB, BA, BB & CA of TIP U-2519 shall not commence until final design has been completed for those sections, the permittee has minimized impacts to waters and wetlands to the maximum extent practicable, any modifications to the plans, and a compensatory mitigation plan, have


-2-

been approved by the US Army Corps of Engineers (COE). Approved permit plans for section C and D are attached.

2. In order to compensate for impacts associated with this permit, mitigation shall be provided in accordance with the provisions outlined on the most recent version of the attached Compensatory Mitigation Responsibility Transfer Form. The requirements of this form, including any special conditions listed on this form, are hereby incorporated as special conditions of this permit modification authorization.

This modification approval will be utilized for future compliance of the project. If you have questions, please contact Liz Hair of the Wilmington Regulatory Field Office, at telephone (910) 251-4049.

Sincerely,


for Steven A. Baker
Colonel, U. S. Army
District Commander

Enclosures:

1. 401 Water Quality Certification Modification dated May 22, 2014
2. Privateer Farms Updated Debit Ledger
3. Roadway Permit Drawings U-2519 CB and revisions dated 5/13/14
4. Mitigation Responsibility Transfer Form

Copies Furnished (w/o attachments):

Mr. Mason Herndon, NCDWR (electronic copy)
Ms. Cynthia Van Der Wiele, USEPA (electronic copy)
Mr. Gary Jordan, USFWS (electronic copy)
Mr. Travis Wilson, NCWRC (electronic copy)
Mr. Jim Rerko, NCDOT, DEO Division 6 (electronic copy)

Copies Furnished (w/enclosures):

Mr. Tyler Stanton, NCDOT (electronic copy)
Ms. Beth Harmon, NCEEP (electronic copy)
Mr. Todd Tugwell, USACE (electronic copy)



P-15

North Carolina Department of Environment and Natural Resources

William G. Ross Jr., Secretary

Coleen Sullins, Director
Division of Water Quality

October 6, 2008

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REGULATORY
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Dr. Greg Thorpe, PhD, Manager
Planning and Environmental Branch
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina, 27699-1548

Subject: 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water with ADDITIONAL CONDITIONS for Proposed Fayetteville Outer Loop in Cumberland, Hoke and Robeson Counties, Federal Aid Project No. NHF-DPR-0100(001), State Project No. 8 2441301, TIP Nos. X-002 B&C and U-2519
DWQ Project No. 20080737

Dear Dr. Thorpe:

Attached hereto is a copy of Certification No. 3758 issued to The North Carolina Department of Transportation dated October 6, 2008.

If we can be of further assistance, do not hesitate to contact us.

Sincerely,

Coleen Sullins,
Director

Attachments

cc: Richard Spencer, US Army Corps of Engineers, Wilmington Field Office
Tyler Stanton, NCDOT NEU
Jim Rerko, DOT Division 6 Environmental Officer
Kathy Matthews, Environmental Protection Agency
Travis Wilson, NC Wildlife Resources Commission
Beth Harmon, Ecosystem Enhancement Program
Ken Averitte, DWQ Fayetteville Regional Office
File Copy

**401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS**

THIS CERTIFICATION 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 2H 0500. This certification authorizes the NCDOT to impact 57.08 acres of jurisdictional wetlands and 13,232 linear feet of jurisdictional streams in Cumberland, Hoke and Robeson Counties. The project shall be constructed pursuant to the application dated received April 25, 2008. The authorized impacts are as described below.

Section X-0002 B Stream Impacts in the Cape Fear River Basin

Site	Permanent Fill in Intermittent Stream (linear ft)	Temporary Impacts to Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Temporary Impacts to Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
2	0	0	213	0	213	213
Total	0	0	213	0	213	213

Total Stream Impact for Section X-0002 B: 213 linear feet

Section X-0002 C Stream Impacts in the Cape Fear River Basin

Site	Permanent Fill in Intermittent Stream (linear ft)	Temporary Impacts to Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Temporary Impacts to Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
1	0	0	279	0	279	279
3	0	0	775	0	775	775
5	0	0	361	0	361	361
6	0	0	479	0	479	479
7	0	0	213	0	213	213
8	0	0	509	0	509	509
9	0	0	98	0	98	98
Total	0	0	2714	0	2714	2714

Total Stream Impact for Section X-0002 C: 2,714 linear feet

Section U-2519 E Stream Impacts in the Cape Fear River Basin

Site	Permanent Fill in Intermittent Stream (linear ft)	Temporary Impacts to Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Temporary Impacts to Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
2	886	0	0	0	886	0
Total	886	0	0	0	886	0

Total Stream Impact for Section U-2519 E: 886 linear feet



This approval is only valid for the purpose and design that you submitted in your application dated received April 25, 2008. Should your project change, you are required to notify the DWQ and submit a new application. If the property is sold, the new owner must be given a copy of this Certification and approval letter, and is thereby responsible for complying with all the conditions. If any additional wetland impacts, or stream impacts, for this project (now or in the future) exceed one acre or 150 linear feet, respectively, additional compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7). For this approval to remain valid, you are required to comply with all the conditions listed below. In addition, you should obtain all other federal, state or local permits before proceeding with your project including (but not limited to) Sediment and Erosion control, Coastal Stormwater, Non-discharge and Water Supply watershed regulations. This Certification shall expire on the same day as the expiration date of the corresponding Corps of Engineers Permit.

Conditions of Certification

1. This Water Quality Certification authorizes impacts to wetlands, streams and open waters to sections X-0002 B and C, and U-2519 DA and E only. When final design plans are completed for U-2519 Sections AA, AB, BA, BB, CA, and CB, modifications to the 401 Water Quality Certification shall be submitted with four copies and fees to the NC Division of Water Quality. Final designs shall reflect all appropriate avoidance, minimization, and mitigation for impacts to wetlands, streams, and other surface waters, and buffers. No construction activities that impact any wetlands, streams, or surface waters, located in U-2519 Sections AA, AB, BA, BB, CA or CB shall begin until after the permittee applies for, and receives a written modification of the 401 Water Quality Certification from the NC Division of Water Quality.
- * 2. Compensatory mitigation for 12,346 linear feet of impact to streams is required. We understand that you have chosen to debit mitigation from the Privateer Farm Mitigation Bank. This certification gives approval to the debiting of 12,346 linear feet of stream mitigation from the Privateer Farms Mitigation Site in order to satisfy the mitigation requirements of this project.
- * 3. Compensatory mitigation for 48.4 acres of wetlands is required at a 2:5:1 ratio. We understand that you have chosen to debit mitigation from the Privateer Farm Mitigation Bank. This certification gives approval to the debiting of 121.0 acres of wetland mitigation from the Privateer Farms Mitigation Site in order to satisfy the mitigation requirements of this project.
4. At locations where ponds will be drained, proper measures will be taken to drain the pond with limited impact to upstream and downstream channel stability as well as to native aquatic species. Proper measures will be taken to avoid sediment release and/or sediment accumulation downstream as a result of pond draining. If typical pond draining techniques will create significant disturbance to native aquatic species, additional measures such as collection and relocation may be necessary to prevent a significant fish kill. NCDOT shall consult with NC Wildlife Resources staff to determine if there are any sensitive species, and the most appropriate measures to limit impacts to these species. The permittee shall observe any natural channel re-establishment, or utilize natural channel construction techniques, to ensure that the jurisdictional stream channel above and below the drained pond remain stable, and that no additional impacts occur within the natural stream channel as a result of draining the pond.
5. The post-construction removal of any temporary bridge structures must return the project site to its preconstruction contours and elevations. The impacted areas shall be revegetated with appropriate native species.
6. Strict adherence to the most recent version of NCDOT's Best Management Practices For Bridge Demolition and Removal approved by the US Army Corps of Engineers is a condition of the 401 Water Quality Certification.
7. 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*.

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- 8 For any streams being impacted due to site dewatering activities, the site shall be graded to its preconstruction contours and revegetated with appropriate native species
- 9 Placement of culverts and other structures in waters, streams, and wetlands shall be placed 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 48 inches, to allow low flow passage of water and aquatic life. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or streambeds or banks, adjacent to or upstream and down stream of the above structures. The applicant is required to provide evidence that the equilibrium is being maintained if requested in writing by DWQ. If this condition is unable to be met due to bedrock or other limiting features encountered during construction, please contact the NC DWQ for guidance on how to proceed and to determine whether or not a permit modification will be required.
- 10 If multiple pipes or barrels are required, they shall be designed to mimic natural stream cross section as closely as possible including pipes or barrels at flood plain elevation and/or sills where appropriate. Widening the stream channel should be avoided. Stream channel widening at the inlet or outlet end of structures typically decreases water velocity causing sediment deposition that requires increased maintenance and disrupts aquatic life passage.
- 11 Riprap shall not be placed in the active thalweg channel or placed in the streambed in a manner that precludes aquatic life passage. Bioengineering boulders or structures should be properly designed, sized and installed.
- * 12 One copy of the final construction drawings shall be furnished to NCDWQ Central Office, and one copy to the NCDWQ Fayetteville Regional Office, prior to the pre-construction meeting. The permittee shall provide written verification that the final construction drawings comply with the permit drawings contained in the application dated received April 25, 2008. Any deviations from the approved drawings are not authorized unless approved by the NC Division of Water Quality.
- 13 If concrete is used during construction, a dry work area shall be maintained to prevent direct contact between curing concrete and stream water. Water that inadvertently contacts uncured concrete shall not be discharged to surface waters due to the potential for elevated pH and possible aquatic life and fish kills.
- 14 During the construction of the project, no staging of equipment of any kind is permitted in waters of the U.S., or protected riparian buffers.
- 15 The dimension, pattern and profile of the stream above and below the crossing shall not be modified. Disturbed floodplains and streams shall be restored to natural geomorphic conditions.
- 16 The use of rip-rap above the Normal High Water Mark shall be minimized. Any rip-rap placed for stream stabilization shall be placed in stream channels in such a manner that it does not impede aquatic life passage.
- * 17 The Permittee shall ensure that the final design drawings adhere to the permit and to the permit drawings submitted for approval.
- 18 All work in or adjacent to stream waters shall be conducted in a dry work area. Approved BMP measures from the most current version of NCDOT Construction and Maintenance Activities manual such as sandbags, rock berms, cofferdams and other diversion structures shall be used to prevent excavation in flowing water.
- 19 Heavy equipment shall be operated from the banks rather than in the stream channel in order to minimize sedimentation and reduce the introduction of other pollutants into the stream.
- 20 All mechanized equipment operated near surface waters must be regularly inspected and maintained to prevent contamination of stream waters from fuels, lubricants, hydraulic fluids, or other toxic materials.



- 21 No rock, sand or other materials shall be dredged from the stream channel except where authorized by this certification
- 22 Discharging hydroseed mixtures and washing out hydroseeders and other equipment in or adjacent to surface waters is prohibited
- 23 The permittee and its authorized agents shall conduct its 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 DWQ determines that such standards or laws are not being met (including the 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, DWQ may reevaluate and modify this certification.
- 24 All fill slopes located in jurisdictional wetlands shall be placed at slopes no flatter than 3:1, unless otherwise authorized by this certification.
- 25 A copy of this Water Quality Certification shall be maintained on site at the construction site at all times. In addition, the Water Quality Certification and all subsequent modifications, if any, shall be maintained with the Division Engineer and the on-site project manager.
- 26 The outside buffer, wetland or water boundary located within the construction corridor approved by this authorization shall be clearly marked by highly visible fencing prior to any land disturbing activities. Impacts to areas within the fencing are prohibited unless otherwise authorized by this certification.
- 27 The issuance of this certification does not exempt the Permittee from complying with any and all statutes, rules, regulations, or ordinances that may be imposed by other government agencies (i.e. local, state, and federal) having jurisdiction, including but not limited to applicable buffer rules, stormwater management rules, soil erosion and sedimentation control requirements, etc.
- 28 The Permittee shall report any violations of this certification to the Division of Water Quality within 24 hours of discovery.
- * 29 Upon completion of the project (including any impacts at associated borrow or waste site), the NCDOT Division Engineer shall complete and return the enclosed "Certification of Completion Form" to notify DWQ when all work included in the 401 Certification has been completed.
- 30 Native woody riparian vegetation (i.e., trees and shrubs native to your geographic region) must be reestablished within the construction limits of the project by the end of the growing season following completion of construction.
- 31 There shall be no excavation from, or waste disposal into, jurisdictional wetlands or waters associated with this permit without appropriate modification. Should waste or borrow sites, or access roads to waste or borrow sites, be located in wetlands or streams, compensatory mitigation will be required since that is a direct impact from road construction activities.
- 32 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 in order to protect surface waters standards.
 - a The erosion and sediment control measures for the project must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Sediment and Erosion Control Planning and Design Manual*.



- b The 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.
- c 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*.
- d The reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act.

33 Sediment and erosion control measures shall not be placed in wetlands or waters unless otherwise approved by this Certification.

Violations of any condition herein set forth may result in revocation of this Certification and may result in criminal and/or civil penalties. This Certification shall become null and void unless the above conditions are made conditions of the Federal 404 and/or Coastal Area Management Act Permit. This Certification shall expire upon the expiration of the 404 or CAMA permit.

If this Certification is unacceptable to you have the right to an adjudicatory hearing upon written request within sixty (60) days following receipt of this Certification. This request must be in the form of a written petition conforming to Chapter 150B of the North Carolina General Statutes and filed with the Office of Administrative Hearings, 6714 Mail Service Center, Raleigh, N.C. 27699-6714. If modifications are made to an original Certification, you have the right to an adjudicatory hearing on the modifications upon written request within sixty (60) days following receipt of the Certification. Unless such demands are made, this Certification shall be final and binding.

This the 6th day of October 2008

DIVISION OF WATER QUALITY

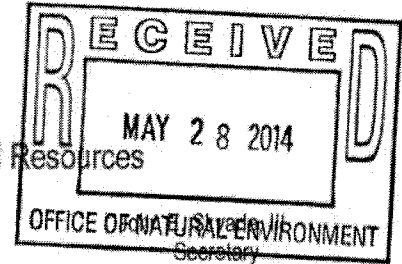
Coleen Sullins
Director

WQC No 3758



North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor



May 22, 2014

Mr. Richard W. Hancock, P.E., Manager
Project Development and Environmental Analysis
North Carolina Department of Transportation
1598 Mail Service Center
Raleigh, North Carolina, 27699-1598

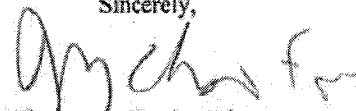
Subject: Modification to the 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS for Proposed improvements to the Fayetteville Outer Loop from I-95 South of Fayetteville to NC 24-87 in Cumberland, Hoke and Robeson Counties, Federal Aid Project No. NHF-DPR-0100(001), State Project No. 8.2441301, TIP Nos X-002 B & C, and U-2519AA, AB, BA, BB, CA, CB, DA & E..
NCDWR Project No. 20080737 v. 4

Dear Mr. Hancock:

Attached hereto is a modification of Certification No. 3758 issued to The North Carolina Department of Transportation (NCDOT) dated October 6, 2008 and modifications dated June 3, 2010 and December 16, 2010.

If we can be of further assistance, do not hesitate to contact us.

Sincerely,



Thomas A. Reeder, Director
Division of Water Resources

Attachments

cc: Liz Hair, US Army Corps of Engineers, Wilmington Field Office (electronic copy only)
Greg Burns, PE, Division 6 Engineer
Jim Rerko, Division 6 Environmental Officer
Cynthia Van Der Wiele, Environmental Protection Agency (electronic copy only)
Travis Wilson, NC Wildlife Resources Commission (electronic copy only)
LeiLani Paugh, NCDOT, Natural Environment Section (electronic copy only)
Sonia Carrillo, NCDWR Central Office
File Copy

Transportation and Permitting Unit
1617 Mail Service Center, Raleigh, North Carolina 27699-1617
Location: 512 N. Salisbury St. Raleigh, North Carolina 27604
Phone: 919-807-8300 | FAX: 919-733-1290
Internet: www.ncwaterquality.org

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**Modification to the 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act
with ADDITIONAL CONDITIONS**

THIS CERTIFICATION 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 Resources (NCDWR) Regulations in 15 NCAC 2H .0500. This certification authorizes the NCDOT to impact an additional 14.16 acres of jurisdictional wetlands and 1,027 linear feet of jurisdictional streams in Cumberland County for the construction of **U-2519 CB and portions of U-2519 DA only**. The project shall be constructed pursuant to the modification dated received April 30, 2014 and revisions received on May, 15, 2014. **No impacts to Sections AA, AB, BA, BB or CA are being authorized with this certification.** The authorized impacts are as described below:

Stream Impacts in the Cape Fear River Basin

Site	Station	Permanent Fill in Intermittent Stream (linear ft)	Temporary Fill in Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Temporary Fill in Perennial Stream (linear ft)	Bank Stabilization (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
1	-L-821+59 to 830+78	0	0	0	5	0	5	0
2	-TT1- 46+10 to 46+73	0	0	69	19	10	98	0
13	-Y2REV-LT-34+55 to 36+20	0	0	80	0	10	90	0
14	-Y2REV-LT-29+32 to 29+33	0	0	25	10	10	45	0
15	-TT4- 54+56 to 58+27	0	0	440	40	0	480	440
18*	-L- 49+55 to 53+31	0	0	135	0	20	155	155
18*	-TT4DA-43+45 to 56+12	0	0	133	11	10	154	143
TOTAL		0	0	882	85	60	1027	738

Total Stream Impact for Modification: 1,027 linear feet.

*same stream feature.

Wetland Impacts in the Cape Fear River Basin

Site	Station	Wetland Type	Fill (ac)	Fill (temporary) (ac)	Excavation (ac)	Mechanized Clearing (ac)	Hand Clearing (ac)	Total Wetland Impact (ac)	Impacts Requiring Mitigation (ac)
1	-L- 821+59 to 830+78	R	0	0	0	0	2.60	2.60	0
3	-L- 836+61 to 838+07	R	0.33	0	0	0.02	0	0.35	0.35
4	-L- 838+80 to 841+17	R	0.10	0	0.07	0.02	0	0.19	0.19
5	-L- 847+36 to 849+22	R	0.62	0	0	0.07	0	0.69	0.69
6	-L- 852+83 to 853+64	R	0.11	0	0	0.02	0	0.13	0.13
7	-L- 855+25 to 855+70	R	0.07	0	0	0.01	0	0.08	0.08
8	-L- 859+50 to 861+81	R	0.62	0	0	0.04	0	0.66	0.66
9	-L- 864+39 to 865+64	R	0.27	0	0	0.04	0	0.31	0.31
10	-L- 889+04 to 902+62	R	1.47	0	0.30	0.17	2.18	4.12	1.94
12	-L- 908+82 to 909+03	NR	0	0	0	0.01	0	0.01	0.01
13	-Y2REV-LT-34+55 to 36+20	NR	0.27	0	0	0	0	0.27	0.27
15	-TT4- 54+56 to 58+27	NR	0.42	0	0	0.08	0	0.50	0.50
16	-Y1- 39+18 to 40+61	NR	0.15	0	0	0.05	0	0.20	0.20
18	-L- 49+55 to 53+31	NR	0.25	0	0	0.07	0	0.32	0.32
18	-TT4DA-43+45 to 56+12	NR	0.16	0	0	0.05	0	0.21	0.21
19	-L- 89+00 to 93+35	R	0	0	0	0	2.62	2.62	0
20	-RPIC-42+50 to 48+50	R	0	0	0	0	0.89	0.89	0
UTILITIES									
U1	-Y4- 16+36 to 16+66	R	0	<0.01	<0.01*	0	0.01	0.01	0
U2	-PR2A- 17+68 to 17+94	NR	0	<0.01	<0.01*	0	<0.01	<0.01	0
TOTAL			4.84	<0.01	0.37	0.65	8.30	14.16	5.86

Total Wetland Impact for Modification: 14.16 acres

*temporary excavation for open cut utility installation

The application provides adequate assurance that the discharge of fill material into the waters of the Cape Fear River Basin in conjunction with the proposed development will not result in a violation of applicable Water Quality Standards and discharge guidelines. Therefore, the State of North Carolina certifies that this activity will not violate the applicable portions of Sections 301, 302, 303, 306, 307 of PL 92-500 and PL 95-217 if conducted in accordance with the application and conditions hereinafter set forth.

This approval is only valid for the purpose and design that you submitted in your modified application dated received April 30, 2014 and revisions received on May, 15, 2014. All the authorized activities and conditions of certification associated with the original Water Quality Certification dated October 6, 2008 and modifications dated June 3, 2010 and December 16, 2010 still apply except where superseded by this certification. Should your project change, you are required to notify the NCDWR and submit a new application. If the property is sold, the new owner must be given a copy of this Certification and approval letter, and is thereby responsible for complying with all the conditions. If any additional wetland impacts, or stream impacts, for this project (now or in the future) exceed one acre or 150 linear feet, respectively, additional compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7). For this approval to remain valid, you are required to comply with all the conditions listed below. In addition, you should obtain all other federal, state or local permits before proceeding with your project including (but not limited to) Sediment and Erosion control, Coastal Stormwater, Non-discharge and Water Supply watershed regulations. This Certification shall expire on the same day as the expiration date of the corresponding Corps of Engineers Permit.

Condition(s) of Certification:

1. This modification is applicable only to the additional proposed activities. All of the authorized activities and conditions of certification associated with the original Water Quality Certification dated October 6, 2008 and subsequent modifications dated June 3, 2010 and December 16, 2010 still apply except where superseded by this certification.
- *2. Material temporarily excavated for utility installation shall be stockpiled in an upland area and placed back into the excavated area in a manner that restores the original grade and soil profile with the organic/root layer on top.
3. Compensatory mitigation for 738 linear feet of impacts to streams is required. We understand that you have chosen to debit mitigation from the Privateer Farm Mitigation Bank. Privateer Farm Mitigation Bank is located in HUC 03030005 which is adjacent to the project HUC 03030004, therefore a 1.5:1 mitigation ratio is required. This certification gives you approval to debit 1,107 linear feet of stream mitigation from the Privateer Farm Mitigation Bank to satisfy the mitigation requirements of this certification.
4. Compensatory mitigation for 5.86 acres of wetlands is required. We understand that you have chosen to debit mitigation from the Privateer Farm Mitigation Bank. Privateer Farm Mitigation Bank is located in HUC 03030005 which is adjacent to the project HUC 03030004, therefore a 3:1 mitigation ratio is required. This certification gives you approval to debit 17.58 acres of wetland mitigation from the Privateer Farm Mitigation Bank to satisfy the mitigation requirements of this certification.

Violations of any condition herein set forth may result in revocation of this Certification and may result in criminal and/or civil penalties. This Certification shall become null and void unless the above conditions are made conditions of the Federal 404 and/or Coastal Area Management Act Permit. This Certification shall expire upon the expiration of the 404 or CAMA permit.

If you wish to contest any statement in the attached Certification you must file a petition for an administrative hearing. You may obtain the petition form from the office of Administrative hearings. You must file the petition with the office of Administrative Hearings within sixty (60) days of receipt of this notice. A petition is considered filed when it is received in the office of Administrative Hearings during normal office hours. The Office of Administrative Hearings accepts filings Monday through Friday between the hours of 8:00am and 5:00pm, except for official state holidays. The original and one (1) copy of the petition must be filed with the Office of Administrative Hearings.

The petition may be faxed-provided the original and one copy of the document is received by the Office of Administrative Hearings within five (5) business days following the faxed transmission. The mailing address for the Office of Administrative Hearings is:

Office of Administrative Hearings

6714 Mail Service Center
Raleigh, NC 27699-6714
Telephone: (919)-431-3000, Facsimile: (919)-431-3100

A copy of the petition must also be served on DENR as follows:

Mr. Lacy Presnell, General Counsel
Department of Environment and Natural Resources
1601 Mail Service Center

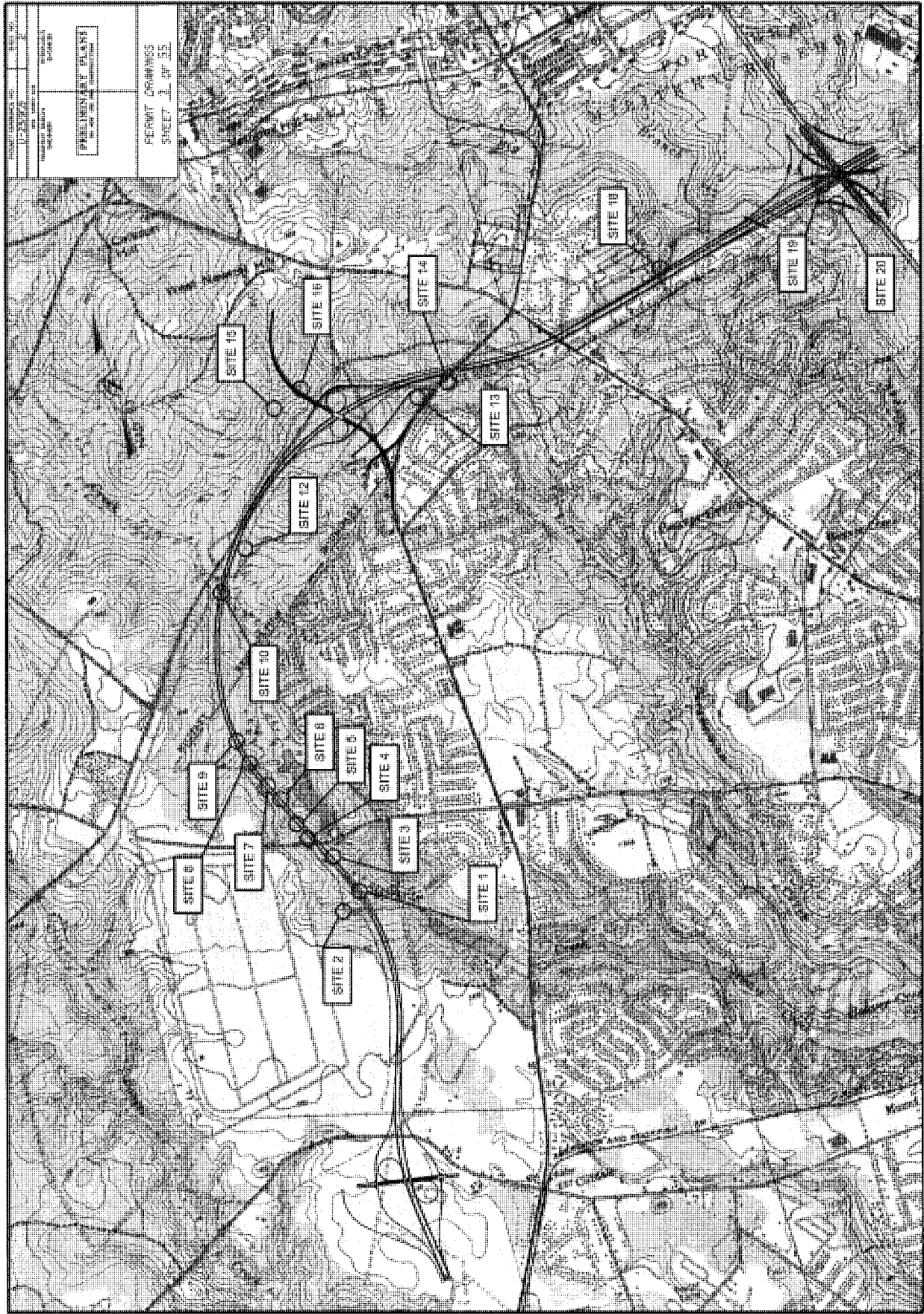
This the 22nd day of May 2014

DIVISION OF WATER RESOURCES

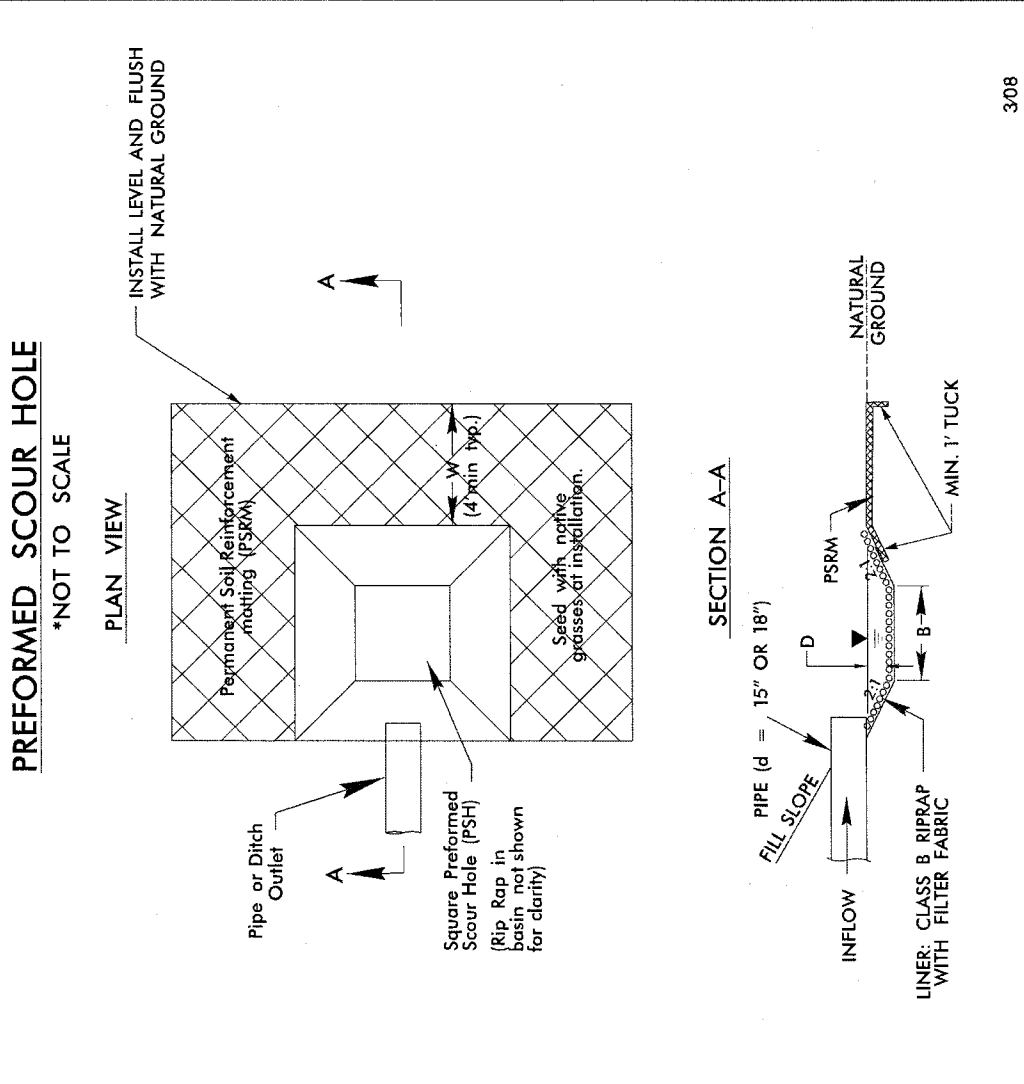
A handwritten signature in black ink, appearing to read 'Tom Reeder', is written over the printed name and title.

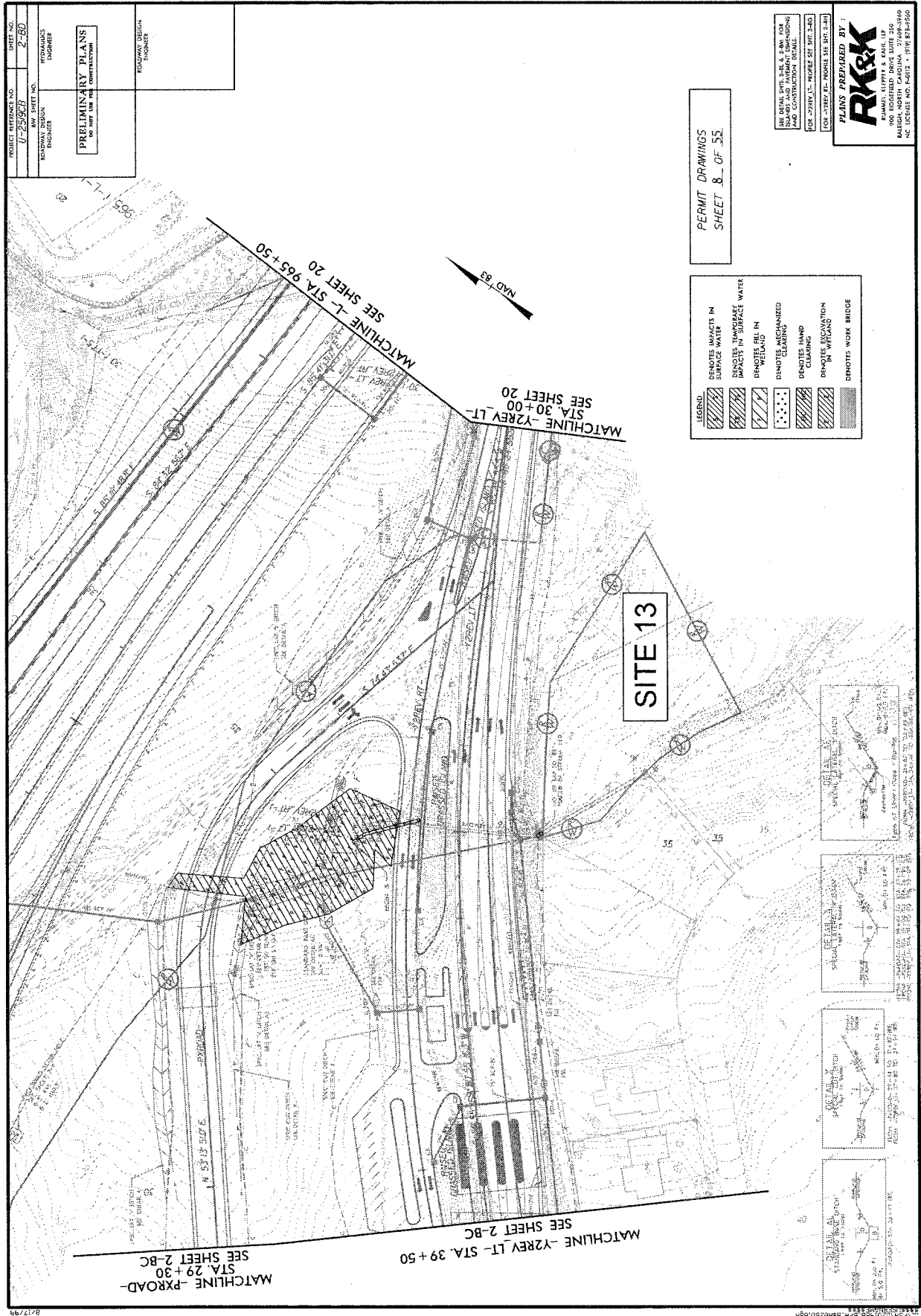
Thomas A. Reeder, Director
Division of Water Resources

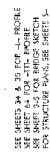
WQC No. 3758

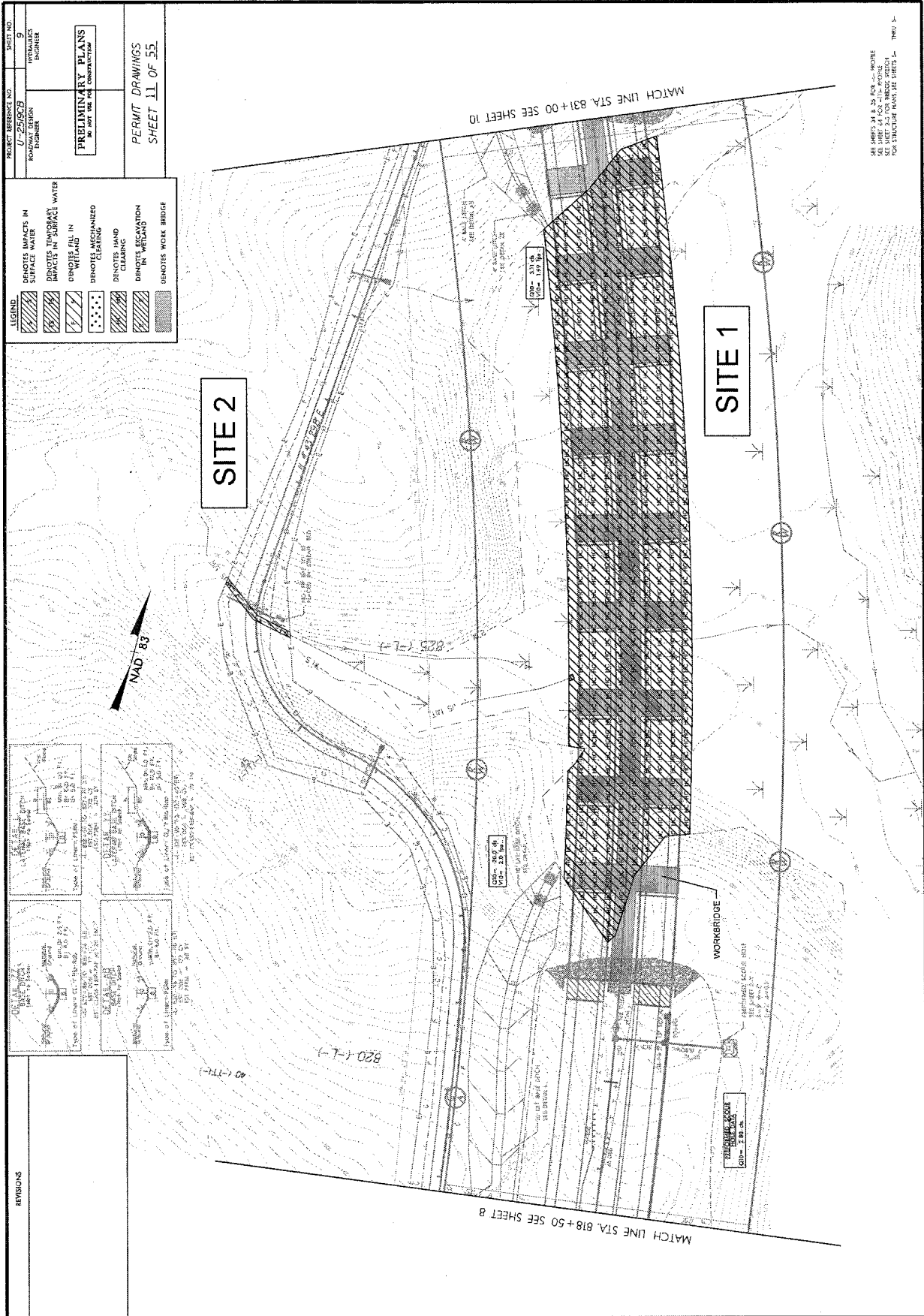


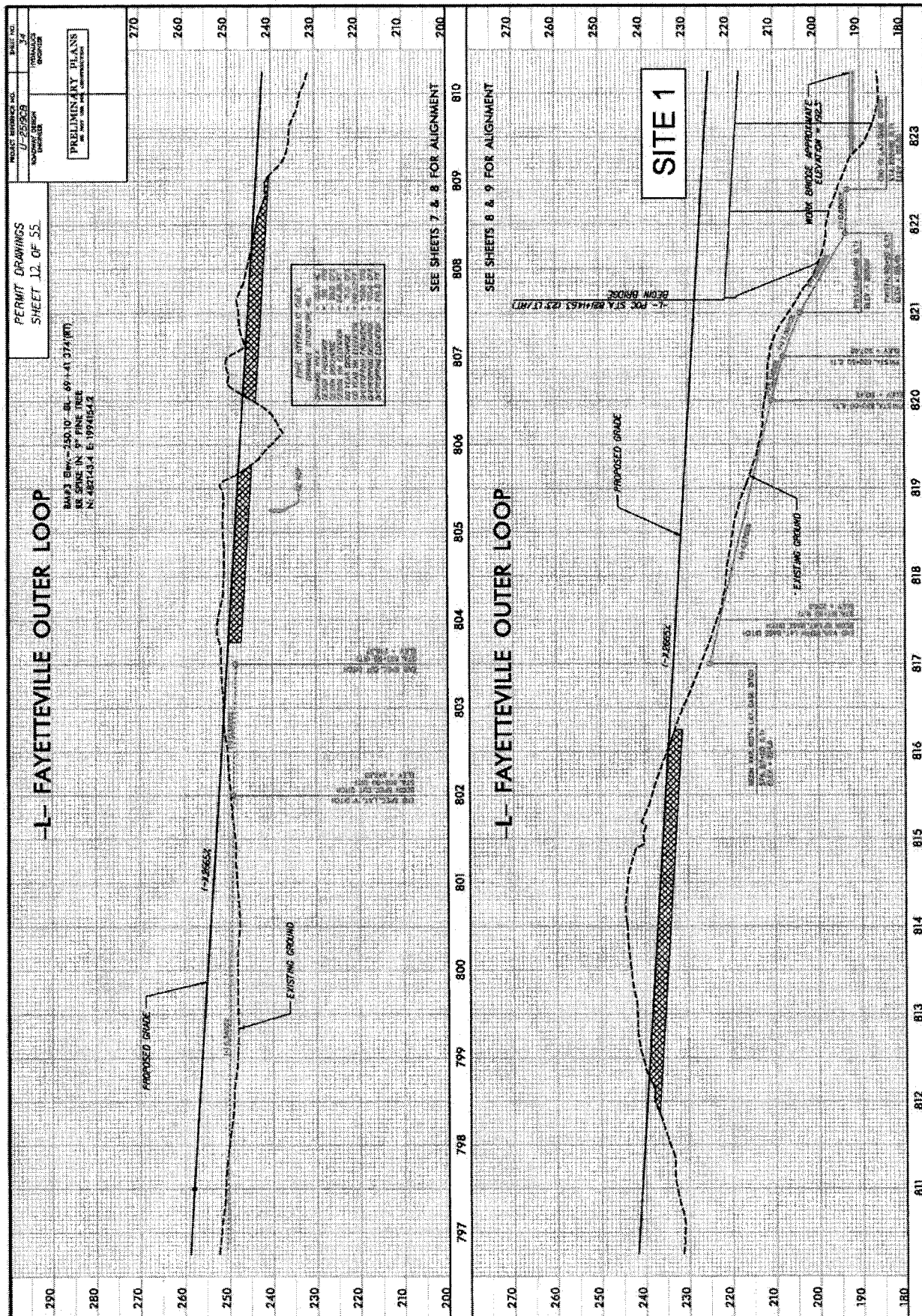
PROJECT REFERENCE NO.	SHEET NO.
U.S. 205/22	308
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS <small>FOR INFORMATION AND DISCUSSION</small>	
PERMIT DRAWINGS SHEET 3 OF 55	

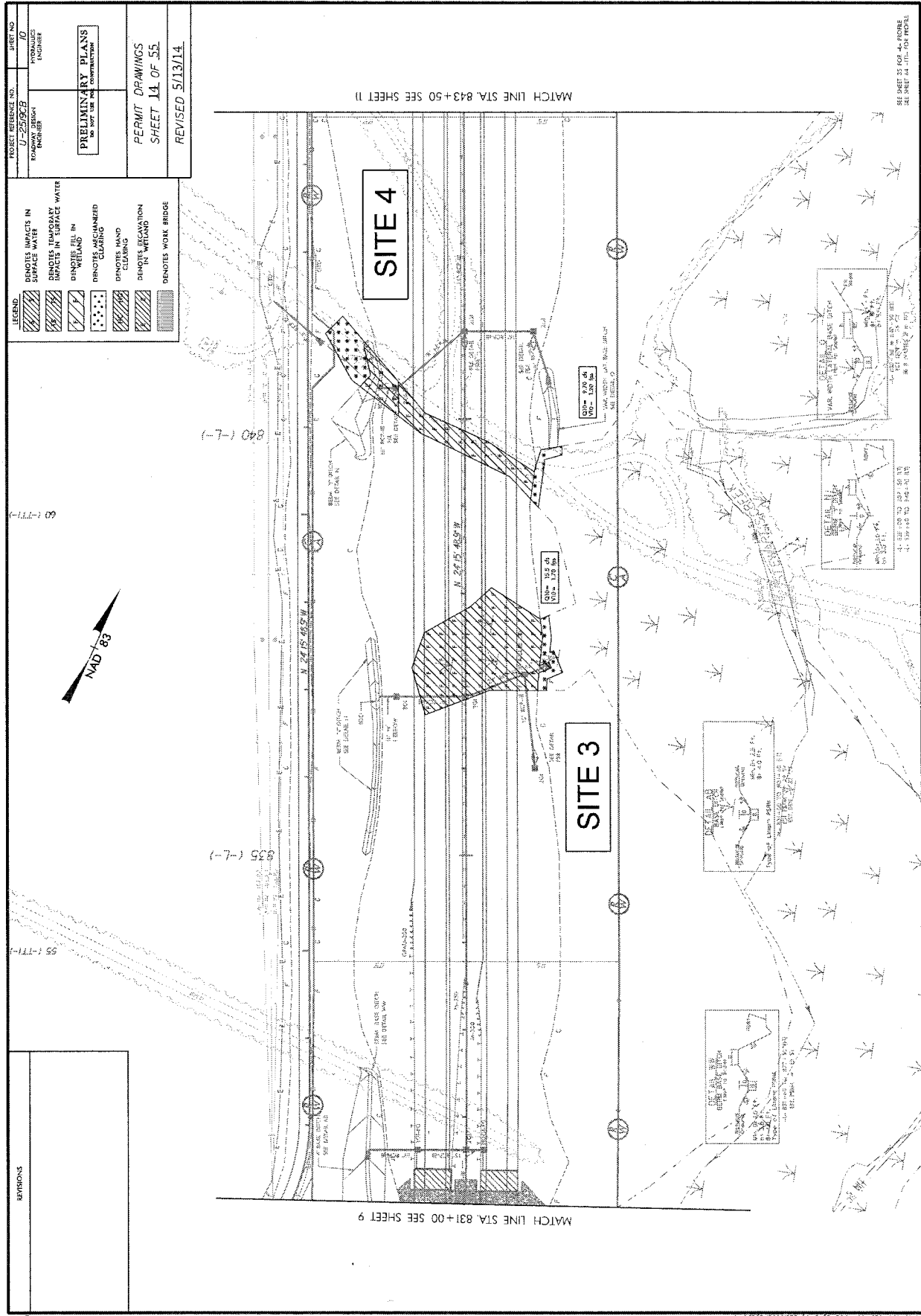


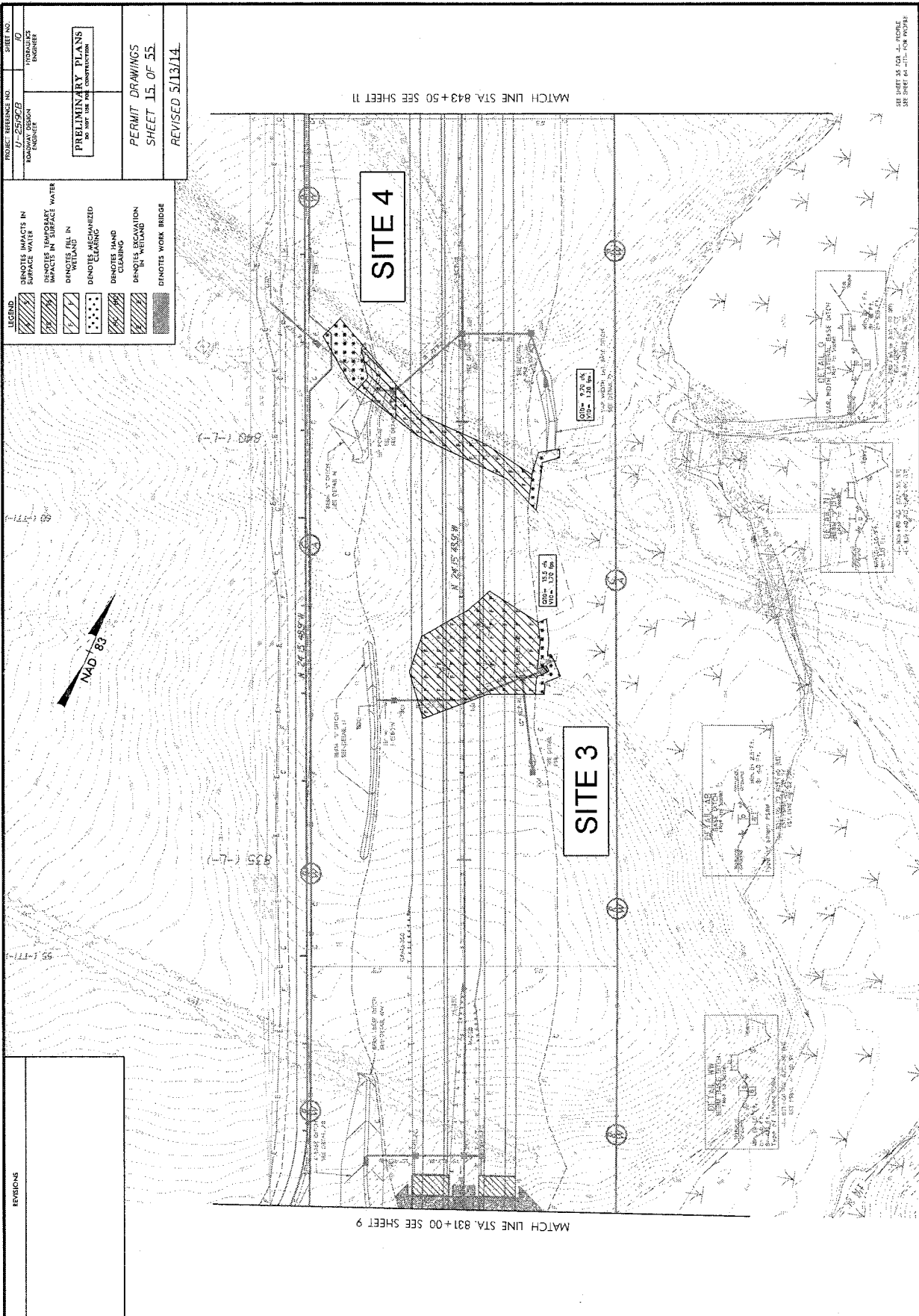


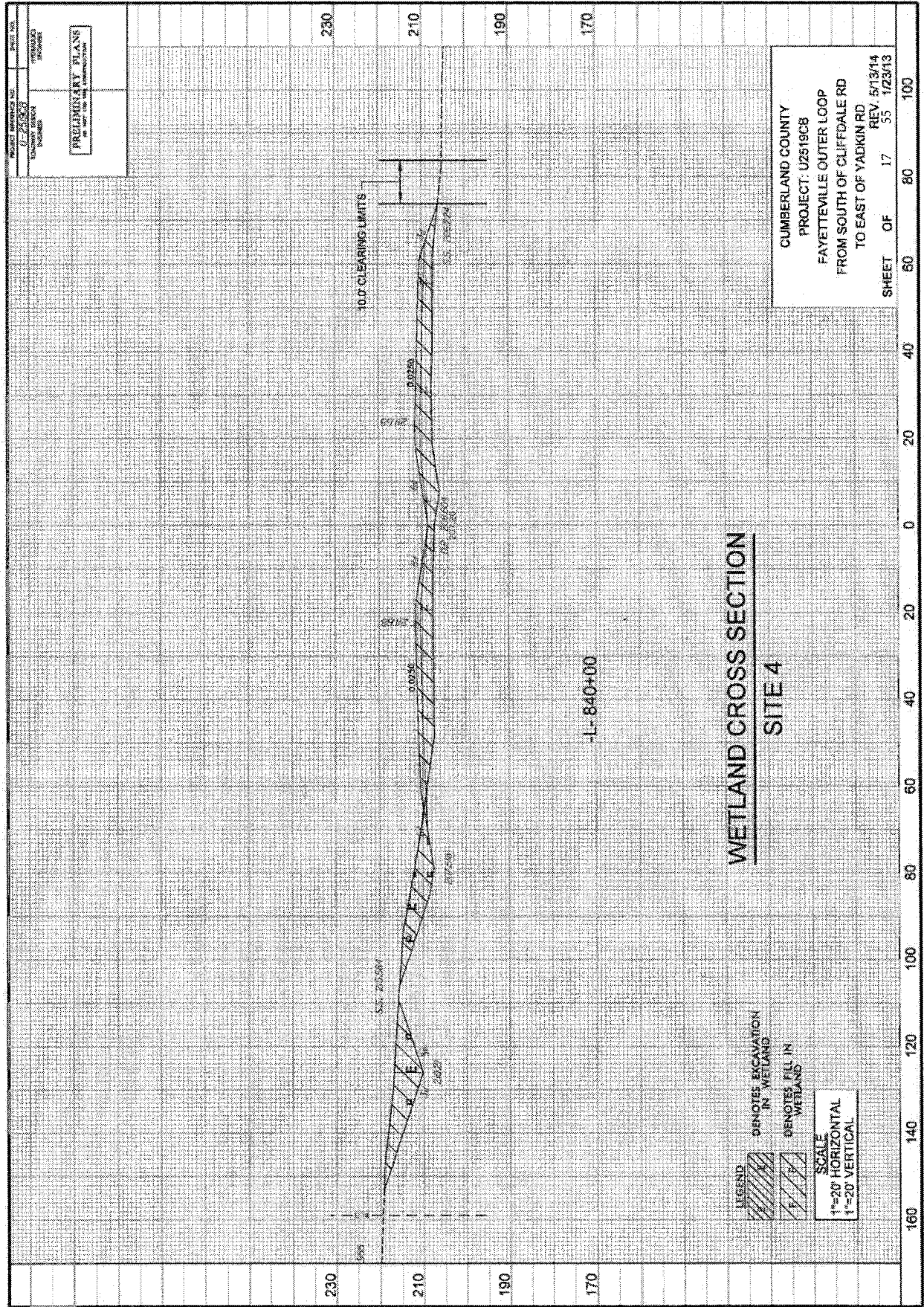


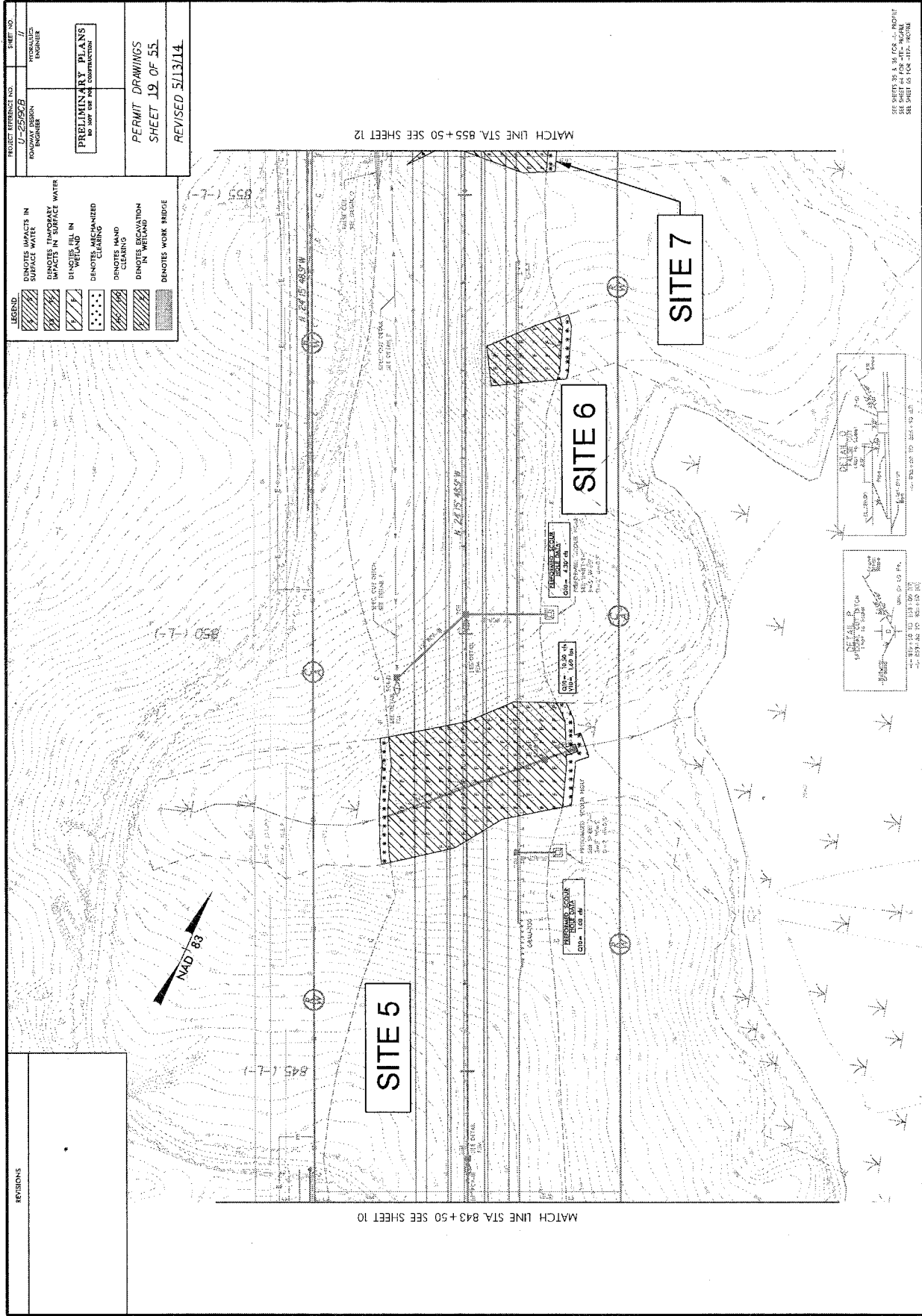




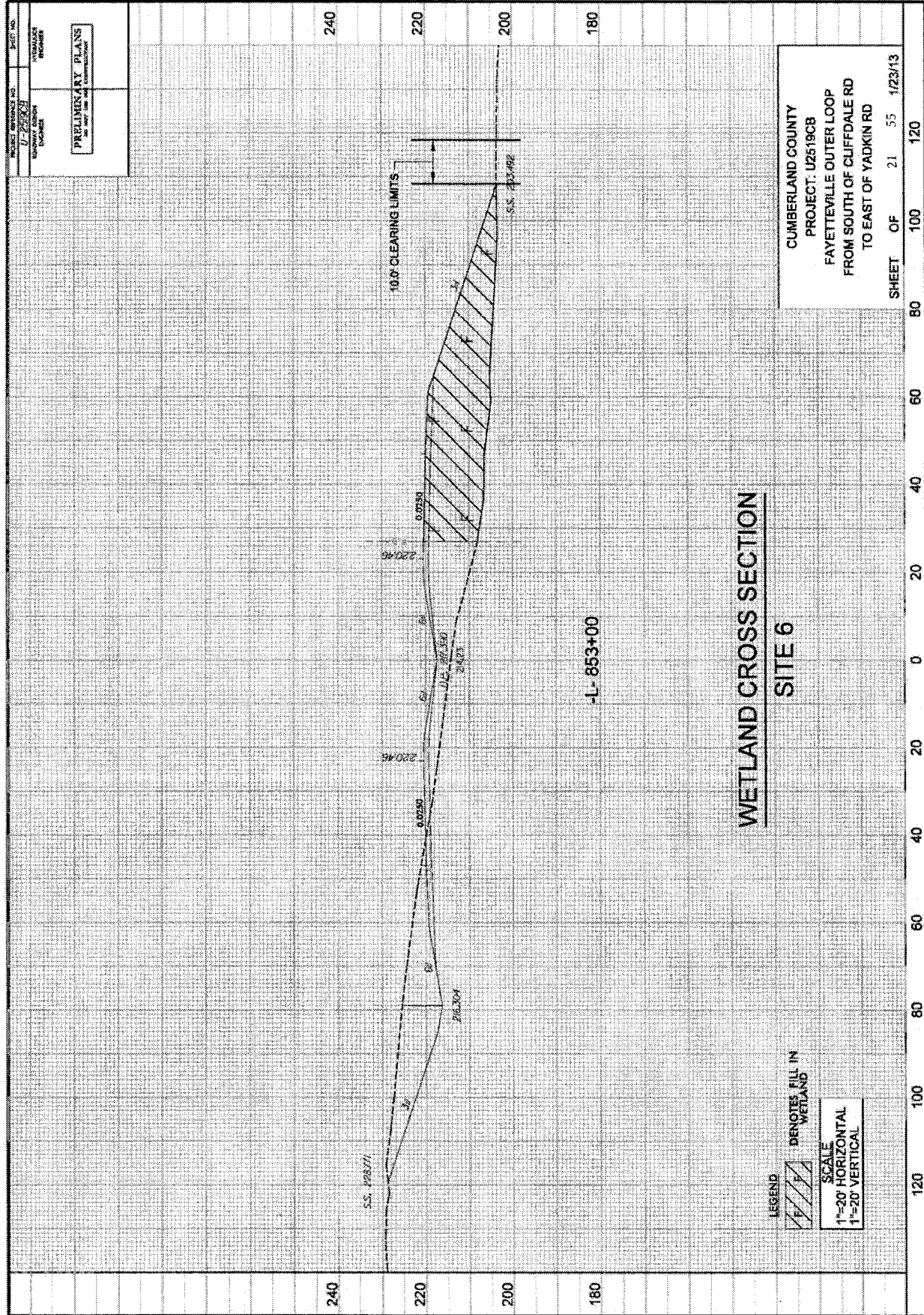


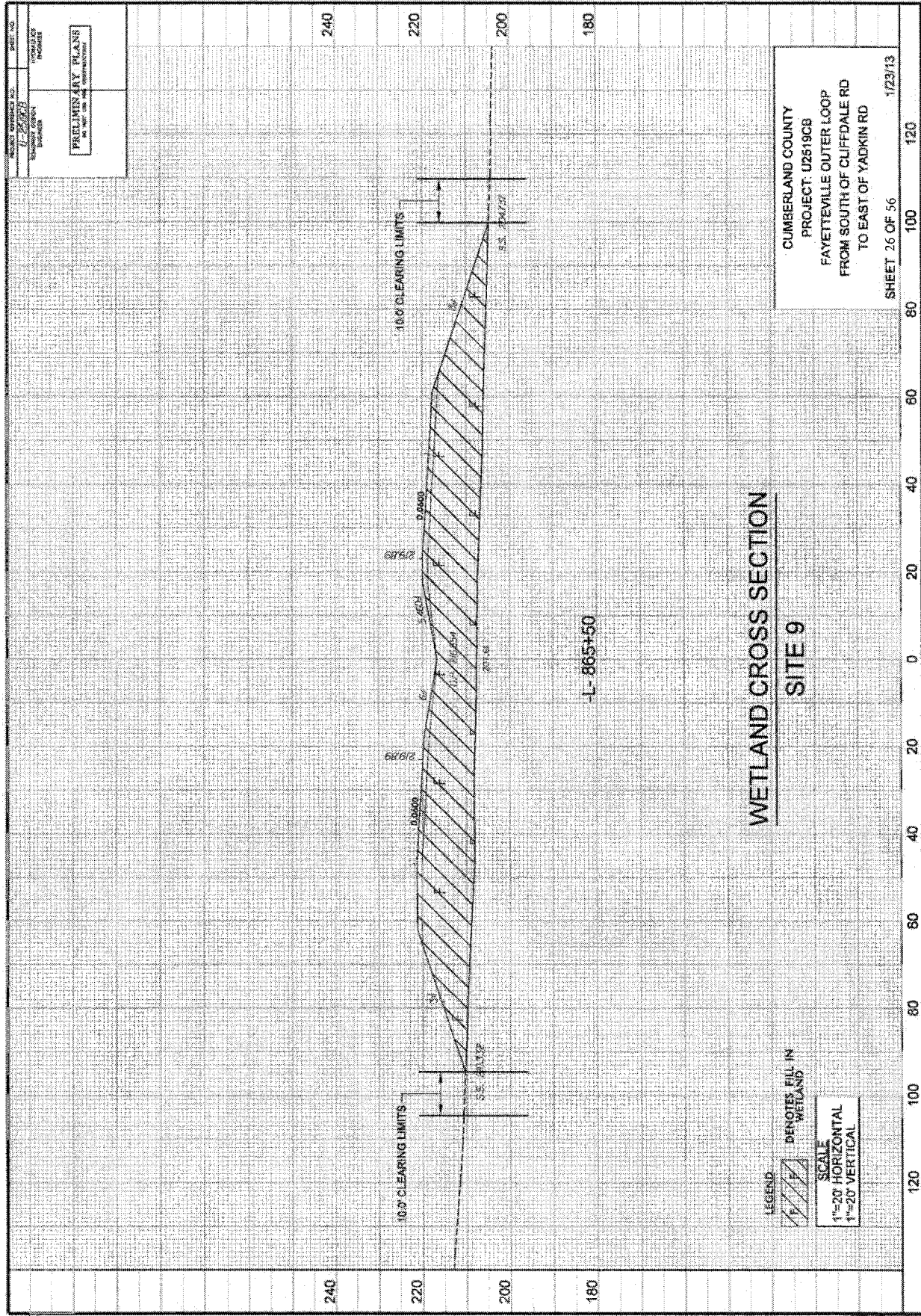




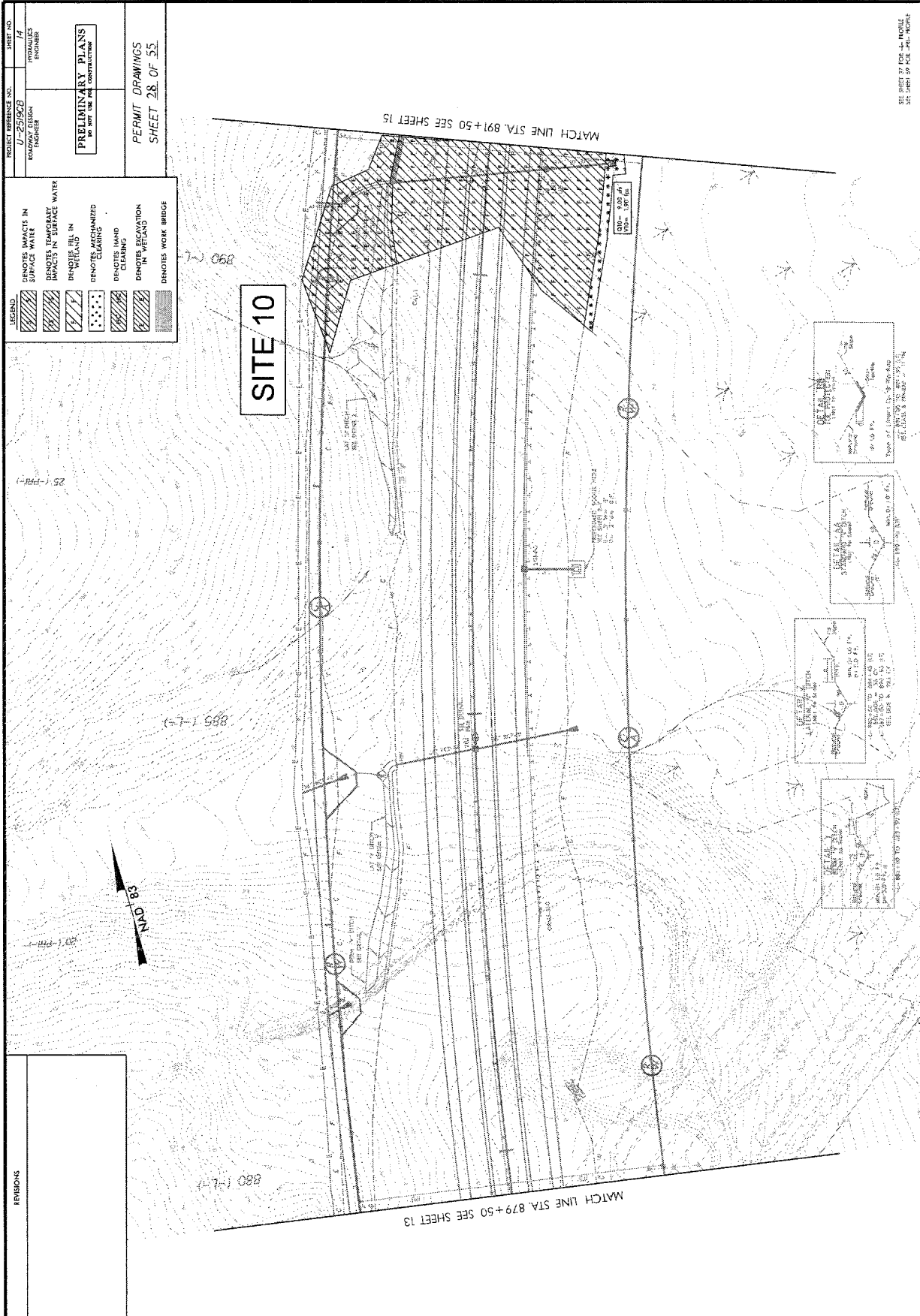


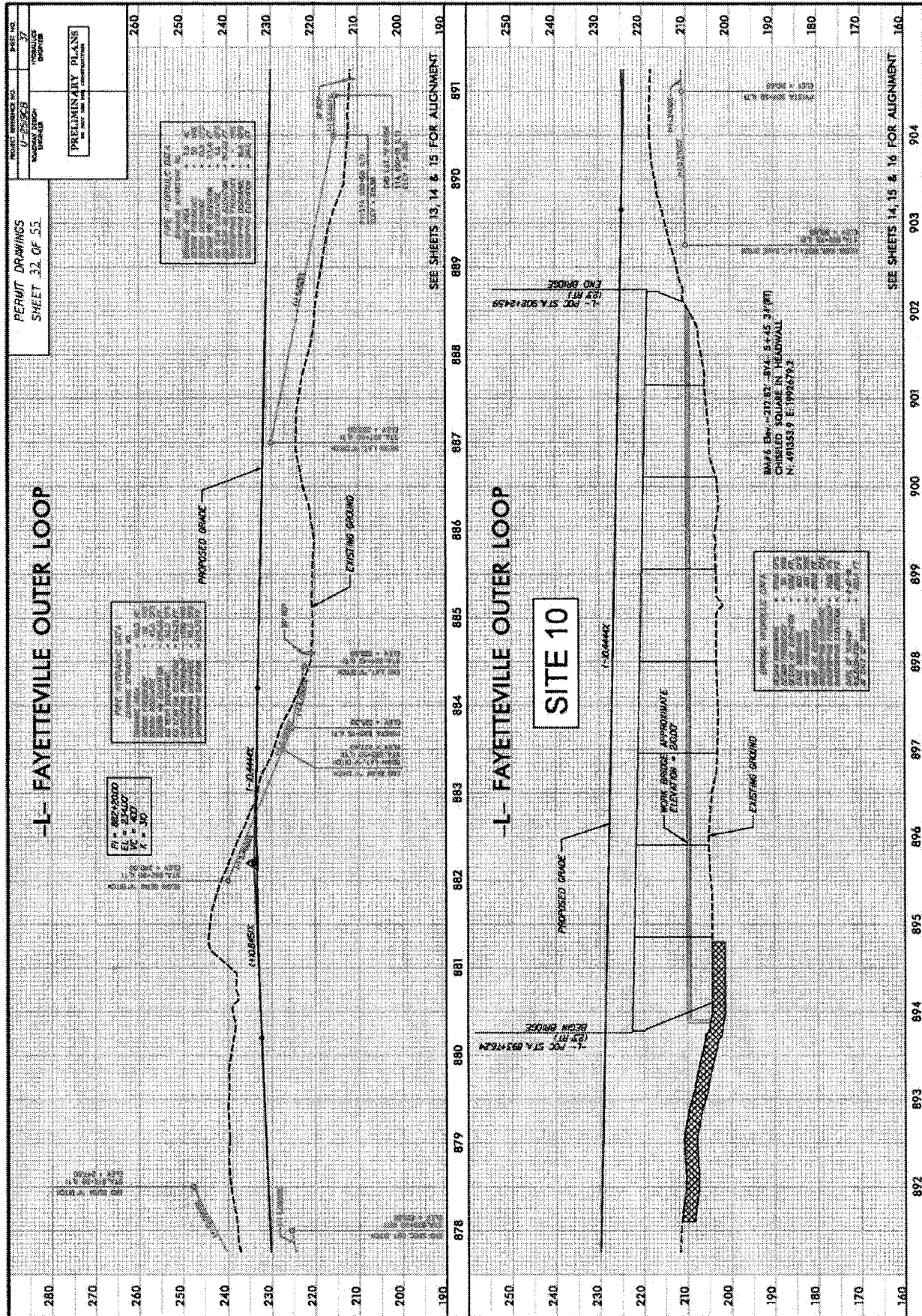
SEE SHEET 18 FOR PROFILE
 SEE SHEET 19 FOR "B" PROFILE
 SEE SHEET 20 FOR "C" PROFILE



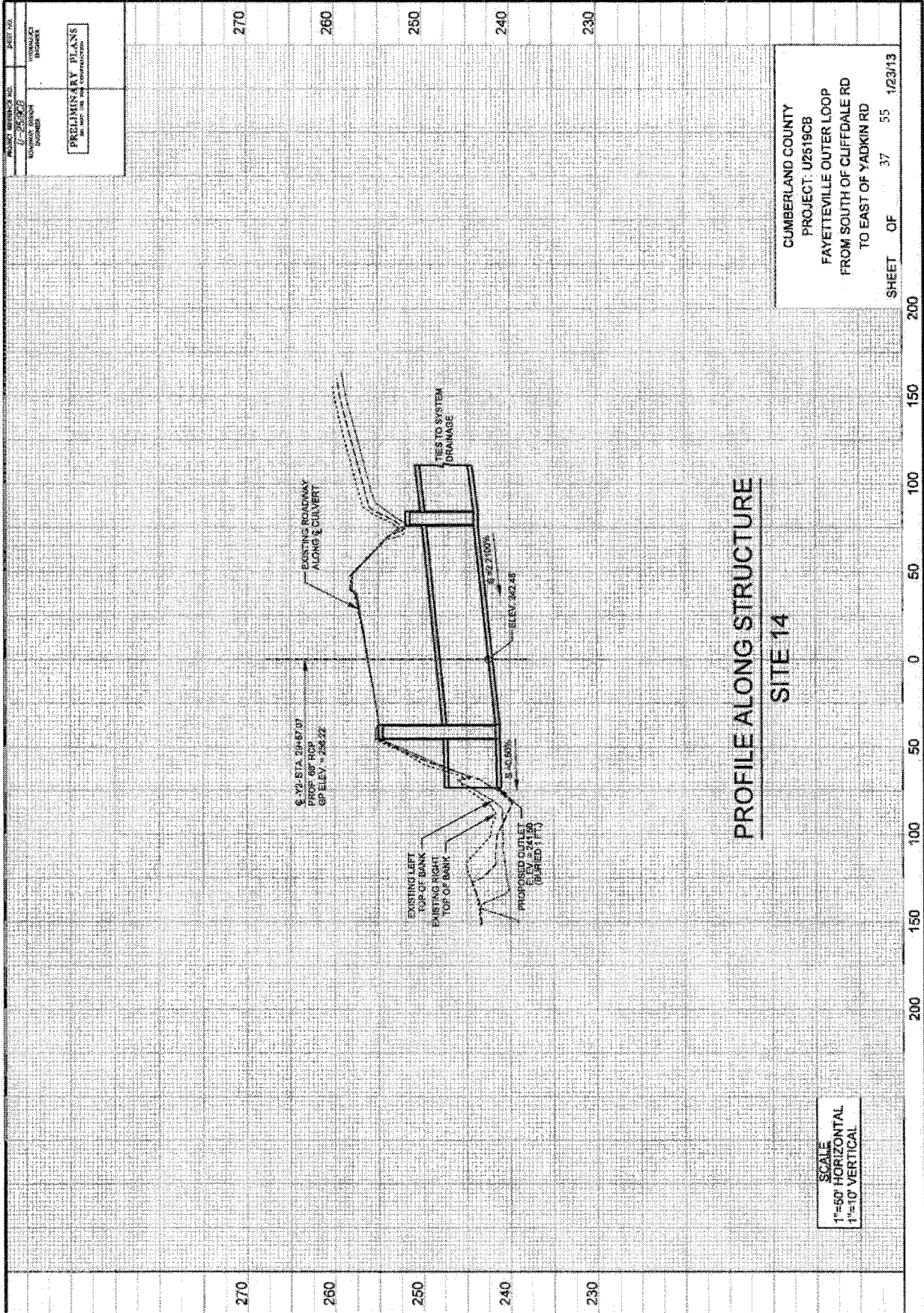


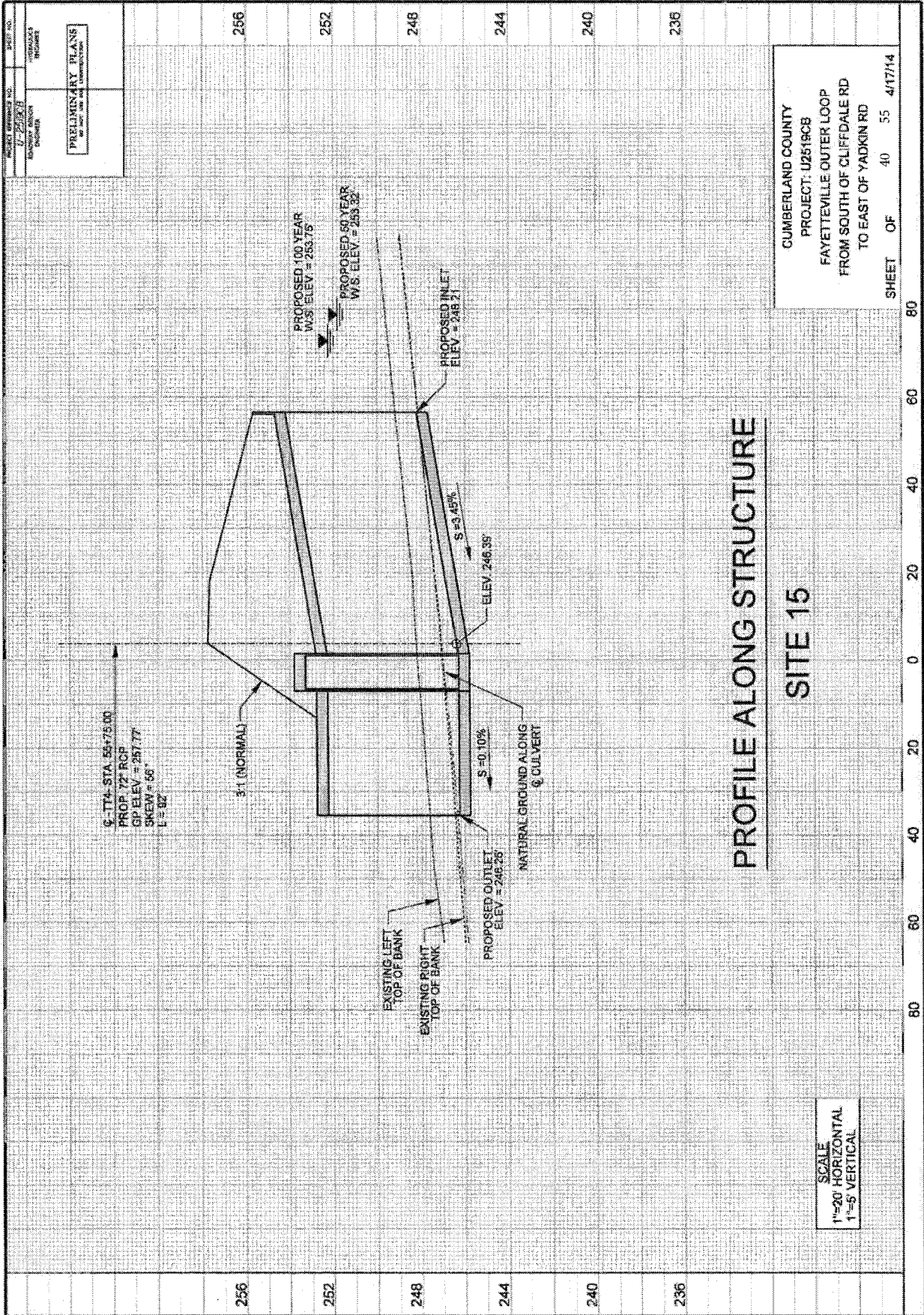


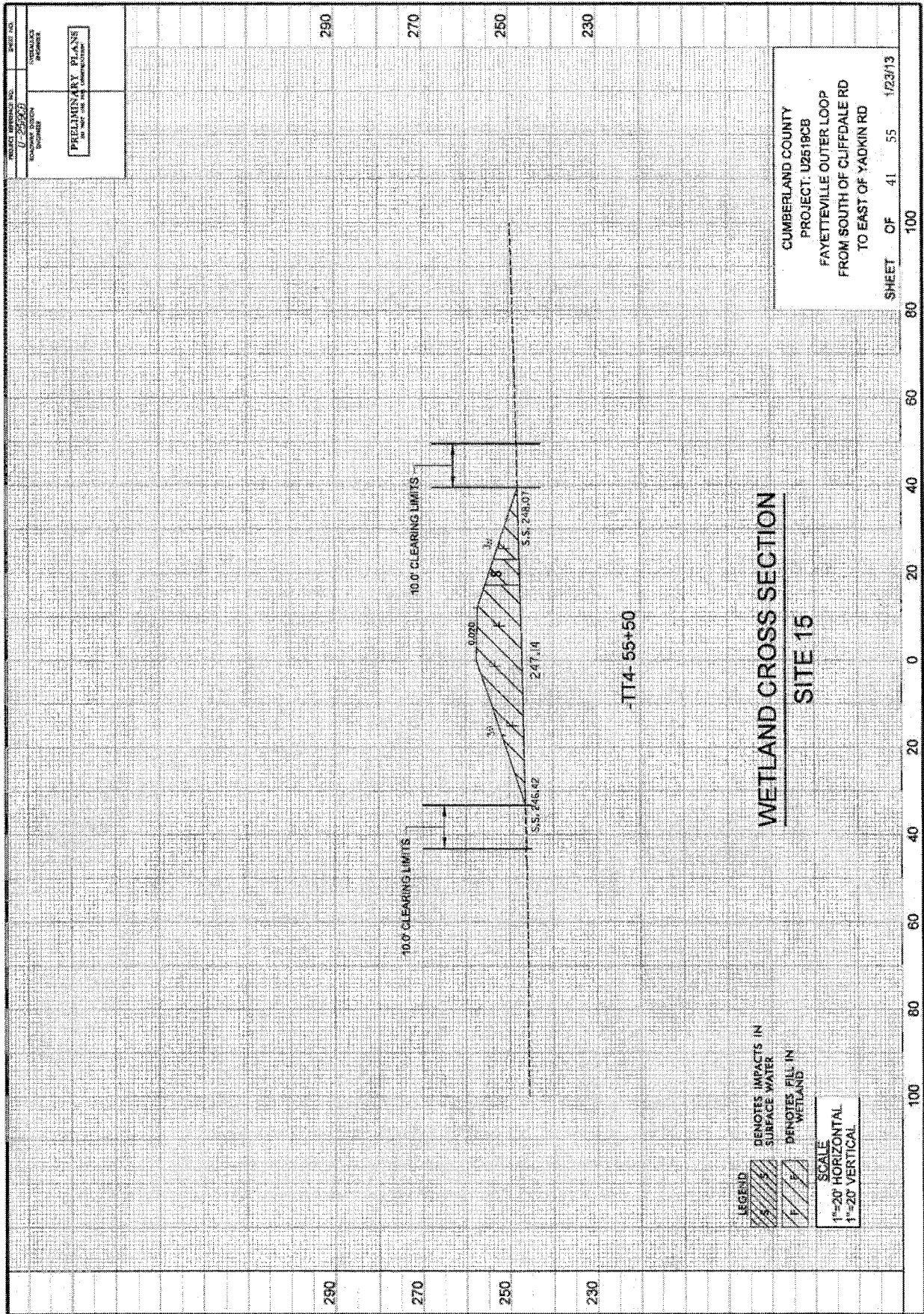




SEE SHEET 37 & 38 FOR L-PROFILE
SEE SHEET 60 FOR -P2A- PROFILE
SEE SHEET 65 FOR -TT48LV- PROFILE







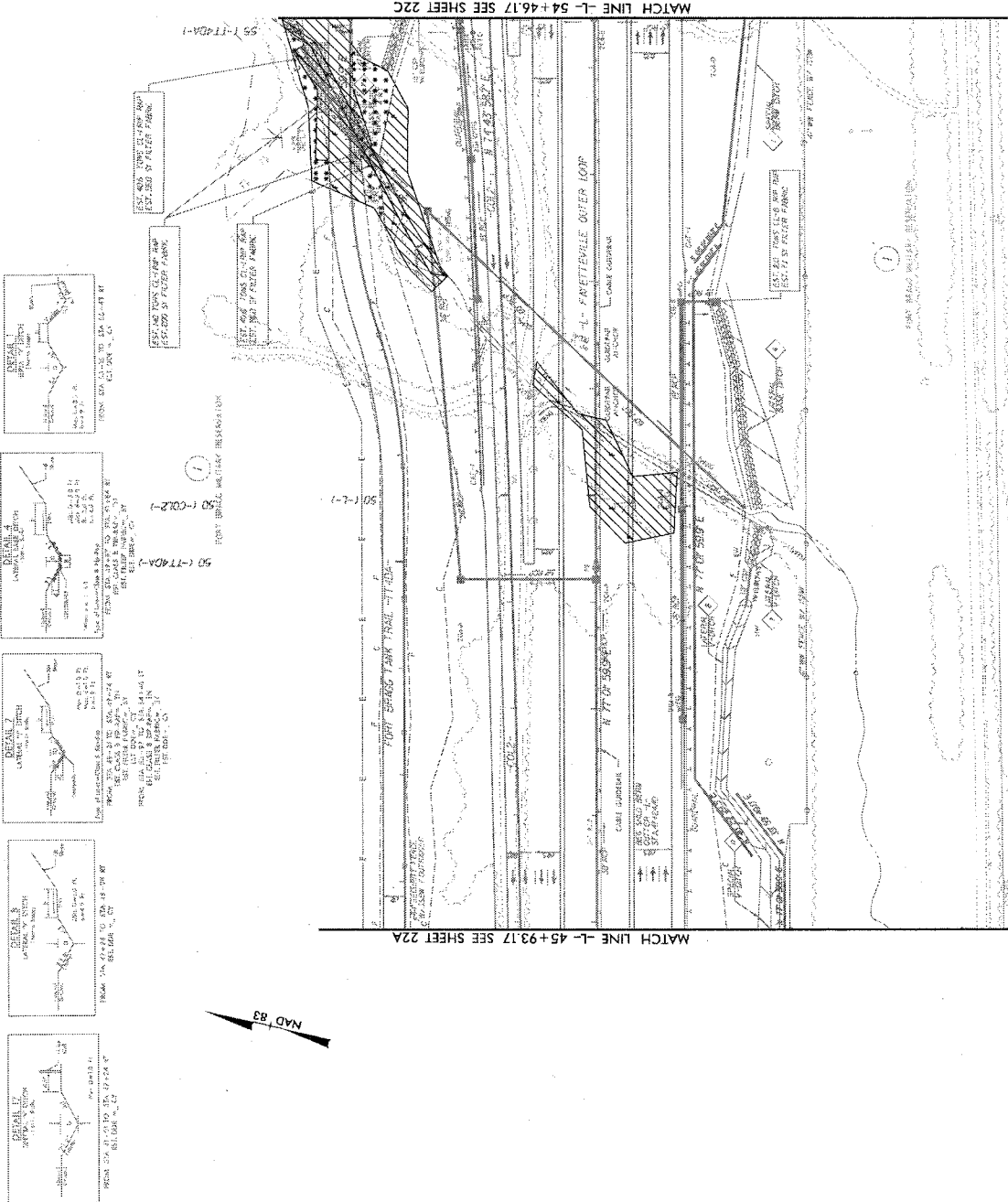
PROJECT REFERENCE NO.	U-2592B	SHEET NO.	229
ROADWAY DESIGN	BY SHEET NO.	PROFILES	
THIS DRAWING IS A PART OF A CONTRACT DOCUMENT AS TO THE RIGHT OF WAY FOR THE ROADWAY. THE LOCATION OF THE RIGHT OF WAY IS SHOWN BY THE DOTTED LINE. THE LOCATION OF THE ROADWAY IS SHOWN BY THE SOLID LINE. THE LOCATION OF THE PROPOSED ROADWAY IS SHOWN BY THE DASHED LINE. THE LOCATION OF THE PROPOSED ROADWAY IS SHOWN BY THE DASHED LINE.			
DATE	01/24/06	BY	01/24/06
DATE	01/24/06	BY	01/24/06

Right of Way for this Plan Sheet has been acquired under metric TIP Project U-2592B. Right of Way authorization was May 19, 2006. Right of Way shown is for information purposes only.

LEGEND	
DENOTES IMPACTS IN SURFACE WATER	
DENOTES TEMPORARY IMPACTS IN SURFACE WATER	
DENOTES FILL IN WETLAND	
DENOTES MECHANIZED CLEARING	
DENOTES HAND CLEARING	
DENOTES RECAUTION IN WETLAND	
DENOTES WORK BRIDGE	

PERMIT DRAWINGS
SHEET 42 OF 55
REVISED 5/14/14

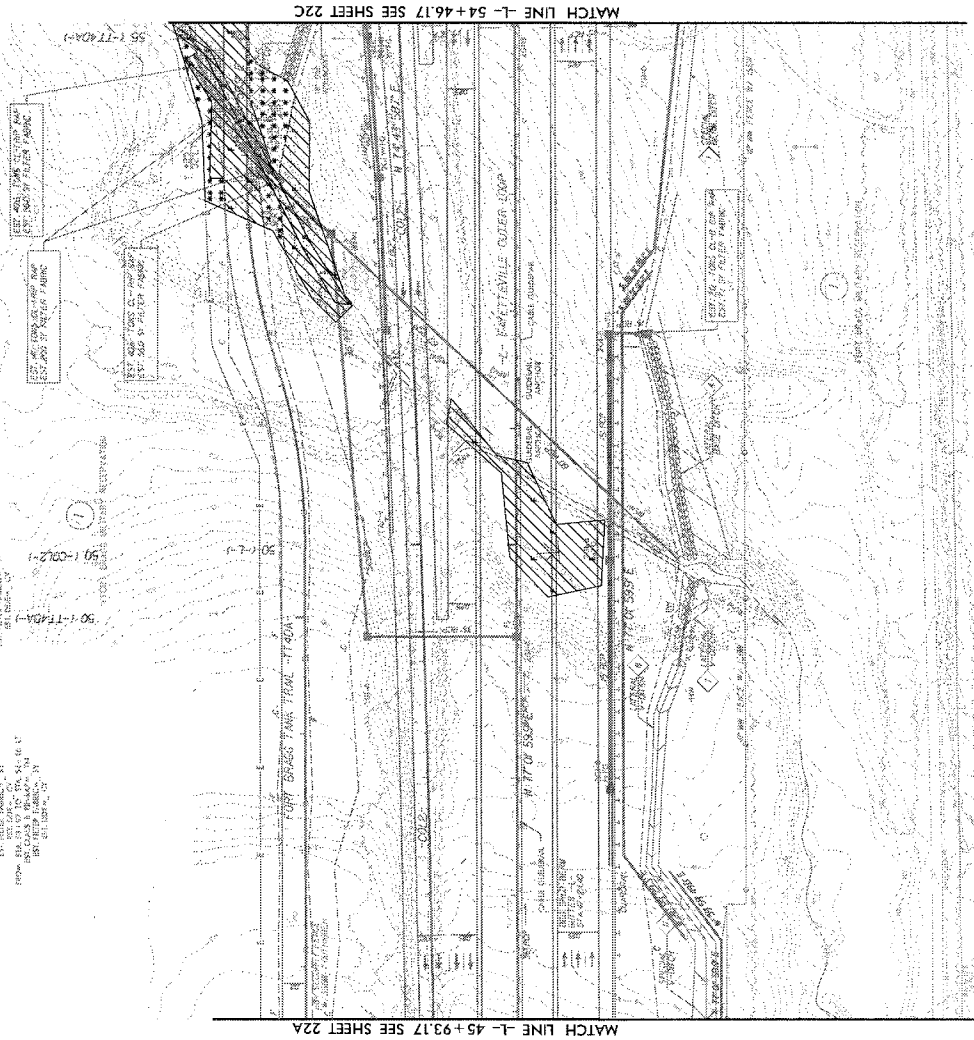
SITE 18



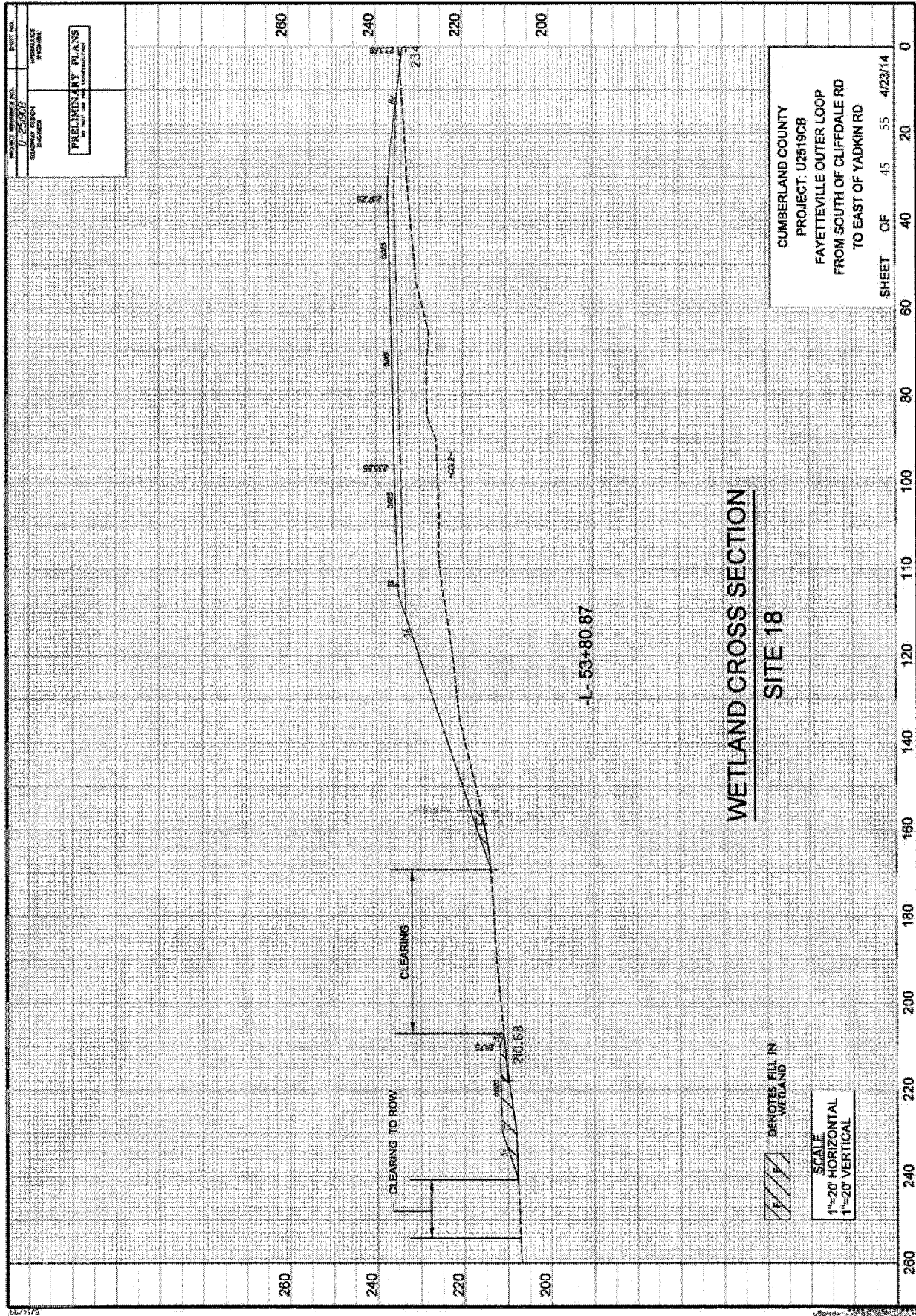
SEE SHEET 14 FOR PROFILE
SEE SHEET 15 FOR PROFILE
SEE SHEET 16 FOR PROFILE

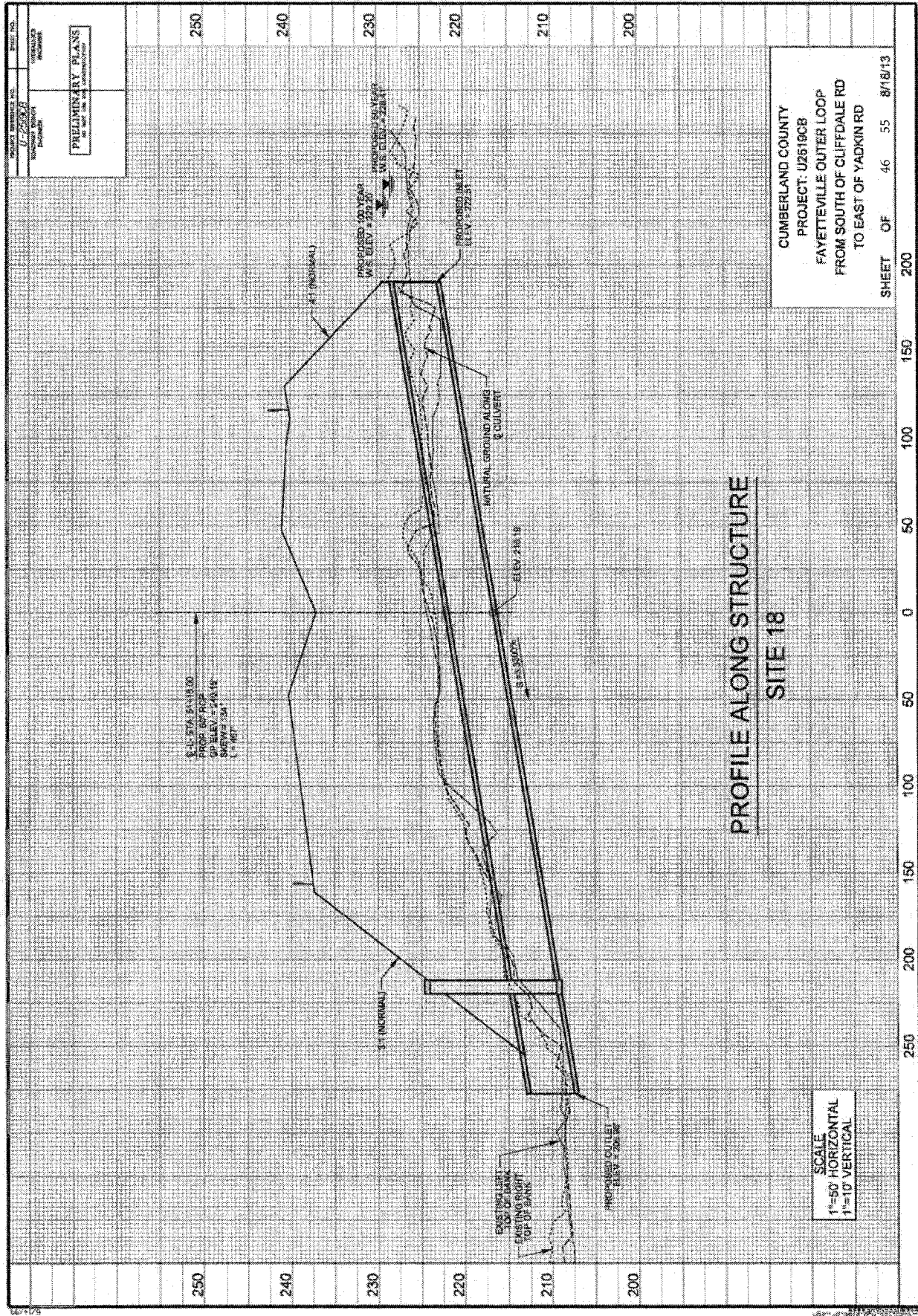
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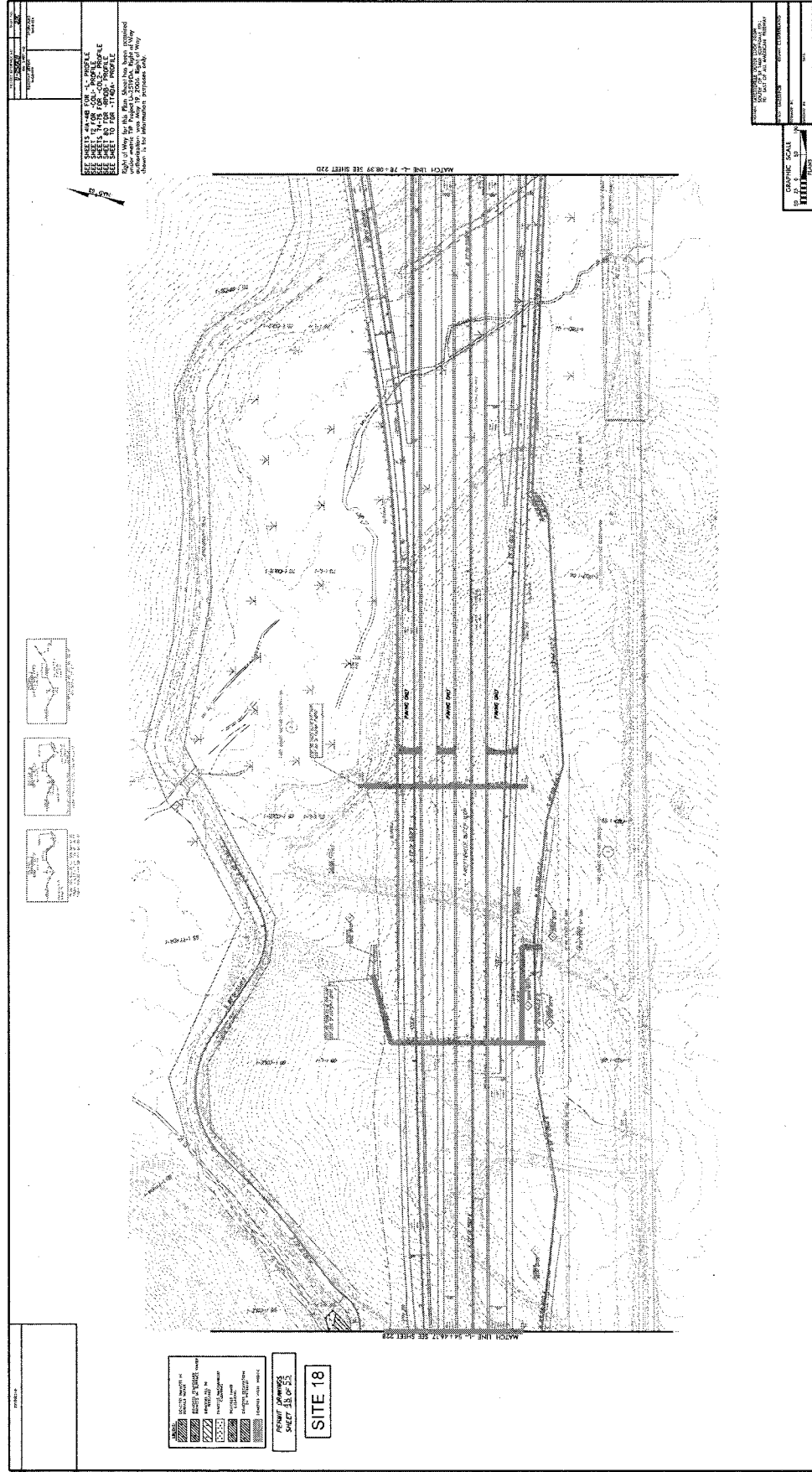
SITE 18

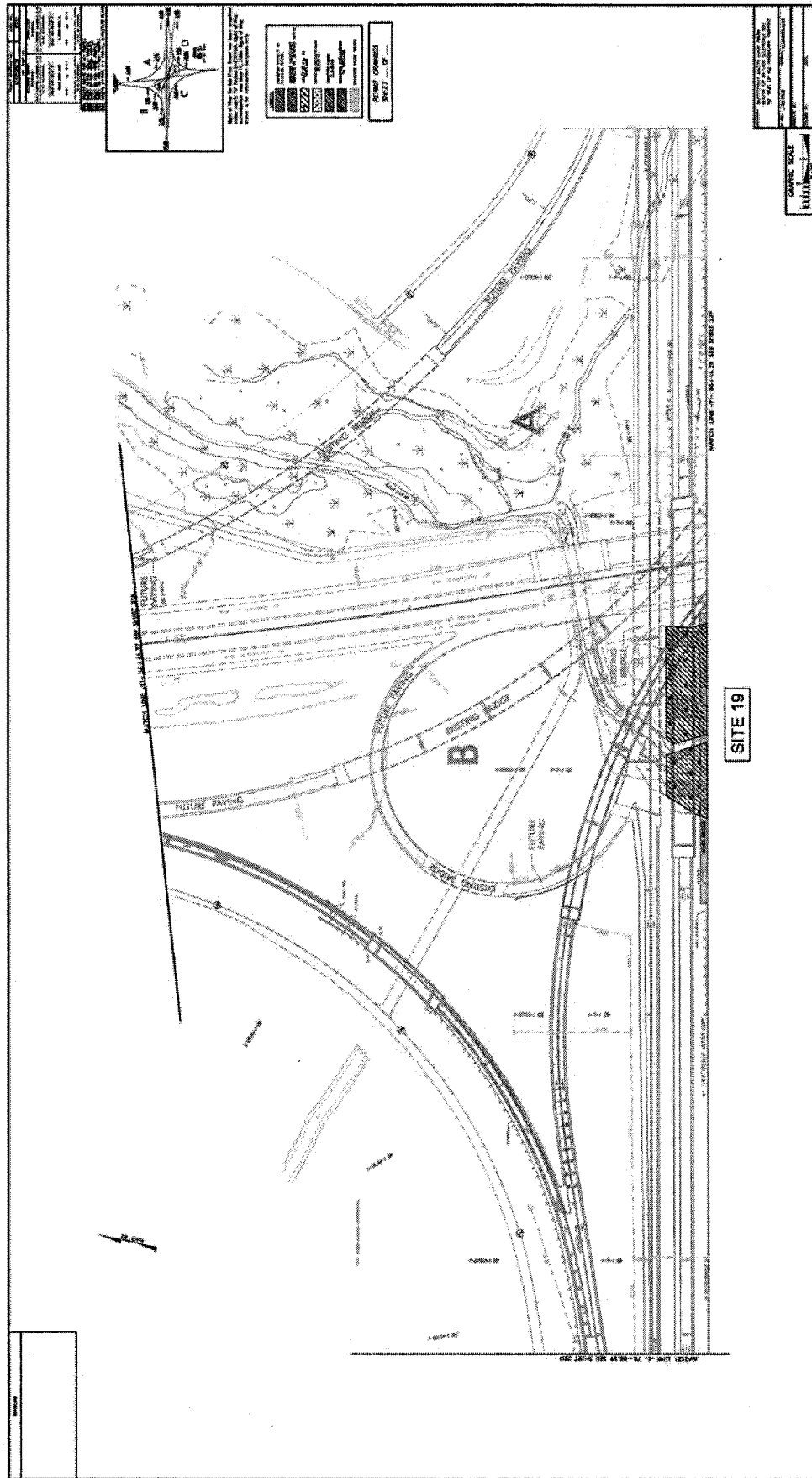


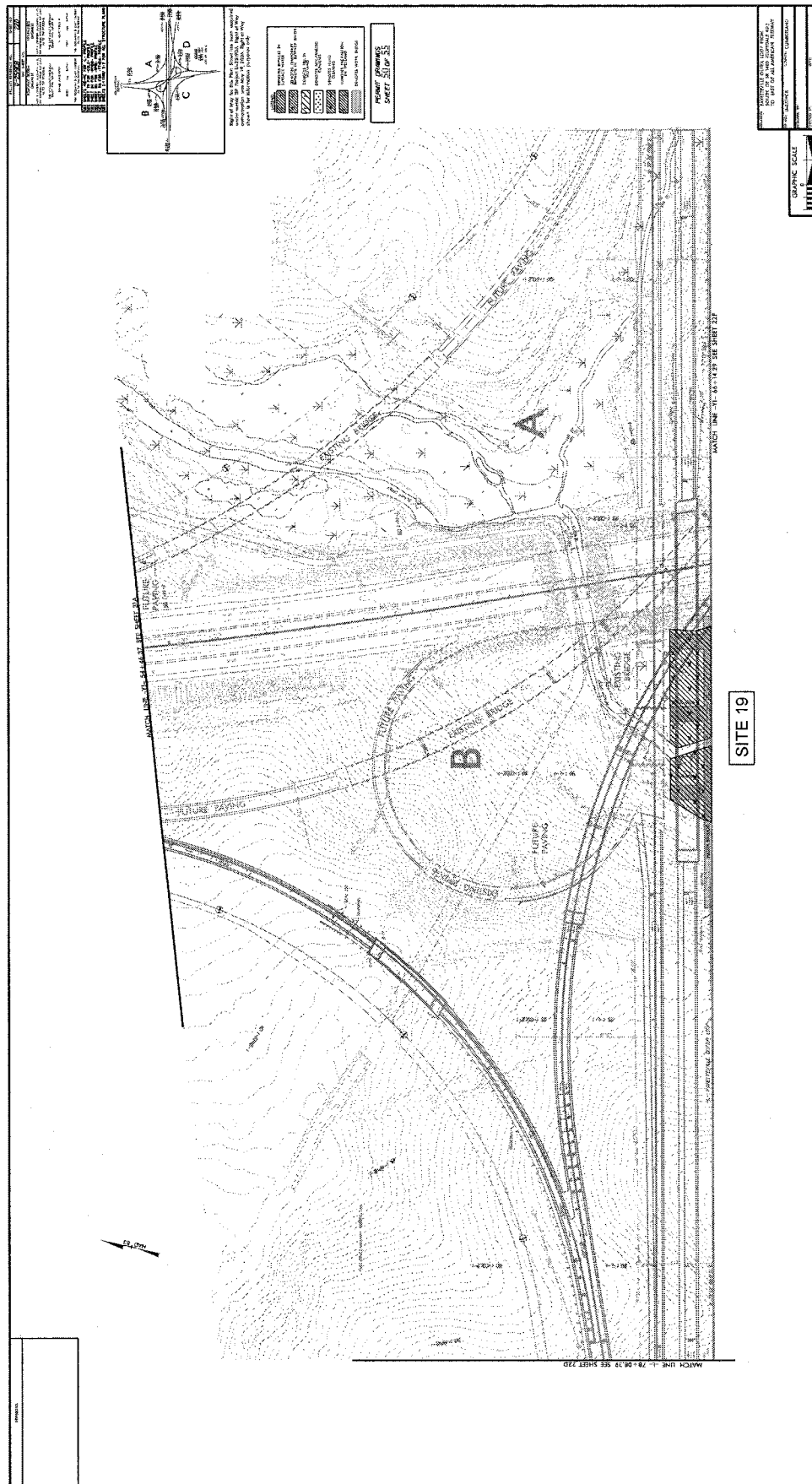
SEE SHEET 41A FOR -L- PROFILE
SEE SHEET 74 FOR -COL2- PROFILE
SEE SHEET 70 FOR -J14DA- PROFILE

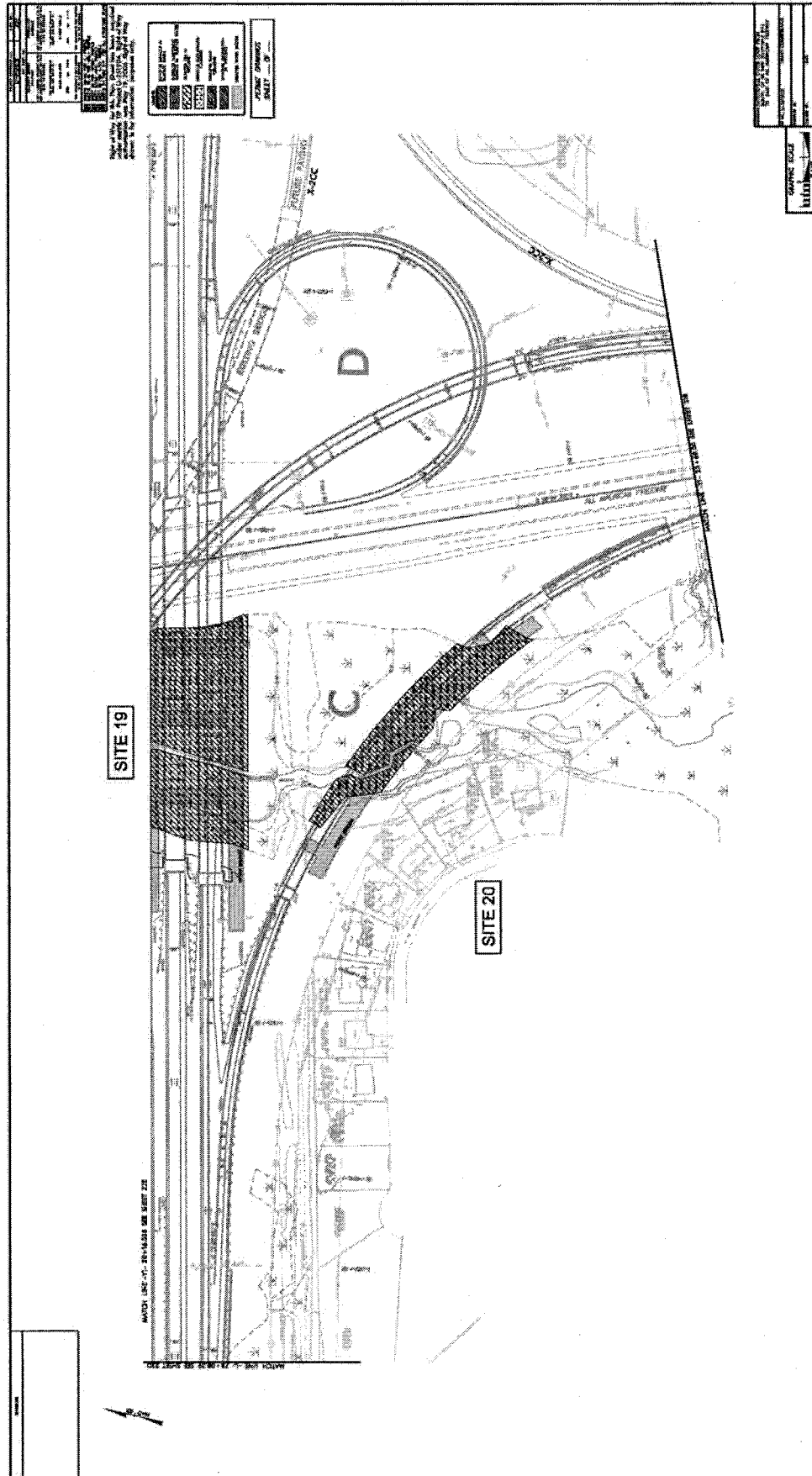


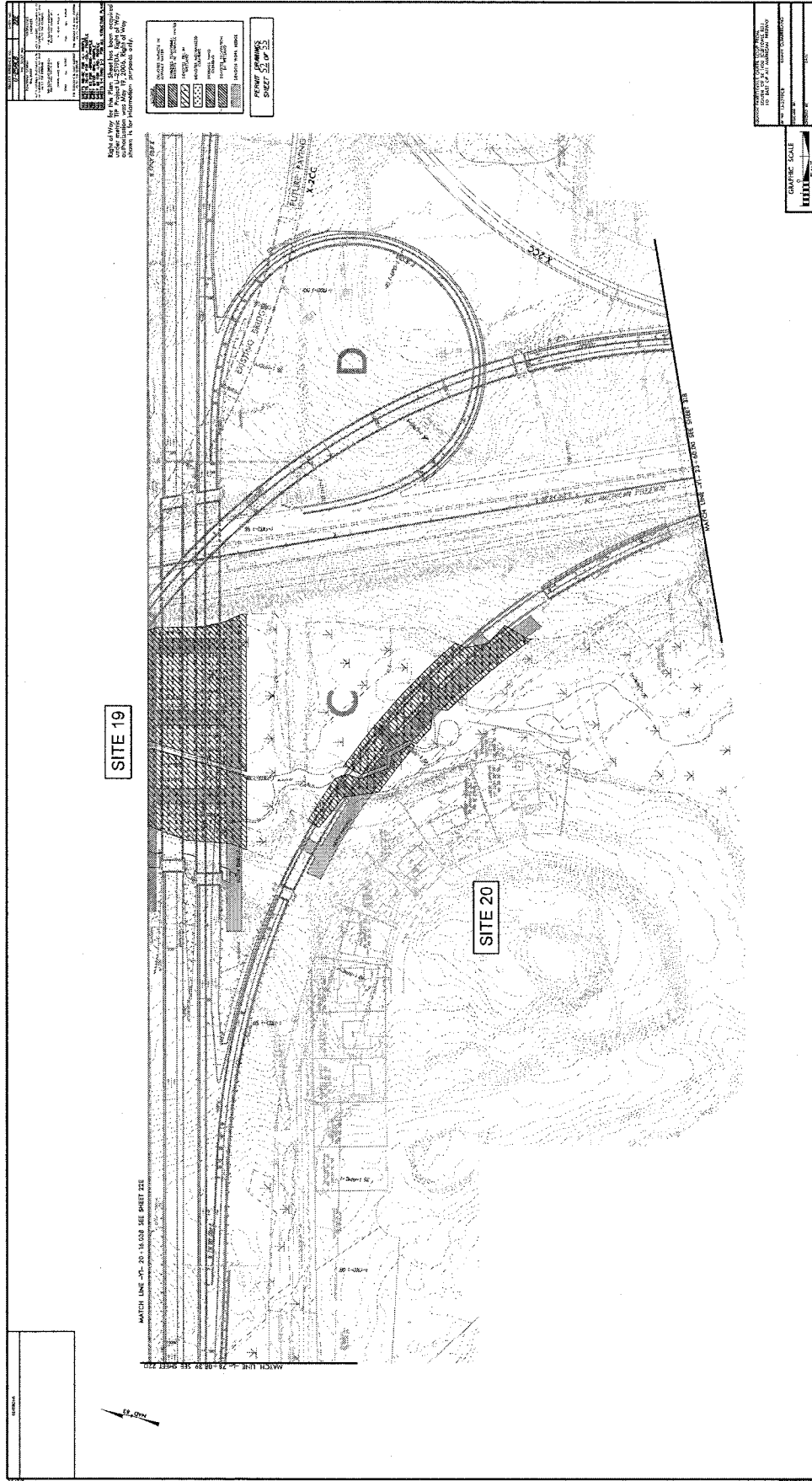


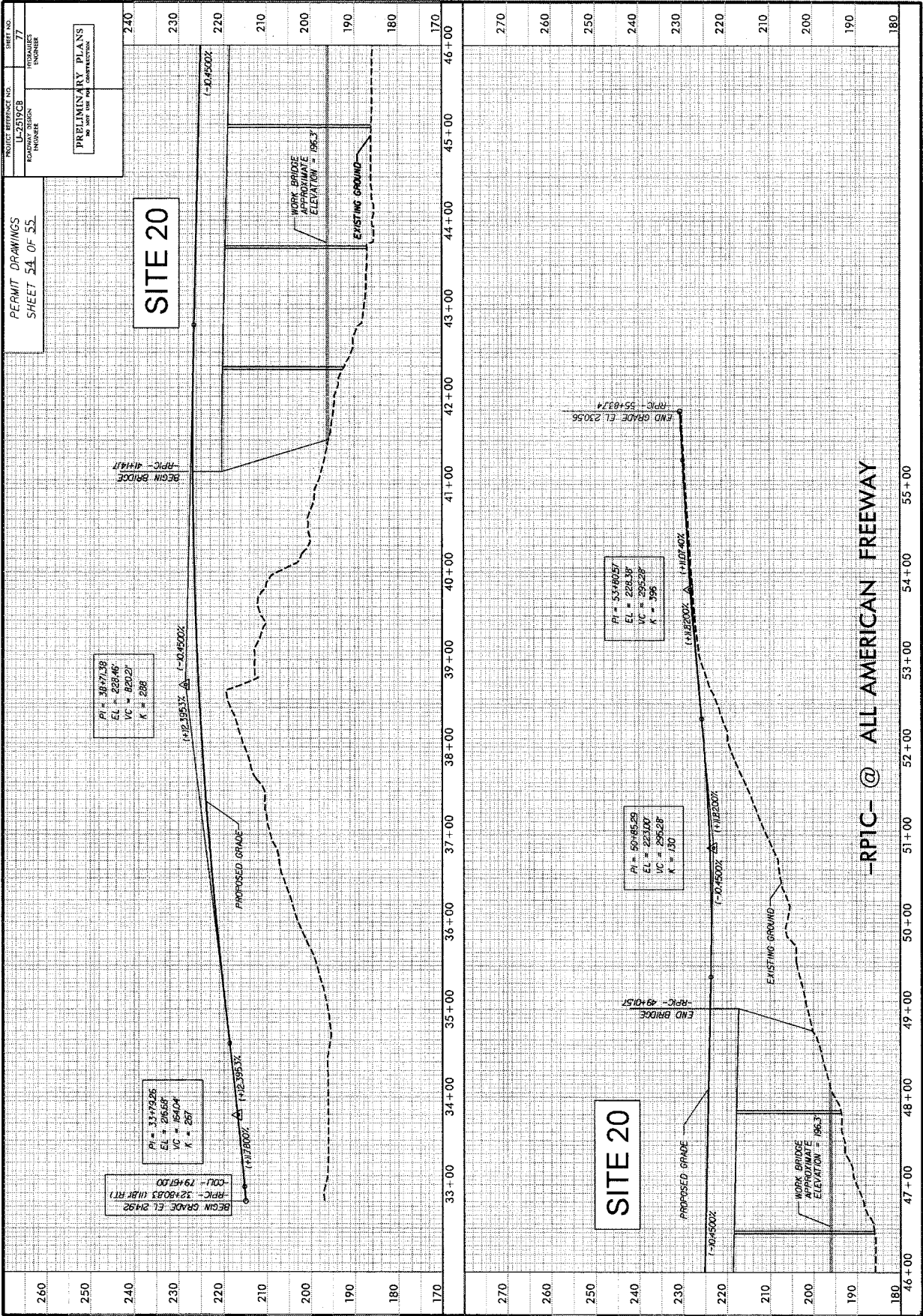












WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-L- 821+59 TO 830+76	Bridge	-	-	-	-	2.60	-	0.01	-	5	-
2	-TT1- 46+10 TO 46+73	48" CSP	-	-	-	-	-	0.01	0.01	69	19	-
	-TT1- 46+29	Bank Stabilization	-	-	-	-	-	-	-	10	-	-
3	-L- 836+61 TO 838+07	Roadway & 42" RCP	0.33	-	-	0.02	-	-	-	-	-	-
4	-L- 838+80 TO 841+17	Roadway	0.10	-	0.07	0.02	-	-	-	-	-	-
5	-L- 847+36 TO 849+22	Roadway & 36" RCP	0.62	-	-	0.07	-	-	-	-	-	-
6	-L- 852+83 TO 853+64	Roadway	0.11	-	-	0.02	-	-	-	-	-	-
7	-L- 855+25 TO 855+70	Roadway	0.07	-	-	0.01	-	-	-	-	-	-
8	-L- 859+50 TO 861+81	Roadway & 30" RCP	0.62	-	-	0.04	-	-	-	-	-	-
9	-L- 864+39 TO 865+64	Roadway & 54" RCP	0.27	-	-	0.04	-	-	-	-	-	-
10	-L- 889+04 TO 902+62	Roadway & Bridge	1.47	-	0.30	0.17	2.18	-	-	-	-	-
11	SITE ELIMINATED	N/A	-	-	-	-	-	-	-	-	-	-
12	-L- 908+82 TO 909+03	Roadway	-	-	-	0.01	-	-	-	-	-	-
13	-Y2REV_LT- 34+55 TO 36+20	Roadway	0.27	-	-	-	-	0.01	-	80	-	-
	-Y2REV_LT- 35+03	Bank Stabilization	-	-	-	-	-	-	-	10	-	-
14	-Y2REV_LT- 29+32 TO 29+33	66" RCP	-	-	-	-	-	0.01	0.01	25	10	-
	-Y2REV_LT- 29+33	Bank Stabilization	-	-	-	-	-	-	-	10	-	-
15	-TT4- 54+56 TO 58+27	Roadway & 72" RCP	0.42	-	-	0.08	-	0.06	0.01	440	40	-
16	-Y1- 39+18 TO 40+61	Roadway & 72" RCP	0.15	-	-	0.05	-	-	-	-	-	-
17	SITE ELIMINATED	N/A	-	-	-	-	-	-	-	-	-	-
18	-L- 49+55 TO 53+31	Roadway & 60" RCP	0.25	-	-	0.07	-	0.02	-	135	-	-
	-L- 53+08	Bank Stabilization	-	-	-	-	-	-	-	20	-	-
	-TT4DA- 43+45 TO 56+12	Roadway & 48" RCP	0.16	-	-	0.05	-	0.02	0.01	133	11	-
	-TT4DA- 54+75	Bank Stabilization	-	-	-	-	-	-	-	10	-	-
19	-L- 89+00 TO 93+35	Bridge	-	-	-	-	2.62	-	-	-	-	-
20	-RP1C- 42+50 TO 48+50	Bridge	-	-	-	-	0.89	-	-	-	-	-
TOTALS:			4.84	0.00	0.37	0.65	8.29	0.13	0.05	942	85	0

Notes: 1. Total for "Existing Channel Impacts - Permanent" includes 40' of Bank Stabilization at culvert outlets.

2. Site 4 includes 0.05 acres of "Total Take"

3. Site 8 includes 0.13 acres of "Total Take"

4. Site 13 includes 0.18 acres of "Total Take"

5. Permanent Wetland Impacts from bridge pier installation = 0.03

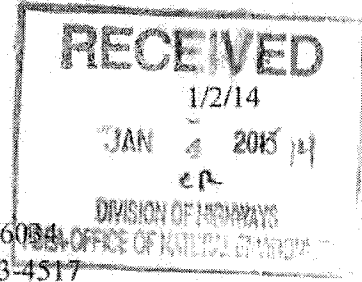
6. Temporary Wetland Impacts from work bridge pier installation = 0.02

7. All impacts at Sites 19 & 20 other than those associated with the Bridge Construction shown, were permitted under Project U-2519DA.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

CUMBERLAND COUNTY

U-2519CB
SHEET 55 OF 55
Rev. 5/14/2014
10/8/2013



U-2519CB NEU Narrative

Utility Owners:

- **Power:** Duke Progress Energy - Contact: Mr. Jamie Loy (919) 546-6084
- **Power:** PWC (Distribution) - Contact: Mr. Rick Anderson (919) 223-4517
- **Power:** PWC (Transmission)- Contact: Mr. Rick Anderson (919) 223-4517
- **Power:** Sandhills Utility Services - Contact: Mr. Bill Cannon (910) 497-7399
- **Telephone:** Century Link - Contact: Mr. Kevin Godwin (910) 366-2142
- **Water:** PWC - Contact: Mr. Chris Rainey (910) 223-4370
- **Water:** Old North Utility Services- Contact: Mr. Pat Jennings (910) 495-1311
- **Sewer:** Old North Utility Services- Contact: Mr. Pat Jennings (910) 495-1311
- **CATV:** Time Warner - Contact: Mr. Jack Crabb (910) 401-5034
- **Gas:** Fort Bragg DPW- Contact: Mrs. Peggy (910) 396-0325
- **Telephone:** USA-SENC -Contact: Mrs. Peggy (910) 396-0325

General Utility Relocation:

All utility lines inside the project limits will be adjusted as necessary or relocated away from construction.

Existing Utilities:

- **Power (Duke Energy Progress Distribution):**
 - Joint use poles containing power, Telephone (PWC) and TV (TWC) runs along the north side of Y-5.
- **Power (PWC Transmission):**
 - Existing transmission line to be relocated begins at Y-5 sta. 240+00 and continues until it crosses the L line at sta. 779+62.42 and continues until it reaches the substation
- **Power (PWC Distribution):**
 - Existing overhead power runs parallel to Y-5 on the south side, power will be relocated due to conflicts with the proposed ramp, loop, and bridge.
- **Power (Sandhills Utility Services):**
 - Overhead power on the south side of Y-4 begins at sta. 12+82.31 and ends at sta. 51+87.46
 - Overhead power begins on the north side of L sta. 928+12.51 and crosses the L line and runs 411ft to a transformer
 - Overhead power begins on the south side of Y-4 at sta. 50+23.49 continues for 857ft and crosses RPC2 at sta. 15+60 and continues for another 50ft
 - An existing line begins south of RPC2 sta. 14+35.45 and connects to a transformer located at RPC2 sta. 17+25.85

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- Power leaves the transformer located south of RPC2 sta. 14+35.45 on the south eastern side and continues 698ft where it crosses Y-1 at sta. 59+05.60 and continues for another 46ft before making a 60 degree turn in the north eastern direction where the line then continues for 2874ft running alongside Y-2
- Power line begins on the north side of Y-2 at sta. 34+39.20 and crosses Y-2 at sta. 33+72.28 and continues for 2185ft and turns northeast 49 degrees and continues for 485ft
- Existing power located 111.4ft to the east of Y-3 sta. 25+94.21 and continues 145.5 degrees southeast for 350ft the line then makes a 75 degree turn northeast and continues in that direction for 507ft
- **Telephone (Century Link):**
 - Existing fiber optic line runs along the south side of Y-5 beginning at sta. 229+32.28 and ending at sta. 268+08.06.
 - Existing telephone cable located on the south side of Y-2 portion of line to relocated begins at Y-2 sta. 36+19.26 and ends at sta. 18+29.23
 - Two existing line one fiber optic and one telephone line along Y-3 between sta. 12+97.06 and sta. 24+69.31 will be abandoned due to conflicts. These two lines run parallel to each other on the north side of Y-3
 - Existing telephone lines along the south and north side of Y-1 and also along the south side of existing Reilly Rd.
- **Telephone (USA SENC):**
 - Two Existing telephone lines run parallel to each other and begin at Y-4 sta. 22+13.31 and continues in a southeastern direction, the line continues in this direction until it reaches RPB2 where it then begins to run parallel with the ramp. The telephone line eventually crosses RPB2 at sta. 16+92.28 and sta. 17+58.17 and continues to run parallel with RPB2 on the north side until it reaches the intersection of RPB2 and Y-1. One of the telephone lines stop while the other one turns north and continues to run parallel with Y-1
- **Water (PWC):**
 - Existing 16" water line begins at sta. 230+03.29 for 45.32ft south of Y-5 and continues to run parallel until sta. 263+27.69, where it makes a 90 degree turn and crosses Y-5 and continues to run parallel to Y-5 for 335.6 ft
 - Existing 8" water line begins at sta. 263+27.69 runs parallel to Y-5 45.3 ft from the centerline until it ends at sta. 266+53.52
- **Water (Old North Utility Services):**
 - Existing water line to be relocated begins at Y-4 sta. 19+51.49 and runs parallel to Chicken Foot Rd on the south side and branches off at Ramp A2 at sta. 14+19.98 to the north and to the south

P-82

- **Sewer (Old North Utility Services):**
 - Existing sewer line to be relocated runs parallel to Chicken Foot Rd on the north side, the sewer line relocation ends at L sta. 964+64.97
- **Time Warner Cable:**
 - Existing TV (TWC) runs along the north side of Y-5 on joint use poles with power and telephone.
- **Gas (FB-DPW):**
 - Existing gas line begins at Y-4 sta. 22+94.67 and continues in a southeastern direction, the line continues in this direction until it reaches RPB2 where it then begins to run parallel with the ramp/ the gas line eventually crosses RPB2 at sta. 16+14.02 and continues to run parallel with RPB2 on the north side until it reaches the intersection of RPB2 and Y-1. Here the gas line crosses the intersection and continues alongside RPA2 and continues down Chicken Foot Rd. until it reaches Reilly Rd and begins to run parallel with Y-2. The portion of the line stated above will be abandoned and relocated

Proposed Utility Relocation:

- **Power (Duke Energy Progress Distribution):**
 - Proposed overhead power will be located on the north side of Y-5; part of the line will remain overhead while the portion under the proposed bridge will be placed underground
- **Power (PWC Transmission):**
 - A portion of the existing transmission line will be relocated inside the proposed utility easement that has been acquired; the transmission line will leave the substation crossing the L line and then continue southwest inside the easement until the existing line is reached.
- **Power (PWC Distribution):**
 - The proposed overhead power will be relocated out and around by means of a PUE that is located outside the right of way line along Y-23 and RPC1. The existing line will be abandoned along Y-5 in between Y-23 and RPC1
- **Power (Sandhills Utility Service):**
 - Proposed underground power will begin at Y-4 sta. 12+82.31 and run along the north side of Y-4 until sta. 23+81.10; at this station the power crosses Y-4 and runs parallel to PR2A beginning at sta. 23+81.08 on the south side and ending at sta. 34+86.52
 - 2 proposed underground power lines branch off of a proposed underground power line at PR2A sta. 36+13.24 and PR2A sta. 36+16 and run parallel to each other for 187ft and connect to an existing transformer
 - Proposed underground power beginning on the north side of the L line and crosses at sta. 928+67016 and continues for 453ft

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- Proposed underground power beginning 60ft north of RPA2 and crossing at RPA2 sta. 21+42.96 and continuing 943ft running parallel to Y-1
- Proposed underground power begins at PR2A sta. 22+05.50 and runs parallel to the CA fence for 674ft where it continues to run parallel outside the RW/CA fence for 432ft. the line then make a 45 degree turn to the south east for 812ft and makes a 95degree turn to the northeast and continues in that direction for another 455ft
- Underground power begins 56ft to the west of Y-6 and runs northeast 67.5 degrees for 604ft until it crosses Y-2 at sta. 48+35.40 and continues along the north side of Y-2 for 2636ft
- Begin power at the coordinates 1995684.74, 493023.18 in the direction of 58.2 degrees northeast for 311ft, the line then makes a 82 degree turn northeast and continues 215ft, the direction changes once more to 54 degrees northeast for 447ft, before ending at another proposed power line
- Proposed power begins 60ft to the east of Y-3 sta. 28+12.29 and runs 42.5 degrees to the northeast for 168ft from here the line tees off; to the west the line continues 334ft and to the east it continues for 25ft before taking a 76 degree turn to the northeast and continues for 160ft and then makes another turn 43 degrees to the north east for 183ft , the line then makes a 108.5 degree turn to the south east and continues in that direction for 177.5ft the line then turns northeast 35 degrees and continues in that direction for 44ft and connect to a transformer
- **Telephone (Century Link):**
 - The existing telephone line running parallel to -Y5-on the south side will be relocated on the same side to avoid conflicts. The proposed fiber optic line will begin at sta. 229+32.28 and will be relocated 1ft inside and parallel to the right of way until sta. 242+80.51 is reached. At this location the fiber optic line makes a 90 degree turn and continues to run along this direction until sta. 257+82.99 is reached. This is where the line will resume the location of 1ft inside and parallel to the right of way line until it reconnects to the existing line at sat. 268+08.06. The existing line between stations 229+32.28 through 268+08.06 will be abandoned.
 - The existing telephone line located on Y-2 will be relocated to on the same side of the existing line beginning at sta. 36+19.26 and ending at sta. 18+29.23; the relocation will be located further away from Y-2 on the south side to avoid conflicts. The existing line between the beginning and ending stations will be abandoned
 - The two existing lines will be abandoned and replaced with one single fiber optic line. The proposed line will begin at Y-3 sta. 12+97.06 and continue through 24+69.31 where it will cross Y-3 and end at a hand hole.
 - Proposed telephone will be relocated on the south side of Y-1 and along the existing Reilly Rd to avoid conflicts. The telephone lines will also be relocated

P-84

out and around the intersection of Y-1 and Y-6. Parts of the existing lines will be abandoned while other sections will remain.

- **Telephone (USA-SENC):**

- Two proposed telephone lines run parallel to each other and begin at Y-4 sta. 22+13.31, both of these lines run parallel with the right of way line until the intersection of RPB2 and Y-1, at this location one of the telephone lines ends and the other continues parallel to the right of way line to the north of Y-1 until the right of way line ends and the proposed line ties back in to the existing at Y-1 sta. 36+60.47; the existing telephone line will be abandoned.
- Two proposed telephone lines run parallel to each other and connect to the existing line at RPA2 sta. 14+40.24 and sta. 14+36.69 and continue to run parallel to the right of way line. Once the lines reach L sta. 964+07.42 they make a 90 degree turn and cross the L line until they reach Y-2 and continue parallel until they reach Y-2 sta. 40+92.11 where they reconnect with an existing pedestal

- **Water (PWC):**

- The existing 16" water line will be relocated to the south side of Y-5 starting at Sta. 231+00 and ending at Sta. 231+20. The existing line between those stationing will be removed and a down and under will be installed to avoid conflict with drainage
- Proposed 16" water line will connect to existing 16" at sta. 238+84.76 and will be located 5ft inside the right of way and will reconnect to the existing water line at sta. 244+12.45. The existing line between those stationing will be abandoned
- Connect to existing 16" water line at sta. 247+85.92 proposed line will cross Y-5 and run line parallel to Y-5 for 1125.3ft where it sta. 259+93.42 a 45 degree bend will be used to cross back over Y-5 and connect back to the existing 16" water line at sta. 260+83.68. Existing line to be abandoned between the stations.

- **Water (Old North Utility Services):**

- Proposed 12" water line begins at Y-4 sta. 19+51.49 and runs parallel with the right of way line until the intersection of RPB2 and Y-1 where the water line crosses the intersection and continues to run parallel to the right of way line until it reconnects with the existing water line to the north of RPA2 sta. 14+26.31; existing water line will be abandoned between the two stations.

- **Sewer (Old North Utility Services):**

- Proposed 8" and 4" sewer lines begin at Y-4 sta. 23+60.94 and run parallel with the right of way line until the intersection of RPB2 and Y-1 where the sewer lines cross this intersection and continue to run parallel to the right of way line until it reaches L sta. 964+68.90 and makes a 90 degree turn and continues in that direction until the lines reach the lift station

- **Time Warner Cable:**

- Proposed cable TV lines will be relocated to avoid conflicts with the proposed construction

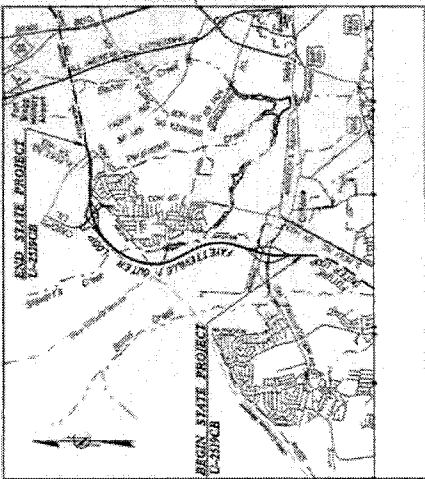
- **Gas (FB-DPW):**
 - Proposed 4" gas line begins at Y-4 sta. 22+94.67 and runs parallel with the right of way line until the intersection of RPB2 and Y-1 where the gas line crosses the intersection and continues to run parallel to the right of way line until it reconnects with the existing gas line to the north of Y-2 sta. 24+63.68. Existing gas line will be abandoned between the two stations.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

**CUMBERLAND COUNTY
AGREEMENT PLANS**

LOCATION: FAYETTEVILLE OUTER LOOP
FROM SOUTH OF SR 1400 (CLIFFDALE RD)
TO EAST OF SR 1415 (YADKIN ROAD)

TYPE OF WORK: RELOCATION OF WATER

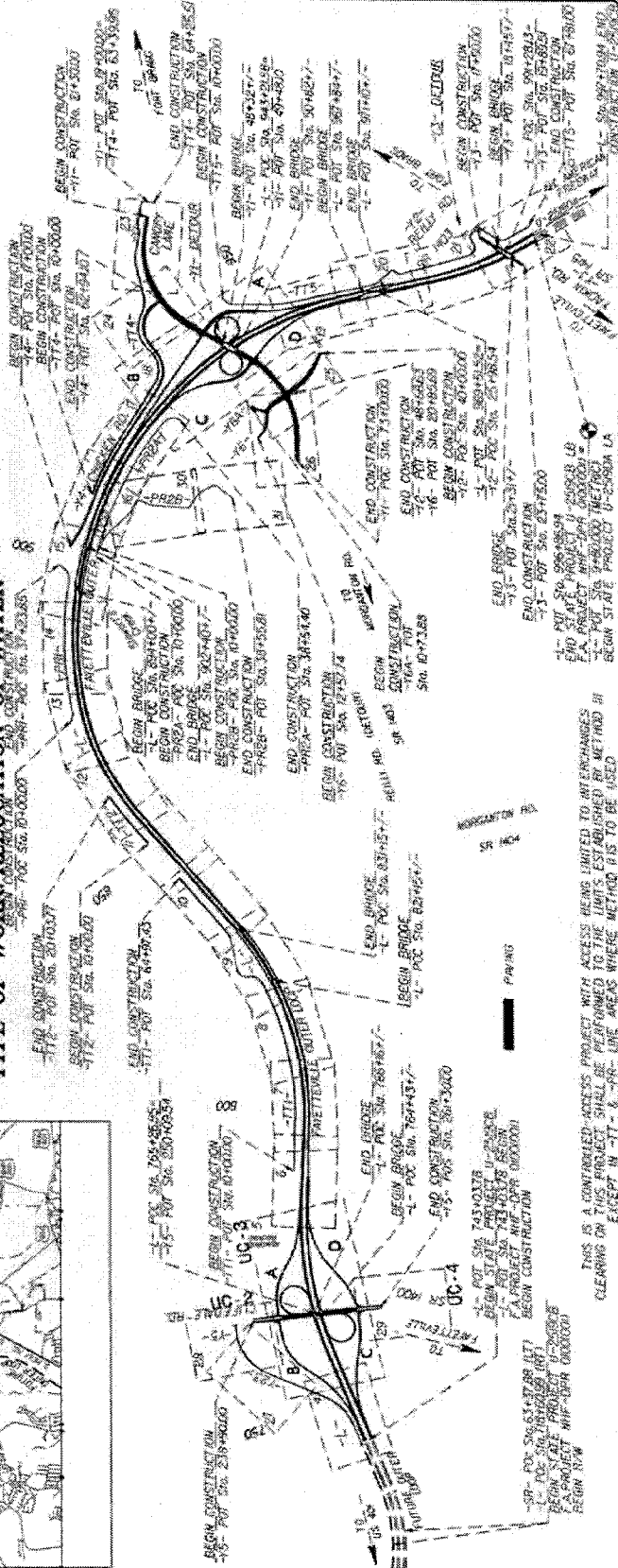


TIP NO. **U-2519CB**
SHEET NO. **UC-1**

INCOMPLETE PLANS
PRELIMINARY PLANS
NO CONSTRUCTION

Utility Permit Drawing
Sheet **1** of **18**

REVISED NEU PERMIT
JANUARY 2, 2013



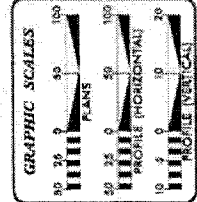
THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III
EXCEPT IN TT-6, -6R- LINE AREAS WHERE METHOD III IS TO BE USED

WATER AND SEWER OWNERS ON PROJECT

(1) WATER- PUBLIC WORKS COMMISSION

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
UC-1	TITLE SHEET
UC-1 THRU UC-20	PLAN SHEETS



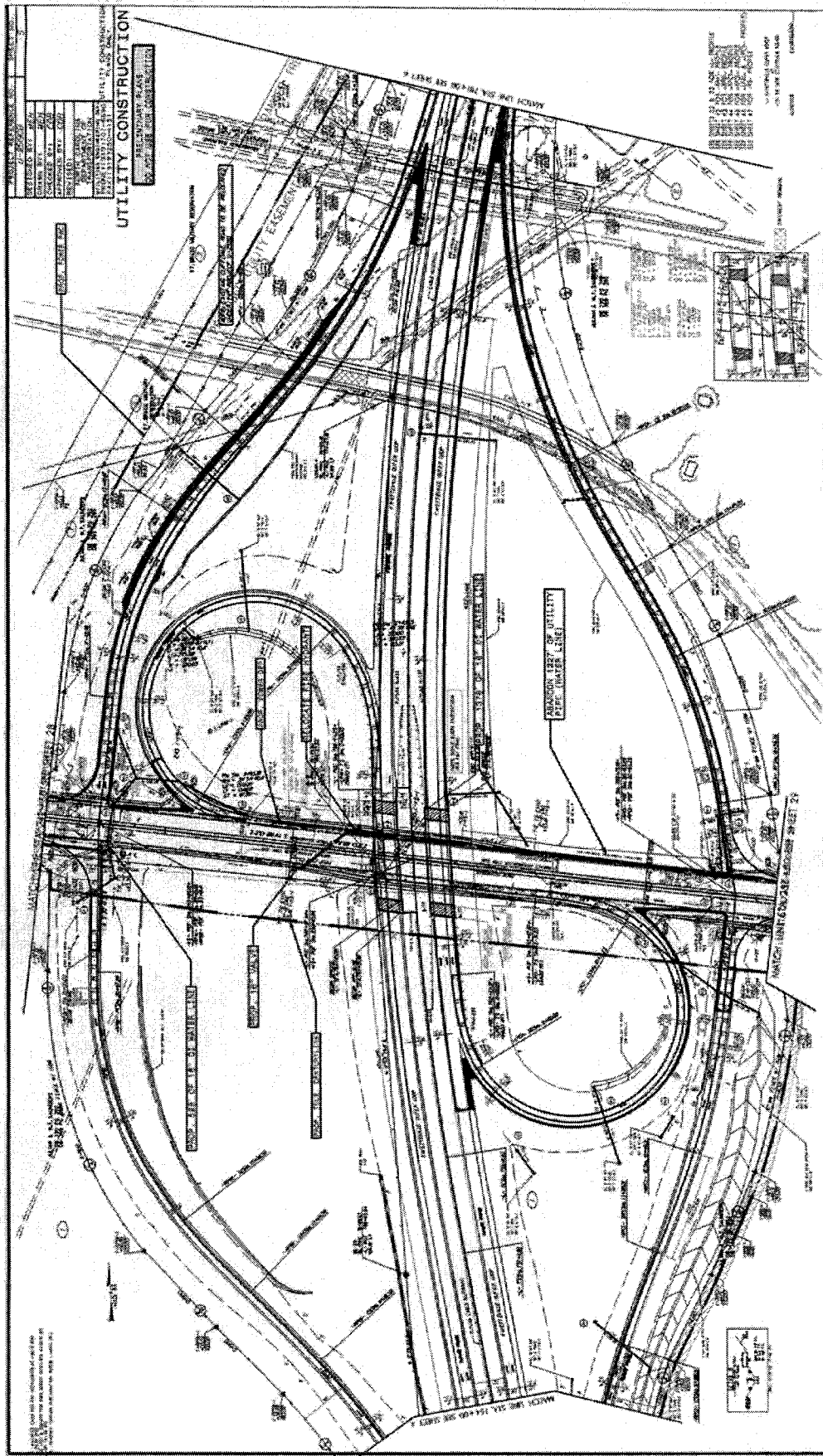
PREPARED BY THE OFFICE OF
DESIGN AND CONSTRUCTION
DIVISION OF HIGHWAYS
UTILITY ENGINEERING

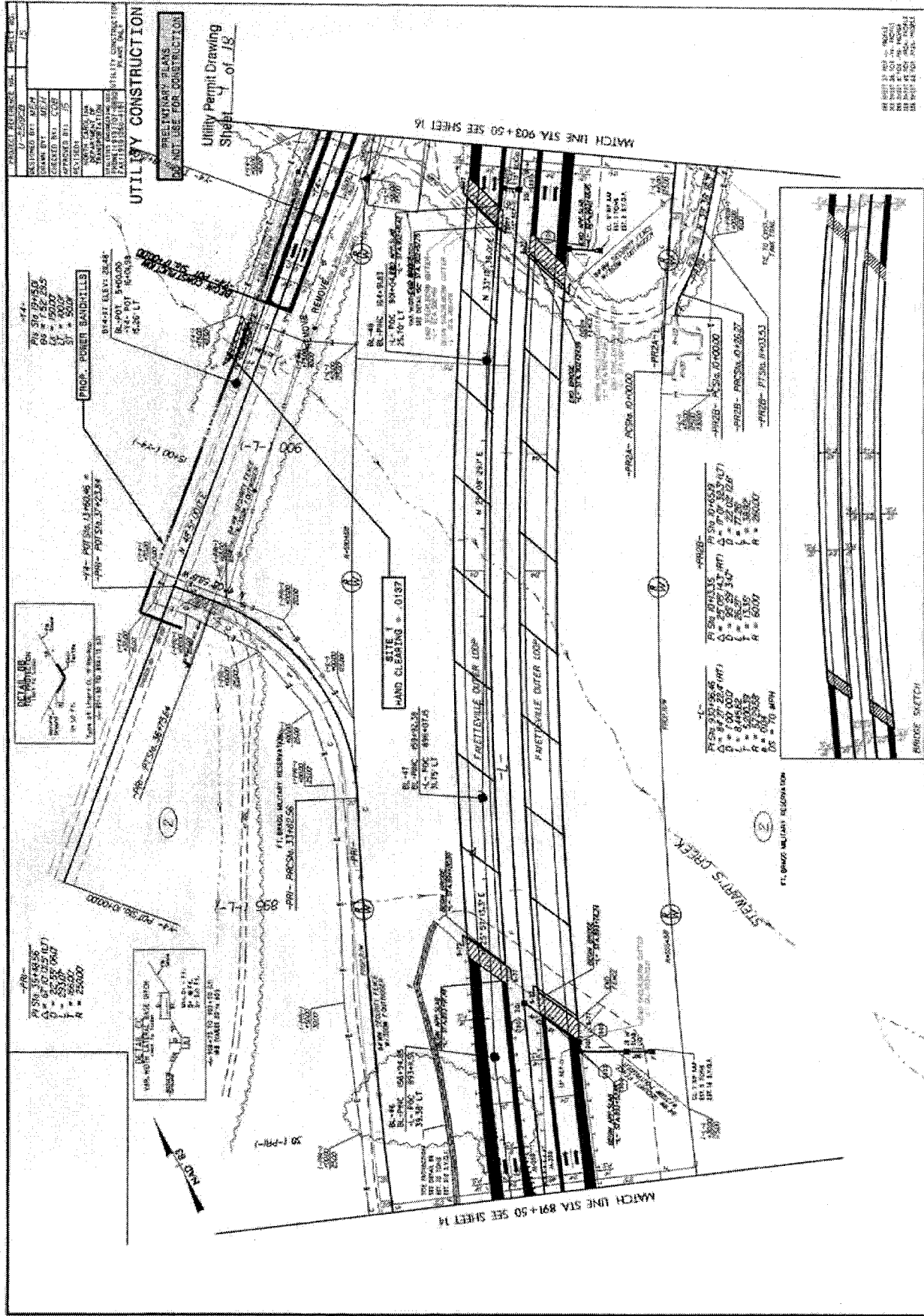
FOR THE PROJECT OWNER
CUMBERLAND COUNTY
ADMINISTRATIVE CENTER
100 N. MAIN ST.
FAYETTEVILLE, NC 28404

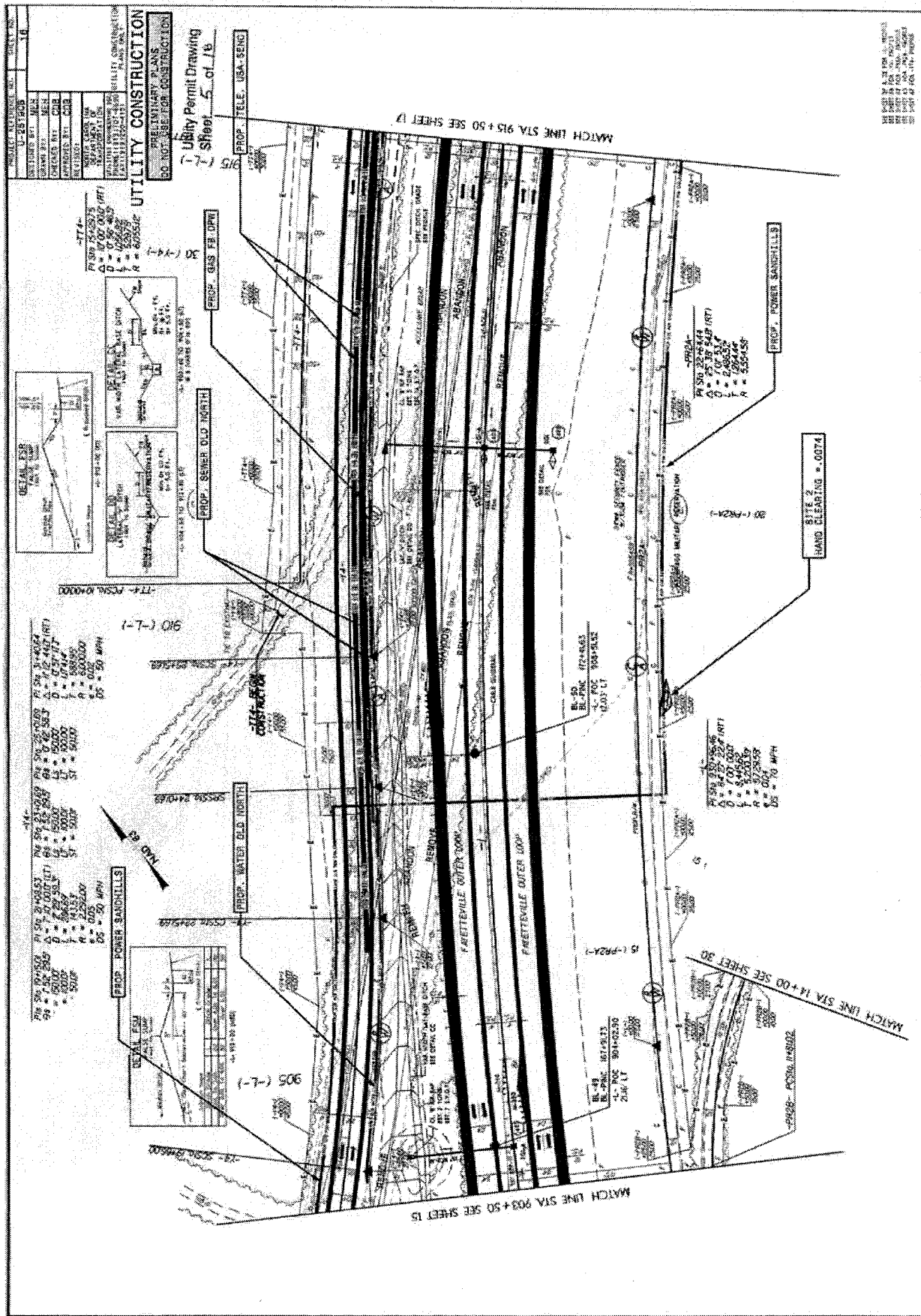
FOR THE PROJECT OWNER
CUMBERLAND COUNTY
ADMINISTRATIVE CENTER
100 N. MAIN ST.
FAYETTEVILLE, NC 28404

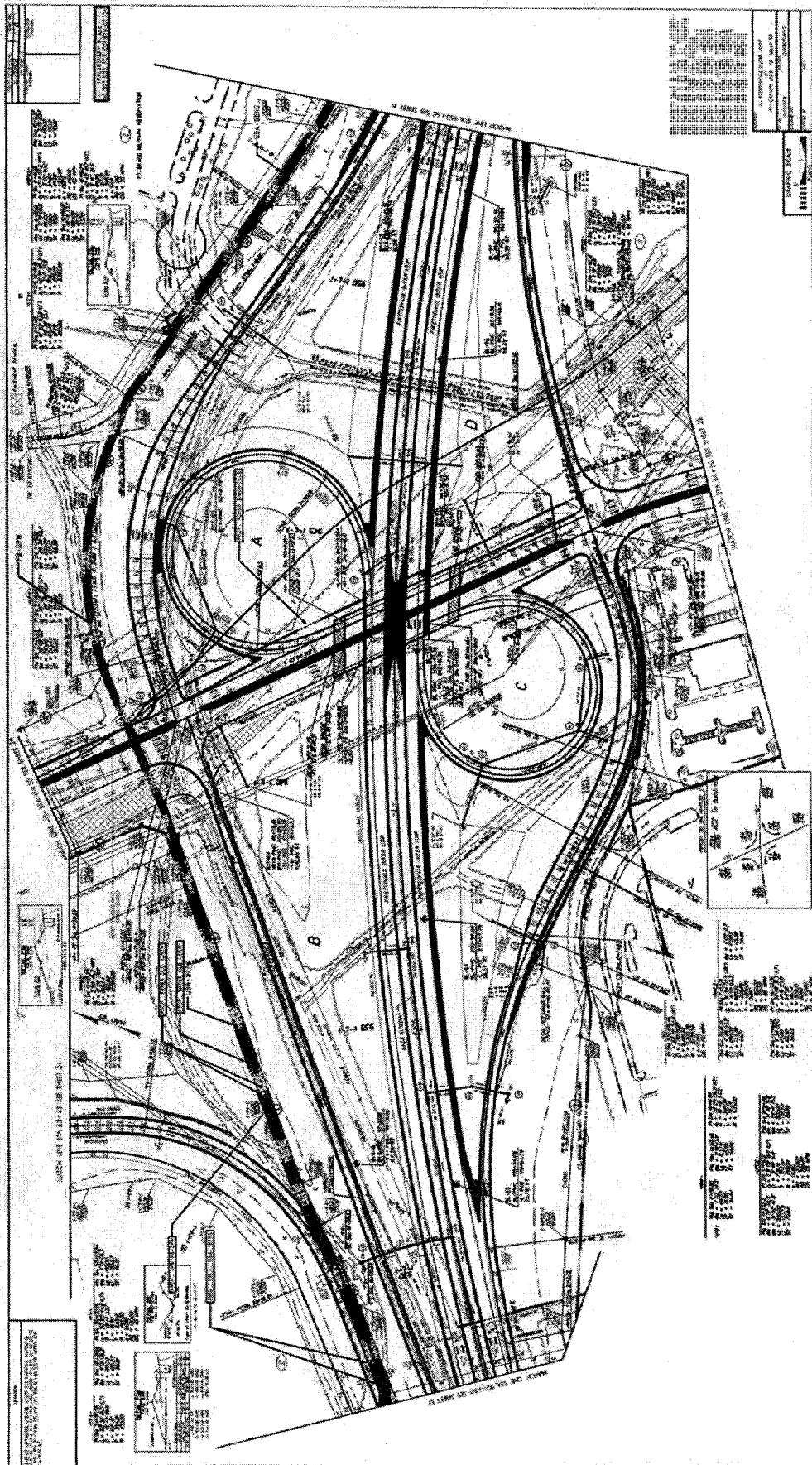
FOR THE PROJECT OWNER
CUMBERLAND COUNTY
ADMINISTRATIVE CENTER
100 N. MAIN ST.
FAYETTEVILLE, NC 28404

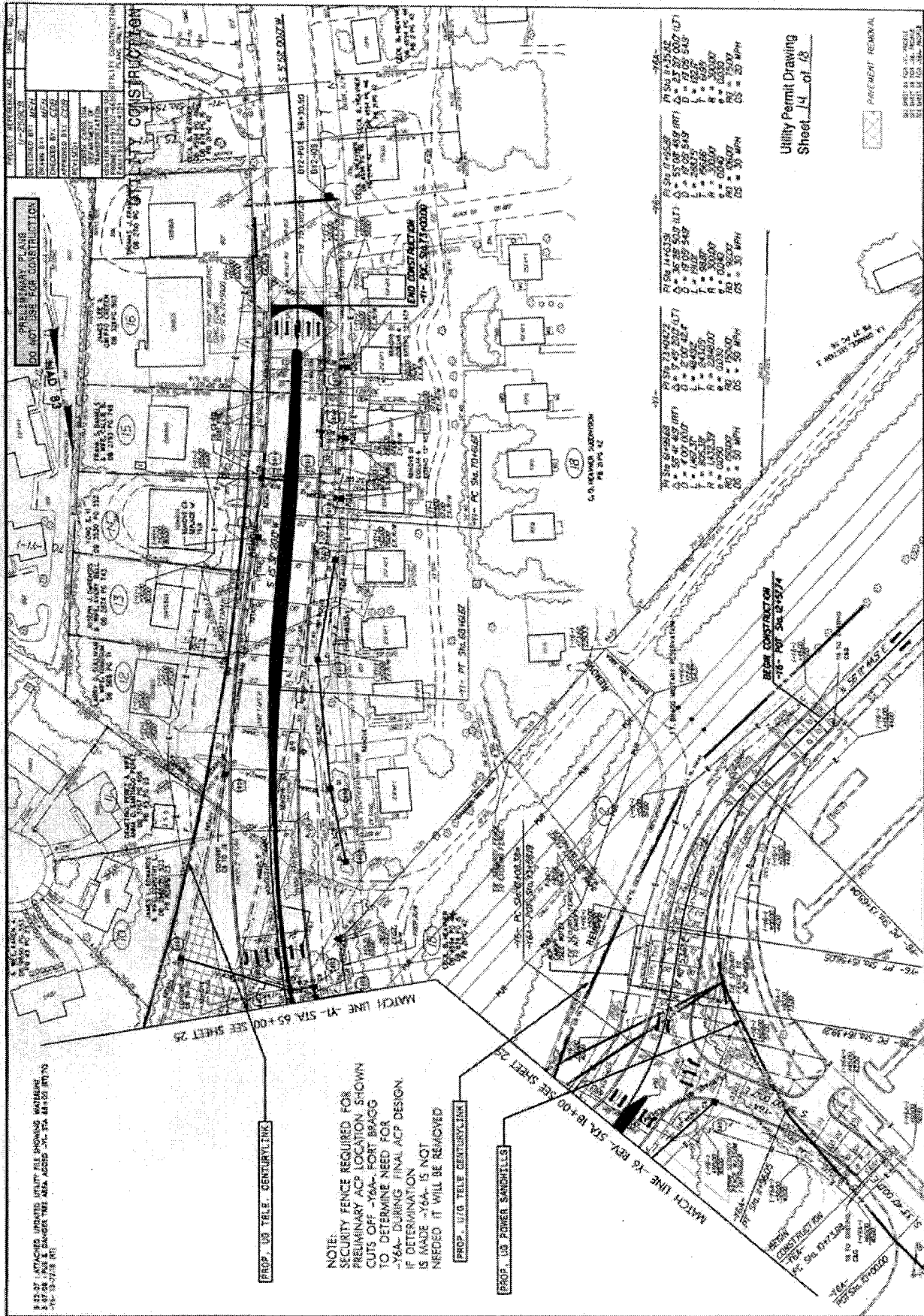
TIP PROJECT: U-2519CB











Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS						SURFACE WATER IMPACTS			
			Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design Depth (ft)
1	Y4 18+36 TO 16+66	U/G Power by Open Cut		<0.01	<0.01			0.01				
2	PR2A 17+68 TO 17+94	U/G Power by Open Cut		<0.01	<0.01			<0.01				
TOTALS:				<0.01	<0.01			0.01				

Note:

 Revised 8/1/13
 NC DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 CUMBERLAND COUNTY
 WBS - 34817 1.1 (J-2519CB)
 SHEET 1 OF 1
 1/13/2014

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
NCDOT GENERAL SEED SPECIFICATION FOR SEED QUALITY

(5-17-11)

Z-3

Seed shall be sampled and tested by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory. When said samples are collected, the vendor shall supply an independent laboratory report for each lot to be tested. Results from seed so sampled shall be final. Seed not meeting the specifications shall be rejected by the Department of Transportation and shall not be delivered to North Carolina Department of Transportation warehouses. If seed has been delivered it shall be available for pickup and replacement at the supplier's expense.

Any re-labeling required by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory, that would cause the label to reflect as otherwise specified herein shall be rejected by the North Carolina Department of Transportation.

Seed shall be free from seeds of the noxious weeds Johnsongrass, Balloonvine, Jimsonweed, Witchweed, Itchgrass, Serrated Tussock, Showy Crotalaria, Smooth Crotalaria, Sicklepod, Sandbur, Wild Onion, and Wild Garlic. Seed shall not be labeled with the above weed species on the seed analysis label. Tolerances as applied by the Association of Official Seed Analysts will NOT be allowed for the above noxious weeds except for Wild Onion and Wild Garlic.

Tolerances established by the Association of Official Seed Analysts will generally be recognized. However, for the purpose of figuring pure live seed, the found pure seed and found germination percentages as reported by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory will be used. Allowances, as established by the NCDOT, will be recognized for minimum pure live seed as listed on the following pages.

The specifications for restricted noxious weed seed refers to the number per pound as follows:

<u>Restricted Noxious Weed</u>	<u>Limitations per Lb. Of Seed</u>	<u>Restricted Noxious Weed</u>	<u>Limitations per Lb. of Seed</u>
Blessed Thistle	4 seeds	Cornflower (Ragged Robin)	27 seeds
Cocklebur	4 seeds	Texas Panicum	27 seeds
Spurred Anoda	4 seeds	Bracted Plantain	54 seeds
Velvetleaf	4 seeds	Buckhorn Plantain	54 seeds
Morning-glory	8 seeds	Broadleaf Dock	54 seeds
Corn Cockle	10 seeds	Curly Dock	54 seeds
Wild Radish	12 seeds	Dodder	54 seeds
Purple Nutsedge	27 seeds	Giant Foxtail	54 seeds
Yellow Nutsedge	27 seeds	Horsenettle	54 seeds
Canada Thistle	27 seeds	Quackgrass	54 seeds
Field Bindweed	27 seeds	Wild Mustard	54 seeds
Hedge Bindweed	27 seeds		

Seed of Pensacola Bahiagrass shall not contain more than 7% inert matter, Kentucky Bluegrass, Centipede and Fine or Hard Fescue shall not contain more than 5% inert matter whereas a maximum of 2% inert matter will be allowed on all other kinds of seed. In addition, all seed shall not contain more than 2% other crop seed nor more than 1% total weed seed. The germination rate as tested by the North Carolina Department of Agriculture shall not fall below 70%, which includes both dormant and hard seed. Seed shall be labeled with not more than 7%, 5% or 2% inert matter (according to above specifications), 2% other crop seed and 1% total weed seed.

Exceptions may be made for minimum pure live seed allowances when cases of seed variety shortages are verified. Pure live seed percentages will be applied in a verified shortage situation. Those purchase orders of deficient seed lots will be credited with the percentage that the seed is deficient.

FURTHER SPECIFICATIONS FOR EACH SEED GROUP ARE GIVEN BELOW:

Minimum 85% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 83% pure live seed will not be approved.

Sericea Lespedeza
Oats (seeds)

Minimum 80% pure live seed; maximum 1% total weed seed; maximum 2% total other crop; maximum 144 restricted noxious weed seed per pound. Seed less than 78% pure live seed will not be approved.

Tall Fescue (all approved varieties)	Bermudagrass
Kobe Lespedeza	Browntop Millet
Korean Lespedeza	German Millet – Strain R
Weeping Lovegrass	Clover – Red/White/Crimson
Carpetgrass	

Minimum 78% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 76% pure live seed will not be approved.

Common or Sweet Sundangrass

Minimum 76% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 74% pure live seed will not be approved.

Rye (grain; all varieties)
Kentucky Bluegrass (all approved varieties)
Hard Fescue (all approved varieties)
Shrub (bicolor) Lespedeza

Minimum 70% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 noxious weed seed per pound. Seed less than 70% pure live seed will not be approved.

Centipedegrass
Crownvetch
Pensacola Bahiagrass
Creeping Red Fescue

Japanese Millet
Reed Canary Grass
Zoysia

Minimum 70% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 5% inert matter; maximum 144 restricted noxious weed seed per pound.

Barnyard Grass
Big Bluestem
Little Bluestem
Bristly Locust
Birdsfoot Trefoil
Indiangrass
Orchardgrass
Switchgrass
Yellow Blossom Sweet Clover

STANDARD SPECIAL PROVISION**ERRATA**

(1-17-12) (Rev. 1-21-14)

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 $P_{0.075}/P_{bc}$ Ratio with “1.0”.

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

Division 8

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

Division 12

Page 12-7, Table 1205-3, add “FOR THERMOPLASTIC” to the end of the title.

Page 12-8, Subarticle 1205-5(B), line 13, replace “Table 1205-2” with “Table 1205-4”.

Page 12-8, Table 1205-4 and 1205-5, replace “THERMOPLASTIC” in the title of these tables with “POLYUREA”.

Page 12-9, Subarticle 1205-6(B), line 21, replace “Table 1205-4” with “Table 1205-6”.

Page 12-11, Subarticle 1205-8(C), line 25, replace “Table 1205-5” with “Table 1205-7”.

Division 15

Page 15-4, Subarticle 1505-3(F) Backfilling, line 26, replace “Subarticle 235-4(C)” with “Subarticle 235-3(C)”.

Page 15-6, Subarticle 1510-3(B), after line 21, replace the allowable leakage formula with the following: $W = LD\sqrt{P} \div 148,000$

Page 15-6, Subarticle 1510-3(B), line 32, delete “may be performed concurrently or” and replace with “shall be performed”.

Page 15-17, Subarticle 1540-3(E), line 27, delete “Type 1”.

Division 17

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

Revise the *2012 Roadway Standard Drawings* as follows:

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

STANDARD SPECIAL PROVISION**PLANT AND PEST QUARANTINES****(Imported Fire Ant, Gypsy Moth, Witchweed, And Other Noxious Weeds)**

(3-18-03) (Rev. 10-15-13)

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, 919-733-6932, or <http://www.ncagr.gov/plantind/> to determine those specific project sites located in the quarantined area or for any regulated article used on this project originating in a quarantined county.

Regulated Articles Include

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

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**ON-THE-JOB TRAINING**

(10-16-07) (Rev. 5-21-13)

Z-10

Description

The North Carolina Department of Transportation will administer a custom version of the Federal On-the-Job Training (OJT) Program, commonly referred to as the Alternate OJT Program. All contractors (existing and newcomers) will be automatically placed in the Alternate Program. Standard OJT requirements typically associated with individual projects will no longer be applied at the project level. Instead, these requirements will be applicable on an annual basis for each contractor administered by the OJT Program Manager.

On the Job Training shall meet the requirements of 23 CFR 230.107 (b), 23 USC – Section 140, this provision and the On-the-Job Training Program Manual.

The Alternate OJT Program will allow a contractor to train employees on Federal, State and privately funded projects located in North Carolina. However, priority shall be given to training employees on NCDOT Federal-Aid funded projects.

Minorities and Women

Developing, training and upgrading of minorities and women toward journeyman level status is a primary objective of this special training provision. Accordingly, the Contractor shall make every effort to enroll minority and women as trainees to the extent that such persons are available within a reasonable area of recruitment. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

Assigning Training Goals

The Department, through the OJT Program Manager, will assign training goals for a calendar year based on the contractors' past three years' activity and the contractors' anticipated upcoming year's activity with the Department. At the beginning of each year, all contractors eligible will be contacted by the Department to determine the number of trainees that will be assigned for the upcoming calendar year. At that time the Contractor shall enter into an agreement with the Department to provide a self-imposed on-the-job training program for the calendar year. This agreement will include a specific number of annual training goals agreed to by both parties. The number of training assignments may range from 1 to 15 per contractor per calendar year. The Contractor shall sign an agreement to fulfill their annual goal for the year. A sample agreement is available at www.ncbowd.com/section/on-the-job-training.

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.

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
ROADWAY ITEMS						
0001	0000100000-N	800	MOBILIZATION	Lump Sum	L.S.	
0002	0000400000-N	801	CONSTRUCTION SURVEYING	Lump Sum	L.S.	
0003	0000900000-N	SP	GENERIC MISCELLANEOUS ITEM TEMPORARY GUARD BUILDING	Lump Sum	L.S.	
0004	0000900000-N	SP	GENERIC MISCELLANEOUS ITEM TEMPORARY SPRUNG STRUCTURE AT THE YADKIN ROAD DETOUR	Lump Sum	L.S.	
0005	0001000000-E	200	CLEARING & GRUBBING .. ACRE(S)	Lump Sum	L.S.	
0006	0008000000-E	200	SUPPLEMENTARY CLEARING & GRUB- BING	5 ACR		
0007	0022000000-E	225	UNCLASSIFIED EXCAVATION	1,930,500 CY		
0008	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (19+83.14 -Y3-)	Lump Sum	L.S.	
0009	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (41+90.04 -RP1B-)	Lump Sum	L.S.	
0010	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (45+07.87 -RP1C-)	Lump Sum	L.S.	
0011	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (49+52.23 -Y1-)	Lump Sum	L.S.	
0012	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (55+93.07 -RP1DB-)	Lump Sum	L.S.	
0013	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (765+21.45 -L- RT)	Lump Sum	L.S.	
0014	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (765+33.36 -L- LT)	Lump Sum	L.S.	
0015	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (826+14.99 -L- LT)	Lump Sum	L.S.	

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0016	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (826+15.02 -L- RT)	Lump Sum	L.S.	
0017	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (898+00.42 -L- RT)	Lump Sum	L.S.	
0018	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (898+39.37 -L- LT)	Lump Sum	L.S.	
0019	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (91+81.18 -COL1-)	Lump Sum	L.S.	
0020	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (91+87.85 -L- RT)	Lump Sum	L.S.	
0021	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (91+88.69 -L- LT)	Lump Sum	L.S.	
0022	0036000000-E	225	UNDERCUT EXCAVATION	80,800 CY		
0023	0106000000-E	230	BORROW EXCAVATION	521,200 CY		
0024	0134000000-E	240	DRAINAGE DITCH EXCAVATION	53,810 CY		
0025	0141000000-E	240	BERM DITCH CONSTRUCTION	3,320 LF		
0026	0156000000-E	250	REMOVAL OF EXISTING ASPHALT PAVEMENT	56,500 SY		
0027	0177000000-E	250	BREAKING OF EXISTING ASPHALT PAVEMENT	3,570 SY		
0028	0192000000-N	260	PROOF ROLLING	80 HR		
0029	0195000000-E	265	SELECT GRANULAR MATERIAL	101,000 CY		
0030	0196000000-E	270	GEOTEXTILE FOR SOIL STABILIZA- TION	83,400 SY		
0031	0199000000-E	SP	TEMPORARY SHORING	9,650 SF		
0032	0223000000-E	275	ROCK PLATING	2,630 SY		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0033	0255000000-E	SP	GENERIC GRADING ITEM HAULING & DISPOSAL OF PETROLEUM CONTAMINATED SOIL	120 TON		
0034	0318000000-E	300	FOUNDATION CONDITIONING MATERIAL, MINOR STRUCTURES	3,950 TON		
0035	0320000000-E	300	FOUNDATION CONDITIONING GEOTEXTILE	12,310 SY		
0036	0342000000-E	310	*** SIDE DRAIN PIPE (30")	108 LF		
0037	0342000000-E	310	*** SIDE DRAIN PIPE (36")	260 LF		
0038	0342000000-E	310	*** SIDE DRAIN PIPE (42")	20 LF		
0039	0343000000-E	310	15" SIDE DRAIN PIPE	798 LF		
0040	0344000000-E	310	18" SIDE DRAIN PIPE	732 LF		
0041	0348000000-E	310	*** SIDE DRAIN PIPE ELBOWS (15")	15 EA		
0042	0348000000-E	310	*** SIDE DRAIN PIPE ELBOWS (18")	9 EA		
0043	0348000000-E	310	*** SIDE DRAIN PIPE ELBOWS (24")	1 EA		
0044	0348000000-E	310	*** SIDE DRAIN PIPE ELBOWS (30")	2 EA		
0045	0354000000-E	310	**** RC PIPE CULVERTS, CLASS ***** (48", V)	208 LF		
0046	0354000000-E	310	**** RC PIPE CULVERTS, CLASS ***** (66", V)	228 LF		
0047	0360000000-E	310	12" RC PIPE CULVERTS, CLASS III	100 LF		
0048	0366000000-E	310	15" RC PIPE CULVERTS, CLASS III	5,304 LF		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0049	0372000000-E	310	18" RC PIPE CULVERTS, CLASS III	4,408 LF		
0050	0378000000-E	310	24" RC PIPE CULVERTS, CLASS III	2,232 LF		
0051	0384000000-E	310	30" RC PIPE CULVERTS, CLASS III	1,684 LF		
0052	0390000000-E	310	36" RC PIPE CULVERTS, CLASS III	1,028 LF		
0053	0396000000-E	310	42" RC PIPE CULVERTS, CLASS III	20 LF		
0054	0402000000-E	310	48" RC PIPE CULVERTS, CLASS III	172 LF		
0055	0408000000-E	310	54" RC PIPE CULVERTS, CLASS III	20 LF		
0056	0420000000-E	310	66" RC PIPE CULVERTS, CLASS III	104 LF		
0057	0426000000-E	310	72" RC PIPE CULVERTS, CLASS III	260 LF		
0058	0448000000-E	310	***** RC PIPE CULVERTS, CLASS IV (48")	1,456 LF		
0059	0448000000-E	310	***** RC PIPE CULVERTS, CLASS IV (54")	48 LF		
0060	0448000000-E	310	***** RC PIPE CULVERTS, CLASS IV (60")	580 LF		
0061	0448000000-E	310	***** RC PIPE CULVERTS, CLASS IV (66")	148 LF		
0062	0448000000-E	310	***** RC PIPE CULVERTS, CLASS IV (72")	176 LF		
0063	0448200000-E	310	15" RC PIPE CULVERTS, CLASS IV	8,096 LF		
0064	0448300000-E	310	18" RC PIPE CULVERTS, CLASS IV	2,204 LF		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0065	0448400000-E	310	24" RC PIPE CULVERTS, CLASS IV	1,980 LF		
0066	0448500000-E	310	30" RC PIPE CULVERTS, CLASS IV	1,928 LF		
0067	0448600000-E	310	36" RC PIPE CULVERTS, CLASS IV	1,912 LF		
0068	0448700000-E	310	42" RC PIPE CULVERTS, CLASS IV	312 LF		
0069	0582000000-E	310	15" CS PIPE CULVERTS, 0.064" THICK	100 LF		
0070	0588000000-E	310	18" CS PIPE CULVERTS, 0.064" THICK	148 LF		
0071	0594000000-E	310	24" CS PIPE CULVERTS, 0.064" THICK	104 LF		
0072	0600000000-E	310	30" CS PIPE CULVERTS, 0.079" THICK	48 LF		
0073	0995000000-E	340	PIPE REMOVAL	1,430 LF		
0074	1011000000-N	500	FINE GRADING	Lump Sum	L.S.	
0075	1099500000-E	505	SHALLOW UNDERCUT	2,000 CY		
0076	1099700000-E	505	CLASS IV SUBGRADE STABILIZATION	4,300 TON		
0077	1121000000-E	520	AGGREGATE BASE COURSE	231,500 TON		
0078	1220000000-E	545	INCIDENTAL STONE BASE	1,000 TON		
0079	1275000000-E	600	PRIME COAT	4,700 GAL		
0080	1489000000-E	610	ASPHALT CONC BASE COURSE, TYPE B25.0B	5,040 TON		
0081	1491000000-E	610	ASPHALT CONC BASE COURSE, TYPE B25.0C	70,750 TON		
0082	1498000000-E	610	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B	14,210 TON		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0083	1503000000-E	610	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C	85,420 TON		
0084	1519000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5B	14,040 TON		
0085	1523000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5C	63,100 TON		
0086	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	12,685 TON		
0087	1840000000-E	665	MILLED RUMBLE STRIPS (ASPHALT CONCRETE)	127,800 LF		
0088	1847000000-E	710	***** PORT CEM CONC PAVEMENT, THROUGH LANES (WITH DOWELS) (12")	410 SY		
0089	1881000000-E	SP	GENERIC PAVING ITEM SPEED MODULATOR	65 LF		
0090	2022000000-E	815	SUBDRAIN EXCAVATION	5,180 CY		
0091	2026000000-E	815	GEOTEXTILE FOR SUBSURFACE DRAINS	15,400 SY		
0092	2036000000-E	815	SUBDRAIN COARSE AGGREGATE	2,590 CY		
0093	2044000000-E	815	6" PERFORATED SUBDRAIN PIPE	15,400 LF		
0094	2070000000-N	815	SUBDRAIN PIPE OUTLET	31 EA		
0095	2077000000-E	815	6" OUTLET PIPE	186 LF		
0096	2190000000-N	828	TEMPORARY STEEL PLATE COVERS FOR MASONRY DRAINAGE STRUCTURE	2 EA		
0097	2209000000-E	838	ENDWALLS	28 CY		
0098	2220000000-E	838	REINFORCED ENDWALLS	24 CY		
0099	2253000000-E	840	PIPE COLLARS	1.5 CY		
0100	2264000000-E	840	PIPE PLUGS	1.5 CY		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0101	2275000000-E	SP	FLOWABLE FILL	1 CY		
0102	2286000000-N	840	MASONRY DRAINAGE STRUCTURES	293 EA		
0103	2297000000-E	840	MASONRY DRAINAGE STRUCTURES	63 CY		
0104	2308000000-E	840	MASONRY DRAINAGE STRUCTURES	251 LF		
0105	2352000000-N	840	FRAME WITH GRATE, STD 840.**** (840.16)	30 EA		
0106	2352000000-N	840	FRAME WITH GRATE, STD 840.**** (840.20)	7 EA		
0107	2354000000-N	840	FRAME WITH GRATE, STD 840.22	5 EA		
0108	2355000000-N	840	FRAME WITH GRATE, STD 840.29	1 EA		
0109	2364200000-N	840	FRAME WITH TWO GRATES, STD 840.20	40 EA		
0110	2365000000-N	840	FRAME WITH TWO GRATES, STD 840.22	127 EA		
0111	2367000000-N	840	FRAME WITH TWO GRATES, STD 840.29	2 EA		
0112	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)	6 EA		
0113	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)	31 EA		
0114	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)	33 EA		
0115	2396000000-N	840	FRAME WITH COVER, STD 840.54	2 EA		
0116	2407000000-N	840	STEEL FRAME WITH TWO GRATES, STD 840.37	7 EA		
0117	2451000000-N	852	CONCRETE TRANSITIONAL SECTION FOR DROP INLET	14 EA		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0118	2549000000-E	846	2'-6" CONCRETE CURB & GUTTER	16,130 LF		
0119	2556000000-E	846	SHOULDER BERM GUTTER	8,450 LF		
0120	2570000000-N	SP	MODIFIED CONCRETE FLUME	2 EA		
0121	2577000000-E	846	CONCRETE EXPRESSWAY GUTTER	40 LF		
0122	2580000000-E	846	CONCRETE VALLEY GUTTER	160 LF		
0123	2591000000-E	848	4" CONCRETE SIDEWALK	3,120 SY		
0124	2605000000-N	848	CONCRETE CURB RAMP	16 EA		
0125	2612000000-E	848	6" CONCRETE DRIVEWAY	310 SY		
0126	2619000000-E	850	4" CONCRETE PAVED DITCH	190 SY		
0127	2627000000-E	852	4" CONCRETE ISLAND COVER	570 SY		
0128	2655000000-E	852	5" MONOLITHIC CONCRETE ISLANDS (KEYED IN)	4,170 SY		
0129	2703000000-E	854	CONCRETE BARRIER, TYPE ***** (T1)	270 LF		
0130	2724000000-E	857	PRECAST REINFORCED CONCRETE BARRIER, SINGLE FACED	8,340 LF		
0131	2752000000-E	SP	GENERIC PAVING ITEM 1'-6" MODIFIED CURB & GUTTER	4,930 LF		
0132	2752000000-E	SP	GENERIC PAVING ITEM 6" CONCRETE CURB	1,310 LF		
0133	2875000000-N	859	CONVERT EXISTING CATCH BASIN TO DROP INLET	5 EA		
0134	2893000000-N	859	CONVERT EXISTING CATCH BASIN TO JUNCTION BOX WITH MANHOLE	1 EA		
0135	3000000000-N	SP	IMPACT ATTENUATOR UNIT, TYPE 350	9 EA		
0136	3030000000-E	862	STEEL BM GUARDRAIL	23,000 LF		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0137	3045000000-E	862	STEEL BM GUARDRAIL, SHOP CURVED	37.5 LF		
0138	3105000000-N	862	STEEL BM GUARDRAIL TERMINAL SECTIONS	2 EA		
0139	3150000000-N	862	ADDITIONAL GUARDRAIL POSTS	25 EA		
0140	3195000000-N	862	GUARDRAIL ANCHOR UNITS, TYPE AT-1	1 EA		
0141	3210000000-N	862	GUARDRAIL ANCHOR UNITS, TYPE CAT-1	23 EA		
0142	3215000000-N	862	GUARDRAIL ANCHOR UNITS, TYPE III	6 EA		
0143	3270000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE 350	35 EA		
0144	3285000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE M-350	15 EA		
0145	3317000000-N	862	GUARDRAIL ANCHOR UNITS, TYPE B-77	55 EA		
0146	3389200000-E	865	CABLE GUIDERAIL	25,000 LF		
0147	3389500000-N	865	ADDITIONAL GUIDERAIL POSTS	10 EA		
0148	3389600000-N	865	CABLE GUIDERAIL ANCHOR UNITS	21 EA		
0149	3503000000-E	866	WOVEN WIRE FENCE, 47" FABRIC	24,960 LF		
0150	3509000000-E	866	4" TIMBER FENCE POSTS, 7'-6" LONG	1,586 EA		
0151	3515000000-E	866	5" TIMBER FENCE POSTS, 8'-0" LONG	360 EA		
0152	3533000000-E	866	CHAIN LINK FENCE, *** FABRIC (84")	110,598 LF		
0153	3539000000-E	866	METAL LINE POSTS FOR *** CHAIN LINK FENCE (84")	3,102 EA		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0154	3545000000-E	866	METAL TERMINAL POSTS FOR *** CHAIN LINK FENCE (84")	204 EA		
0155	3628000000-E	876	RIP RAP, CLASS I	950 TON		
0156	3649000000-E	876	RIP RAP, CLASS B	1,820 TON		
0157	3656000000-E	876	GEOTEXTILE FOR DRAINAGE	8,845 SY		
0158	3659000000-N	SP	PREFORMED SCOUR HOLES WITH LEVEL SPREADER APRON	9 EA		
0159	4048000000-E	902	REINFORCED CONCRETE SIGN FOUN- DATIONS	37 CY		
0160	4054000000-E	902	PLAIN CONCRETE SIGN FOUNDA- TIONS	2 CY		
0161	4057000000-E	SP	OVERHEAD FOOTING	141 CY		
0162	4060000000-E	903	SUPPORTS, BREAKAWAY STEEL BEAM	14,801 LB		
0163	4066000000-E	903	SUPPORTS, SIMPLE STEEL BEAM	11,160 LB		
0164	4072000000-E	903	SUPPORTS, 3-LB STEEL U-CHANNEL	1,664 LF		
0165	4078000000-E	903	SUPPORTS, 2-LB STEEL U-CHANNEL	14 EA		
0166	4082100000-N	SP	SUPPORTS, OVERHEAD SIGN STRUC- TURE AT STA ***** (131+30 -COL1-)	Lump Sum	L.S.	
0167	4082100000-N	SP	SUPPORTS, OVERHEAD SIGN STRUC- TURE AT STA ***** (36+60 -L-)	Lump Sum	L.S.	
0168	4082100000-N	SP	SUPPORTS, OVERHEAD SIGN STRUC- TURE AT STA ***** (63+00 -L-)	Lump Sum	L.S.	
0169	4082100000-N	SP	SUPPORTS, OVERHEAD SIGN STRUC- TURE AT STA ***** (81+25 -COL1-)	Lump Sum	L.S.	
0170	4082100000-N	SP	SUPPORTS, OVERHEAD SIGN STRUC- TURE AT STA ***** (976+60 -L-)	Lump Sum	L.S.	

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0171	4096000000-N	904	SIGN ERECTION, TYPE D	6 EA		
0172	4102000000-N	904	SIGN ERECTION, TYPE E	99 EA		
0173	4108000000-N	904	SIGN ERECTION, TYPE F	14 EA		
0174	4109000000-N	904	SIGN ERECTION, TYPE *** (OVER- HEAD) (A)	5 EA		
0175	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)	25 EA		
0176	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (B)	9 EA		
0177	4114000000-N	904	SIGN ERECTION, MILEMARKERS	14 EA		
0178	4115000000-N	904	SIGN ERECTION, OVERLAY (OVER- HEAD)	1 EA		
0179	4116000000-N	904	SIGN ERECTION, OVERLAY (GROUND MOUNTED)	1 EA		
0180	4116100000-N	904	SIGN ERECTION, RELOCATE, TYPE **** (GROUND MOUNTED) (A)	6 EA		
0181	4155000000-N	907	DISPOSAL OF SIGN SYSTEM, U- CHANNEL	4 EA		
0182	4234000000-N	907	DISPOSAL OF SIGN, A OR B (OVERHEAD)	3 EA		
0183	4400000000-E	1110	WORK ZONE SIGNS (STATIONARY)	1,225 SF		
0184	4405000000-E	1110	WORK ZONE SIGNS (PORTABLE)	864 SF		
0185	4410000000-E	1110	WORK ZONE SIGNS (BARRICADE MOUNTED)	358 SF		
0186	4415000000-N	1115	FLASHING ARROW BOARD	4 EA		
0187	4420000000-N	1120	PORTABLE CHANGEABLE MESSAGE SIGN	6 EA		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0188	4422000000-N	1120	PORTABLE CHANGEABLE MESSAGE SIGN (SHORT TERM)	80 DAY		
0189	4430000000-N	1130	DRUMS	725 EA		
0190	4435000000-N	1135	CONES	75 EA		
0191	4445000000-E	1145	BARRICADES (TYPE III)	715 LF		
0192	4450000000-N	1150	FLAGGER	200 HR		
0193	4455000000-N	1150	FLAGGER	480 DAY		
0194	4465000000-N	1160	TEMPORARY CRASH CUSHIONS	4 EA		
0195	4470000000-N	1160	RESET TEMPORARY CRASH CUSHION	2 EA		
0196	4480000000-N	1165	TMA	4 EA		
0197	4485000000-E	1170	PORTABLE CONCRETE BARRIER	3,990 LF		
0198	4500000000-E	1170	RESET PORTABLE CONCRETE BARRIER	1,800 LF		
0199	4507000000-E	1170	WATER FILLED BARRIER	3,500 LF		
0200	4508000000-E	1170	RESET WATER FILLED BARRIER	1,200 LF		
0201	4510000000-N	SP	LAW ENFORCEMENT	240 HR		
0202	4516000000-N	1180	SKINNY DRUM	110 EA		
0203	4520000000-N	1266	TUBULAR MARKERS (FIXED)	50 EA		
0204	4589000000-N	SP	GENERIC TRAFFIC CONTROL ITEM TEMPORARY MEDIAN CROSSEOVERS	Lump Sum	L.S.	
0205	4650000000-N	1251	TEMPORARY RAISED PAVEMENT MARKERS	1,715 EA		
0206	4685000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)	12,180 LF		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0207	4686000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)	18,047 LF		
0208	4687000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 240 MILS)	440 LF		
0209	4688000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (6", 90 MILS)	115,360 LF		
0210	4690000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (6", 120 MILS)	31,716 LF		
0211	4695000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)	890 LF		
0212	4697000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (8", 120 MILS)	705 LF		
0213	4700000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (12", 90 MILS)	17,820 LF		
0214	4702000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (12", 120 MILS)	2,750 LF		
0215	4710000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (24", 120 MILS)	620 LF		
0216	4721000000-E	1205	THERMOPLASTIC PAVEMENT MARKING CHARACTER (120 MILS)	24 EA		
0217	4725000000-E	1205	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)	180 EA		
0218	4770000000-E	1205	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV)	715 LF		
0219	4810000000-E	1205	PAINT PAVEMENT MARKING LINES (4")	190,000 LF		
0220	4820000000-E	1205	PAINT PAVEMENT MARKING LINES (8")	1,900 LF		
0221	4835000000-E	1205	PAINT PAVEMENT MARKING LINES (24")	740 LF		
0222	4845000000-N	1205	PAINT PAVEMENT MARKING SYMBOL	90 EA		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0223	4847000000-E	1205	POLYUREA PAVEMENT MARKING LINES (4", *****) (HIGHLY REFLECTIVE ELEMENTS)	2,419 LF		
0224	4847100000-E	1205	POLYUREA PAVEMENT MARKING LINES (6", *****) (HIGHLY REFLECTIVE ELEMENTS)	18,430 LF		
0225	4847110000-E	1205	POLYUREA PAVEMENT MARKING LINES (8", *****) (HIGHLY REFLECTIVE ELEMENTS)	350 LF		
0226	4847120000-E	1205	POLYUREA PAVEMENT MARKING LINES (12", *****) (HIGHLY REFLECTIVE ELEMENTS)	450 LF		
0227	4850000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (4")	21,000 LF		
0228	4860000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (8")	200 LF		
0229	4870000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (24")	200 LF		
0230	4875000000-N	1205	REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS	18 EA		
0231	4900000000-N	1251	PERMANENT RAISED PAVEMENT MARKERS	141 EA		
0232	4905000000-N	1253	SNOWPLOWABLE PAVEMENT MARKERS	3,736 EA		
0233	4935000000-N	1267	FLEXIBLE DELINEATORS (CRYSTAL)	150 EA		
0234	4940000000-N	1267	FLEXIBLE DELINEATORS (YELLOW)	114 EA		
0235	5015000000-E	1401	120' HIGH MOUNT STANDARD	16 EA		
0236	5020000000-N	1401	PORTABLE DRIVE UNIT	1 EA		
0237	5025000000-E	SP	HIGH MOUNT FOUNDATIONS	170 CY		
0238	5030000000-N	1403	HIGH MOUNT LUMINAIRES ***** (750W HPS)	128 EA		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0239	5120000000-N	1407	ELECTRIC SERVICE POLE ***** (30' CLASS 4)	3 EA		
0240	5125000000-E	1407	ELECTRIC SERVICE LATERAL ***** (3 #1/0 USE)	75 LF		
0241	5145000000-N	1408	LIGHT CONTROL EQUIPMENT, TYPE RW ***** (240/480 V)	3 EA		
0242	5155000000-E	1409	ELECTRICAL DUCT, TYPE BD, SIZE ***** (2")	477 LF		
0243	5155000000-E	1409	ELECTRICAL DUCT, TYPE BD, SIZE ***** (3")	620 LF		
0244	5160000000-E	1409	ELECTRICAL DUCT, TYPE JA, SIZE ***** (2")	581 LF		
0245	5160000000-E	1409	ELECTRICAL DUCT, TYPE JA, SIZE ***** (3")	239 LF		
0246	5160000000-E	1409	ELECTRICAL DUCT, TYPE JA, SIZE ***** (4")	351 LF		
0247	5160000000-E	1409	ELECTRICAL DUCT, TYPE JA, SIZE ***** (6")	301 LF		
0248	5170000000-E	1410	** #8 W/G FEEDER CIRCUIT (-2)	560 LF		
0249	5175000000-E	1410	** #6 W/G FEEDER CIRCUIT (-2)	1,245 LF		
0250	5180000000-E	1410	** #4 W/G FEEDER CIRCUIT (-2)	1,015 LF		
0251	5185000000-E	1410	** #2 W/G FEEDER CIRCUIT (-2)	1,865 LF		
0252	5190000000-E	1410	***** FEEDER CIRCUIT (2 #1 W/G)	780 LF		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0253	5205000000-E	1410	** #8 W/G FEEDER CIRCUIT IN ***** CONDUIT (2, 1.5)	520 LF		
0254	5210000000-E	1410	** #6 W/G FEEDER CIRCUIT IN ***** CONDUIT (2, 1.5)	1,490 LF		
0255	5215000000-E	1410	** #4 W/G FEEDER CIRCUIT IN ***** CONDUIT (2, 1.5)	5,695 LF		
0256	5220000000-E	1410	** #2 W/G FEEDER CIRCUIT IN ***** CONDUIT (2, 1.5)	4,880 LF		
0257	5225000000-E	1410	** #1 W/G FEEDER CIRCUIT IN ***** CONDUIT (2, 2)	4,395 LF		
0258	5240000000-N	1411	ELECTRICAL JUNCTION BOXES ***** (PC18)	42 EA		
0259	5240000000-N	1411	ELECTRICAL JUNCTION BOXES ***** (PC30)	9 EA		
0260	5240000000-N	1411	ELECTRICAL JUNCTION BOXES ***** (PC36)	3 EA		
0261	5326600000-E	1510	16" WATER LINE	2,168 LF		
0262	5558600000-E	1515	16" VALVE	1 EA		
0263	5666000000-E	1515	FIRE HYDRANT	2 EA		
0264	5810000000-E	1530	ABANDON 16" UTILITY PIPE	2,343 LF		
0265	5835400000-E	1540	6" ENCASEMENT PIPE	80 LF		
0266	5836200000-E	1540	30" ENCASEMENT PIPE	180 LF		
0267	6000000000-E	1605	TEMPORARY SILT FENCE	160,000 LF		
0268	6006000000-E	1610	STONE FOR EROSION CONTROL, CLASS A	3,800 TON		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0269	6009000000-E	1610	STONE FOR EROSION CONTROL, CLASS B	11,200 TON		
0270	6012000000-E	1610	SEDIMENT CONTROL STONE	16,500 TON		
0271	6015000000-E	1615	TEMPORARY MULCHING	815 ACR		
0272	6018000000-E	1620	SEED FOR TEMPORARY SEEDING	19,400 LB		
0273	6021000000-E	1620	FERTILIZER FOR TEMPORARY SEEDING	79.5 TON		
0274	6024000000-E	1622	TEMPORARY SLOPE DRAINS	12,000 LF		
0275	6029000000-E	SP	SAFETY FENCE	11,000 LF		
0276	6030000000-E	1630	SILT EXCAVATION	150,000 CY		
0277	6036000000-E	1631	MATTING FOR EROSION CONTROL	496,000 SY		
0278	6037000000-E	SP	COIR FIBER MAT	13,000 SY		
0279	6038000000-E	SP	PERMANENT SOIL REINFORCEMENT MAT	7,350 SY		
0280	6042000000-E	1632	1/4" HARDWARE CLOTH	14,500 LF		
0281	6043000000-E	SP	LOW PERMEABILITY GEOTEXTILE	3,100 SY		
0282	6046000000-E	1636	TEMPORARY PIPE FOR STREAM CROSSING	225 LF		
0283	6069000000-E	1638	STILLING BASINS	200 CY		
0284	6070000000-N	1639	SPECIAL STILLING BASINS	8 EA		
0285	6071010000-E	SP	WATTLE	2,100 LF		
0286	6071012000-E	SP	COIR FIBER WATTLE	11,250 LF		
0287	6071020000-E	SP	POLYACRYLAMIDE (PAM)	8,800 LB		
0288	6071030000-E	1640	COIR FIBER BAFFLE	20,000 LF		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0289	6071050000-E	SP	*** SKIMMER (1-1/2")	29 EA		
0290	6071050000-E	SP	*** SKIMMER (2")	17 EA		
0291	6071050000-E	SP	*** SKIMMER (2-1/2")	9 EA		
0292	6071050000-E	SP	*** SKIMMER (3")	5 EA		
0293	6071050000-E	SP	*** SKIMMER (4")	2 EA		
0294	6084000000-E	1660	SEEDING & MULCHING	480 ACR		
0295	6087000000-E	1660	MOWING	200 ACR		
0296	6090000000-E	1661	SEED FOR REPAIR SEEDING	8,250 LB		
0297	6093000000-E	1661	FERTILIZER FOR REPAIR SEEDING	22.25 TON		
0298	6096000000-E	1662	SEED FOR SUPPLEMENTAL SEEDING	11,075 LB		
0299	6108000000-E	1665	FERTILIZER TOPDRESSING	331.75 TON		
0300	6111000000-E	SP	IMPERVIOUS DIKE	250 LF		
0301	6114500000-N	1667	SPECIALIZED HAND MOWING	150 MHR		
0302	6117000000-N	SP	RESPONSE FOR EROSION CONTROL	250 EA		
0303	6120000000-E	SP	CULVERT DIVERSION CHANNEL	220 CY		
0304	6123000000-E	1670	REFORESTATION	20 ACR		
0305	6132000000-N	SP	GENERIC EROSION CONTROL ITEM FABRIC INSERT INLET PROTECTION DEVICE	25 EA		
0306	6132000000-N	SP	GENERIC EROSION CONTROL ITEM FABRIC INSERT INLET PROTECTION DEVICE CLEANOUT	75 EA		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0307	6135000000-E	SP	GENERIC EROSION CONTROL ITEM COMPOST BLANKET	30 ACR		
0308	7048500000-E	1705	PEDESTRIAN SIGNAL HEAD (16", 1 SECTION W/COUNTDOWN)	6 EA		
0309	7060000000-E	1705	SIGNAL CABLE	6,937 LF		
0310	7120000000-E	1705	VEHICLE SIGNAL HEAD (12", 3 SECTION)	42 EA		
0311	7132000000-E	1705	VEHICLE SIGNAL HEAD (12", 4 SECTION)	3 EA		
0312	7144000000-E	1705	VEHICLE SIGNAL HEAD (12", 5 SECTION)	1 EA		
0313	7252000000-E	1710	MESSENGER CABLE (1/4")	1,300 LF		
0314	7264000000-E	1710	MESSENGER CABLE (3/8")	3,406 LF		
0315	7279000000-E	1715	TRACER WIRE	7,000 LF		
0316	7300000000-E	1715	UNPAVED TRENCHING (***** (1, 2")	2,350 LF		
0317	7300000000-E	1715	UNPAVED TRENCHING (***** (2, 2")	41 LF		
0318	7300000000-E	1715	UNPAVED TRENCHING (***** (4, 2")	45 LF		
0319	7300100000-E	1715	UNPAVED TRENCHING FOR TEMP- ORARY LEAD-IN	944 LF		
0320	7301000000-E	1715	DIRECTIONAL DRILL (***** (1, 2")	7,070 LF		
0321	7301000000-E	1715	DIRECTIONAL DRILL (***** (2, 2")	898 LF		
0322	7324000000-N	1716	JUNCTION BOX (STANDARD SIZE)	101 EA		
0323	7348000000-N	1716	JUNCTION BOX (OVER-SIZED, HEA- VY DUTY)	16 EA		
0324	7360000000-N	1720	WOOD POLE	6 EA		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0325	7372000000-N	1721	GUY ASSEMBLY	11 EA		
0326	7408000000-E	1722	1" RISER WITH WEATHERHEAD	1 EA		
0327	7420000000-E	1722	2" RISER WITH WEATHERHEAD	5 EA		
0328	7432000000-E	1722	2" RISER WITH HEAT SHRINK TUBING	4 EA		
0329	7444000000-E	1725	INDUCTIVE LOOP SAWCUT	9,639 LF		
0330	7456000000-E	1726	LEAD-IN CABLE (*****)(14-2)	18,872 LF		
0331	7516000000-E	1730	COMMUNICATIONS CABLE (**FIBER)(12)	9,000 LF		
0332	7528000000-E	1730	DROP CABLE	320 LF		
0333	7540000000-N	1731	SPLICE ENCLOSURE	6 EA		
0334	7541000000-N	1731	MODIFY SPLICE ENCLOSURE	2 EA		
0335	7552000000-N	1731	INTERCONNECT CENTER	5 EA		
0336	7564000000-N	1732	FIBER-OPTIC TRANSCEIVER, DROP & REPEAT	5 EA		
0337	7566000000-N	1733	DELINEATOR MARKER	12 EA		
0338	7575160000-E	1734	REMOVE EXISTING COMMUNICATIONS CABLE	2,200 LF		
0339	7576000000-N	SP	METAL STRAIN SIGNAL POLE	18 EA		
0340	7588000000-N	SP	METAL POLE WITH SINGLE MAST ARM	1 EA		
0341	7613000000-N	SP	SOIL TEST	19 EA		
0342	7614100000-E	SP	DRILLED PIER FOUNDATION	144 CY		
0343	7631000000-N	SP	MAST ARM WITH METAL POLE DE-SIGN	1 EA		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0344	7636000000-N	1745	SIGN FOR SIGNALS	10 EA		
0345	7642200000-N	1743	TYPE II PEDESTAL WITH FOUNDATION	6 EA		
0346	7684000000-N	1750	SIGNAL CABINET FOUNDATION	6 EA		
0347	7756000000-N	1751	CONTROLLER WITH CABINET (TYPE 2070L, BASE MOUNTED)	6 EA		
0348	7780000000-N	1751	DETECTOR CARD (TYPE 2070L)	30 EA		
0349	7901000000-N	1753	CABINET BASE EXTENDER	6 EA		
0350	7948000000-N	1757	TRAFFIC SIGNAL REMOVAL	2 EA		
0351	7960000000-N	SP	METAL POLE FOUNDATION REMOVAL	9 EA		
0352	7972000000-N	SP	METAL POLE REMOVAL	9 EA		
0353	7980000000-N	SP	GENERIC SIGNAL ITEM MICROWAVE VEHICLE DETECTOR- SINGLE ZONE	2 EA		
0354	7990000000-E	SP	GENERIC SIGNAL ITEM BACK PULL FIBER OPTIC CABLE	1,100 LF		
0355	7990000000-E	SP	GENERIC SIGNAL ITEM TWO-WAY CONCRETE DUCTBANK (ACP)	1,760 LF		

WALL ITEMS

0356	8801000000-E	SP	MSE RETAINING WALL NO **** (2)	14,700 SF		
0357	8801000000-E	SP	MSE RETAINING WALL NO **** (3)	6,550 SF		
0358	8801000000-E	SP	MSE RETAINING WALL NO **** (4)	7,000 SF		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0359	8801000000-E	SP	MSE RETAINING WALL NO **** (6)	2,550 SF		
0360	8801000000-E	SP	MSE RETAINING WALL NO **** (7)	2,250 SF		
0361	8802014000-E	SP	SOLDIER PILE RETAINING WALLS	7,900 SF		
0362	8847000000-E	SP	GENERIC RETAINING WALL ITEM SOUND BARRIER WALL	177,990 SF		
0363	8847000000-E	SP	GENERIC RETAINING WALL ITEM VISUAL BARRIER WALL	56,431.27 SF		

STRUCTURE ITEMS

0364	8017000000-N	SP	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMP ACCESS AT STA ***** (45+07.87 -RP1C-)	Lump Sum	L.S.	
0365	8017000000-N	SP	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMP ACCESS AT STA ***** (57+07.00 -RP1DB-)	Lump Sum	L.S.	
0366	8017000000-N	SP	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMP ACCESS AT STA ***** (826+15.00 -L- LT)	Lump Sum	L.S.	
0367	8017000000-N	SP	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMP ACCESS AT STA ***** (898+20.00 -L- LT)	Lump Sum	L.S.	
0368	8017000000-N	SP	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMP ACCESS AT STA ***** (94+24.58 -L- LT)	Lump Sum	L.S.	
0369	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (1, 765+27.44 -L- LT)	Lump Sum	L.S.	
0370	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (1, 765+27.44 -L- RT)	Lump Sum	L.S.	

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0371	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (1,943+21.58 -L-)	Lump Sum	L.S.	
0372	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (1,991+23.18 -L-)	Lump Sum	L.S.	
0373	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (1,42+10.23 -RP1B-)	Lump Sum	L.S.	
0374	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (1,57+07.00 -RP1DB-)	Lump Sum	L.S.	
0375	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (2,42+10.23 -RP1B-)	Lump Sum	L.S.	
0376	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (2,57+07.00 -RP1DB-)	Lump Sum	L.S.	
0377	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (3,57+07.00 -RP1DB-)	Lump Sum	L.S.	
0378	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (3,94+24.58 -L- LT)	Lump Sum	L.S.	
0379	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (3,94+24.58 -L- RT)	Lump Sum	L.S.	
0380	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (4,57+07.00 -RP1DB-)	Lump Sum	L.S.	
0381	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (4,94+24.58 -L- RT)	Lump Sum	L.S.	
0382	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (4,94+43.84 -COL1-)	Lump Sum	L.S.	
0383	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (5,57+07.00 -RP1DB-)	Lump Sum	L.S.	

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0384	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (5,94+43.84 -COL1-)	Lump Sum	L.S.	
0385	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (6,57+07.00 -RP1DB-)	Lump Sum	L.S.	
0386	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (7,57+07.00 -RP1DB-)	Lump Sum	L.S.	
0387	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (8,57+07.00 -RP1DB-)	Lump Sum	L.S.	
0388	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (9,57+07.00 -RP1DB-)	Lump Sum	L.S.	
0389	8112730000-N	450	PDA TESTING	43 EA		
0390	8147000000-E	420	REINFORCED CONCRETE DECK SLAB	450,771 SF		
0391	8156000000-E	SP	CONCRETE WEARING SURFACE	4,261.2 SF		
0392	8161000000-E	420	GROOVING BRIDGE FLOORS	418,553.2 SF		
0393	8175000000-E	420	CLASS AA CONCRETE (BRIDGE)	28.9 CY		
0394	8182000000-E	420	CLASS A CONCRETE (BRIDGE)	8,038.9 CY		
0395	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (21+01.60 -PXROAD-)	Lump Sum	L.S.	
0396	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (42+10.23 -RP1B-)	Lump Sum	L.S.	
0397	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (45+07.87 -RP1C-)	Lump Sum	L.S.	
0398	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (57+07.00 -RP1DB-)	Lump Sum	L.S.	

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0399	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (765+27.44 -L- LT)	Lump Sum	L.S.	
0400	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (765+27.44 -L- RT)	Lump Sum	L.S.	
0401	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (826+15.00 -L- LT)	Lump Sum	L.S.	
0402	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (826+15.00 -L- RT)	Lump Sum	L.S.	
0403	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (898+20.00 -L- LT)	Lump Sum	L.S.	
0404	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (898+20.00 -L- RT)	Lump Sum	L.S.	
0405	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (94+24.58 -L- LT)	Lump Sum	L.S.	
0406	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (94+24.58 -L- RT)	Lump Sum	L.S.	
0407	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (94+43.84 -COL1-)	Lump Sum	L.S.	
0408	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (943+21.58 -L-)	Lump Sum	L.S.	
0409	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (969+51.52 -L- LT)	Lump Sum	L.S.	
0410	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (969+51.52 -L- RT)	Lump Sum	L.S.	
0411	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (991+23.18 -L-)	Lump Sum	L.S.	
0412	8217000000-E	425	REINFORCING STEEL (BRIDGE)	1,475,503 LB		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0413	8224000000-E	425	EPOXY COATED REINFORCING STEEL (BRIDGE)	1,055 LB		
0414	8238000000-E	425	SPIRAL COLUMN REINFORCING STEEL (BRIDGE)	32,038 LB		
0415	8262000000-E	430	45" PRESTRESSED CONCRETE GIRDERS	552.22 LF		
0416	8265000000-E	430	54" PRESTRESSED CONCRETE GIRDERS	2,038 LF		
0417	8274000000-E	430	MODIFIED 63" PRESTRESSED CONC GIRDERS	18,229.64 LF		
0418	8280000000-E	440	APPROX LBS STRUCTURAL STEEL	10,229,100 LS		
0419	8364000000-E	450	HP12X53 STEEL PILES	26,420 LF		
0420	8384000000-E	450	HP14X73 STEEL PILES	32,050 LF		
0421	8384200000-E	450	HP14X73 GALVANIZED STEEL PILES	12,640 LF		
0422	8385200000-E	450	PP ** X **** GALVANIZED STEEL PILES (24 X 0.625)	20,790 LF		
0423	8391000000-N	450	STEEL PILE POINTS	9 EA		
0424	8392500000-E	450	PREDRILLING FOR PILES	342 LF		
0425	8393000000-N	450	PILE REDRIVES	584 EA		
0426	8482000000-E	460	THREE BAR METAL RAIL	1,076.55 LF		
0427	8503000000-E	460	CONCRETE BARRIER RAIL	18,709.89 LF		
0428	8505000000-E	460	VERTICAL CONCRETE BARRIER RAIL	99 LF		
0429	8531000000-E	462	4" SLOPE PROTECTION	4,569.8 SY		
0430	8594000000-E	876	RIP RAP, CLASS B	358 TON		
0431	8608000000-E	876	RIP RAP CLASS II (2'-0" THICK)	4,295 TON		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0432	8622000000-E	876	GEOTEXTILE FOR DRAINAGE	4,760 SY		
0433	8650000000-N	SP	POT BEARINGS	Lump Sum	L.S.	
0434	8654000000-N	SP	DISC BEARINGS	Lump Sum	L.S.	
0435	8657000000-N	430	ELASTOMERIC BEARINGS	Lump Sum	L.S.	
0436	8706000000-N	SP	EXPANSION JOINT SEALS	Lump Sum	L.S.	
0437	8713000000-N	SP	MODULAR EXPANSION JOINT SEALS	Lump Sum	L.S.	
0438	8753200000-E	430	3'-0" X 3'-3" PRESTRESSED CONC BOX BEAMS	1,683 LF		
0439	8860000000-N	SP	GENERIC STRUCTURE ITEM APPROX 980,100 LBS STRUCTURAL STEEL	Lump Sum	L.S.	
0440	8860000000-N	SP	GENERIC STRUCTURE ITEM POST TENSIONING TENDONS	Lump Sum	L.S.	
0441	8881000000-E	SP	GENERIC STRUCTURE ITEM 6,000 PSI CONCRETE	218.7 CY		
0442	8881000000-E	SP	GENERIC STRUCTURE ITEM POST TENSIONING ENCASEMENT	17.4 CY		

1211/Jul30/Q18444241.67/D2074137156000/E442

Total Amount Of Bid For Entire Project :

Vendor 1 of 9: CONTI ENTERPRISES, INC (11092)
Call Order 001 (Proposal: C203398)

Bid Information

Proposal County: CUMBERLAND

Vendor Address: 2045 Lincoln Highway
Edison , NJ , 08817

Signature Check: NCDOT_Robert_A._Scerbo_11092

Time Bid Received: August 19, 2014 01:35 PM

Amendment Count: 1

Bid Checksum: 02A3CCA9

Bid Total: \$125,477,521.00

Items Total: \$125,477,521.00 ✓

Time Total: \$0.00

Bidding Errors:

DBE Warning : DBEName Locklear Contracti not chosen fr

MBE Goal Set 5.0

MBE Goal Met 5.0

WBE Goal Set 5.0

WBE Goal Met 5.0

Vendor 1 of 9: CONTI ENTERPRISES, INC (11092)
Call Order 001 (Proposal: C203398)

Bid Bond Information

Projects:	Bond Maximum:
Counties:	State of Incorporation:
Bond ID: H843-9KKF-XALG-K4K4	Agency Execution Date: 8/11/2014
Paid by Check: No	Surety Name: SurePathNetwork
Bond Percent: 5%	Bond Agency Name: Travelers Casualty and Surety Company

Vendor 11092's Bid Information for Call 001, Letting L140819, 08/19/14

Conti Enterprises, Inc. (11092)
Call Order 001 (Proposal ID C203398)

LIST OF MBE PARTICIPANTS

VENDOR NUMBER	DBE NAME ADDRESS	WORK CODE TYPE OF WORK	CERT TYPE AMOUNT	
6159 MB	BUSY BLACK TRUCKING LLC 5 CAT TAIL COURT , DURHAM, NC 27703		Sub 160,250.00	Committed
8139 MB	SIMMONS PUBLIC UTILITY SITE W0 6545 DOTHAN ROAD , TABOR CITY, NC 28463		Sub 3,205,175.90	Committed
7099 MB	Locklear Contracting Incorporat 469 Lonnie Farm Rd, Pembroke, NC 28372		Sub 2,953,516.50	Committed
			TOTAL: \$6,318,942.40	
			5.04%	

Vendor 11092's Bid Information for Call 001, Letting L140819, 08/19/14

Conti Enterprises, Inc. (11092)
Call Order 001 (Proposal ID C203398)

LIST OF WBE PARTICIPANTS

VENDOR NUMBER	DBE NAME ADDRESS	WORK CODE TYPE OF WORK	CERT TYPE AMOUNT	
4729 WB	THERESA'S CONCRETE SERVICE, INC PO BOX 1513 , SALISBURY, NC 28145		Sub 866,799.00	Committed
5659 WB	SOUTHERN CONCRETE & CONSTRUCTIO P.O. BOX 1673 , ANDERSON, SC 29622		Sub 287,897.40	Committed
7975	ADVANCED FIBER NETWORK, LLC 1486 RAVEN ROCK ROAD , LILLINGTON, NC 27546		Sub 42,305.00	Not committed
5796	A-1 PAVEMENT MARKING LLC 238 N BIVENS RD , MONROE, NC 28110		Sub 515,546.42	Not committed
4761 WB	TRAFFIC CONTROL SAFETY SERVICES POST OFFICE BOX 24511 , WINSTON-SALEM, NC 27114		Sub 1,051,015.45	Committed
4898 WB	BULLINGTON CONSTRUCTION INC 417 FOXGLOVE LANE , INDIAN TRAIL, NC 28079		Sub 2,705,568.30	Committed
3230 WB	HIATT & MASON ENTERPRISES, INC POST OFFICE BOX 1378 , MOUNT AIRY, NC 27030		Sub 1,476,449.48	Committed
12921	CHERRY CONTRACTING INC. DBA - C POST OFFICE BOX 368 , LEWISVILLE, NC 27023		Sup 2,979,489.91	Not committed
4880	TRICOR CONSTRUCTION, INC. 625 POPLAR STREET , SPARTANBURG, SC 29302		Sub 826,250.00	Not committed
			TOTAL: \$6,387,729.63	
			5.09%	

Vendor 11092's Bid Information for Call 001, Letting L140819, 08/19/14

Conti Enterprises, Inc. (11092)
Call Order 001 (Proposal ID C203398)

Miscellaneous Data Info - Contractor Responses:

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NON-COLLUSION AND DEBARMENT CERTIFICATION

Explanation of the prospective bidder that is unable to certify to any of the statements in this certification:

Explanation:

NOT ANSWERED

NOT ANSWERED

NOT ANSWERED

NOT ANSWERED

AWARD LIMITS ON MULTIPLE PROJECTS

By answering YES to this statement, the bidder acknowledges that they are using the award limits on multiple projects. No

It is the desire of the Bidder to be awarded contracts, the value of which will not exceed a total of NOT ANSWERED for those projects indicated herein, for which bids will be opened on (MM/DD/YY)

The Award Limits shall apply to the following projects:

Contract Number	County
NOT ANSWERED	
NOT ANSWERED	
NOT ANSWERED	
NOT ANSWERED	
NOT ANSWERED	
NOT ANSWERED	

Bid Bond Data Info - Contractor Responses:

=====

BondID: H843-9KKF-XALG-K4K4

Surety Registry Agency: SurePathNetwork

Verified?: Yes

Surety Agency: Travelers Casualty and Surety Company

Bond Execution Date: 8/11/2014

Bond Amount: \$6,273,876.05 (Five Percent of Bid)

Contract ID: C203398 Project(s): STATE FUNDED
Letting Date: 08-19-14 Call Order: 001
Bidder: 11092 - Conti Enterprises, Inc.

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars Cts	Bid Amount Dollars Ct
Section 0001 ROADWAY ITEMS				
Alt Group				
0001	0000100000-N MOBILIZATIO N	LUMP	LUMP	6,000,000.00
0002	0000400000-N CONSTRUCTIO N SURVEYING	LUMP	LUMP	1,500,000.00
0003	0000900000-N GENERIC MISCELLANEOUS ITEM TEMPORARY GUARD BUILDING	LUMP	LUMP	35,000.00
0004	0000900000-N GENERIC MISCELLANEOUS ITEM TEMPORARY SPRUNG STRUCTURE AT THE YADKIN ROAD DETOUR	LUMP	LUMP	75,000.00
0005	0001000000-E CLEARING & GRUBBING .. ACRE(S)	LUMP	LUMP	2,500,000.00
0006	0008000000-E SUPPLEMENTA RY CLEARING & GRUB-BING	5.000 ACR	5,000.00000	25,000.00
0007	0022000000-E UNCLASSIFIE D EXCAVATION	1,930,500.000 CY	5.00000	9,652,500.00
0008	0029000000-N REINFORCED BRIDGE APPROACH FILL, STATION ***** (19+83.14 -Y3-)	LUMP	LUMP	38,000.00
0009	0029000000-N REINFORCED BRIDGE APPROACH FILL, STATION ***** (41+90.04 -RP1B-)	LUMP	LUMP	18,000.00

State of NC
Dept of Transportation

Date: 06-17-14
Revised: 07-31-14

Contract ID: C203398

Project(s): STATE FUNDED

Letting Date: 08-19-14 Call Order: 001

Bidder: 11092 - Conti Enterprises, Inc.

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars Cts	Bid Amount Dollars Ct
0010	0029000000-N REINFORCED BRIDGE APPROACH FILL, STATION ***** (45+07.87 -RP1C-)	LUMP	LUMP	20,650.00
0011	0029000000-N REINFORCED BRIDGE APPROACH FILL, STATION ***** (49+52.23 -Y1-)	LUMP	LUMP	48,000.00
0012	0029000000-N REINFORCED BRIDGE APPROACH FILL, STATION ***** (55+93.07 -RP1DB-)	LUMP	LUMP	26,000.00
0013	0029000000-N REINFORCED BRIDGE APPROACH FILL, STATION ***** (765+21.45 -L- RT)	LUMP	LUMP	35,000.00
0014	0029000000-N REINFORCED BRIDGE APPROACH FILL, STATION ***** (765+33.36 -L- LT)	LUMP	LUMP	29,000.00
0015	0029000000-N REINFORCED BRIDGE APPROACH FILL, STATION ***** (826+14.99 -L- LT)	LUMP	LUMP	28,000.00
0016	0029000000-N REINFORCED BRIDGE APPROACH FILL, STATION ***** (826+15.02 -L- RT)	LUMP	LUMP	28,000.00
0017	0029000000-N REINFORCED BRIDGE APPROACH FILL, STATION ***** (898+00.42 -L- RT)	LUMP	LUMP	36,000.00
0018	0029000000-N REINFORCED BRIDGE APPROACH FILL, STATION ***** (898+39.37 -L- LT)	LUMP	LUMP	36,000.00

State of NC
Dept of Transportation

Date: 06-17-14
Revised: 07-31-14

Contract ID: C203398

Project(s): STATE FUNDED

Letting Date: 08-19-14 Call Order: 001

Bidder: 11092 - Conti Enterprises, Inc.

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars Cts	Bid Amount Dollars Ct
0019	0029000000-N REINFORCED BRIDGE APPROACH FILL, STATION ***** (91+81.18 -COL1-)	LUMP	LUMP	15,000.00
0020	0029000000-N REINFORCED BRIDGE APPROACH FILL, STATION ***** (91+87.85 -L- RT)	LUMP	LUMP	15,000.00
0021	0029000000-N REINFORCED BRIDGE APPROACH FILL, STATION ***** (91+88.69 -L- LT)	LUMP	LUMP	15,000.00
0022	0036000000-E UNDERCUT EXCAVATION	80,800.000 CY	5.00000	404,000.00
0023	0106000000-E BORROW EXCAVATION	521,200.000 CY	0.50000	260,600.00
0024	0134000000-E DRAINAGE DITCH EXCAVATION	53,810.000 CY	7.40000	398,194.00
0025	0141000000-E BERM DITCH CONSTRUCTION	3,320.000 LF	7.00000	23,240.00
0026	0156000000-E REMOVAL OF EXISTING ASPHALT PAVEMENT	56,500.000 SY	2.50000	141,250.00
0027	0177000000-E BREAKING OF EXISTING ASPHALT PAVEMENT	3,570.000 SY	1.25000	4,462.50
0028	0192000000-N PROOF ROLLING	80.000 HR	120.00000	9,600.00
0029	0195000000-E SELECT GRANULAR MATERIAL	101,000.000 CY	1.00000	101,000.00

State of NC
Dept of Transportation

Date: 06-17-14
Revised: 07-31-14

Contract ID: C203398

Project(s): STATE FUNDED

Letting Date: 08-19-14 Call Order: 001

Bidder: 11092 - Conti Enterprises, Inc.

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0030	0196000000-E GEOTEXTILE FOR SOIL STABILIZA-TION	83,400.000 SY	0.75000	62,550.00
0031	0199000000-E TEMPORARY SHORING	9,650.000 SF	20.00000	193,000.00
0032	0223000000-E ROCK PLATING	2,630.000 SY	49.00000	128,870.00
0033	0255000000-E GENERIC GRADING ITEM HAULING & DISPOSAL OF PETROLEUM CONTAMINATED SOIL	120.000 TON	110.00000	13,200.00
0034	0318000000-E FOUNDATION CONDITIONING MATE- RIAL, MINOR STRUCTURES	3,950.000 TON	40.00000	158,000.00
0035	0320000000-E FOUNDATION CONDITIONING GEO- TEXTILE	12,310.000 SY	2.50000	30,775.00
0036	0342000000-E *** SIDE DRAIN PIPE (30")	108.000 LF	110.00000	11,880.00
0037	0342000000-E *** SIDE DRAIN PIPE (36")	260.000 LF	120.00000	31,200.00
0038	0342000000-E *** SIDE DRAIN PIPE (42")	20.000 LF	130.00000	2,600.00
0039	0343000000-E 15" SIDE DRAIN PIPE	798.000 LF	50.00000	39,900.00
0040	0344000000-E 18" SIDE DRAIN PIPE	732.000 LF	55.00000	40,260.00

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Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars Cts	Bid Amount Dollars Ct
0041	0348000000-E *** SIDE DRAIN PIPE ELBOWS (15")	15.000 EA	400.00000	6,000.00
0042	0348000000-E *** SIDE DRAIN PIPE ELBOWS (18")	9.000 EA	600.00000	5,400.00
0043	0348000000-E *** SIDE DRAIN PIPE ELBOWS (24")	1.000 EA	800.00000	800.00
0044	0348000000-E *** SIDE DRAIN PIPE ELBOWS (30")	2.000 EA	900.00000	1,800.00
0045	0354000000-E **** RC PIPE CULVERTS, CLASS ***** (48", V)	208.000 LF	250.00000	52,000.00
0046	0354000000-E **** RC PIPE CULVERTS, CLASS ***** (66", V)	228.000 LF	350.00000	79,800.00
0047	0360000000-E 12" RC PIPE CULVERTS, CLASS III	100.000 LF	45.00000	4,500.00
0048	0366000000-E 15" RC PIPE CULVERTS, CLASS III	5,304.000 LF	50.00000	265,200.00
0049	0372000000-E 18" RC PIPE CULVERTS, CLASS III	4,408.000 LF	55.00000	242,440.00
0050	0378000000-E 24" RC PIPE CULVERTS, CLASS III	2,232.000 LF	60.00000	133,920.00
0051	0384000000-E 30" RC PIPE CULVERTS, CLASS III	1,684.000 LF	150.00000	252,600.00
0052	0390000000-E 36" RC PIPE CULVERTS, CLASS III	1,028.000 LF	180.00000	185,040.00

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0053	0396000000-E 42" RC PIPE CULVERTS, CLASS III LF	20.000	210.00000	4,200.00
0054	0402000000-E 48" RC PIPE CULVERTS, CLASS III LF	172.000	240.00000	41,280.00
0055	0408000000-E 54" RC PIPE CULVERTS, CLASS III LF	20.000	280.00000	5,600.00
0056	0420000000-E 66" RC PIPE CULVERTS, CLASS III LF	104.000	350.00000	36,400.00
0057	0426000000-E 72" RC PIPE CULVERTS, CLASS III LF	260.000	400.00000	104,000.00
0058	0448000000-E ***** RC PIPE CULVERTS, CLASS IV (48") LF	1,456.000	300.00000	436,800.00
0059	0448000000-E ***** RC PIPE CULVERTS, CLASS IV (54") LF	48.000	340.00000	16,320.00
0060	0448000000-E ***** RC PIPE CULVERTS, CLASS IV (60") LF	580.000	380.00000	220,400.00
0061	0448000000-E ***** RC PIPE CULVERTS, CLASS IV (66") LF	148.000	550.00000	81,400.00
0062	0448000000-E ***** RC PIPE CULVERTS, CLASS IV (72") LF	176.000	600.00000	105,600.00
0063	0448200000-E 15" RC PIPE CULVERTS, CLASS IV LF	8,096.000	55.00000	445,280.00
0064	0448300000-E 18" RC PIPE CULVERTS, CLASS IV LF	2,204.000	60.00000	132,240.00

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0065	0448400000-E 24" RC PIPE CULVERTS, CLASS IV	1,980.000 LF	65.00000	128,700.00
0066	0448500000-E 30" RC PIPE CULVERTS, CLASS IV	1,928.000 LF	180.00000	347,040.00
0067	0448600000-E 36" RC PIPE CULVERTS, CLASS IV	1,912.000 LF	220.00000	420,640.00
0068	0448700000-E 42" RC PIPE CULVERTS, CLASS IV	312.000 LF	250.00000	78,000.00
0069	0582000000-E 15" CS PIPE CULVERTS, 0.064" THICK	100.000 LF	45.00000	4,500.00
0070	0588000000-E 18" CS PIPE CULVERTS, 0.064" THICK	148.000 LF	60.00000	8,880.00
0071	0594000000-E 24" CS PIPE CULVERTS, 0.064" THICK	104.000 LF	80.00000	8,320.00
0072	0600000000-E 30" CS PIPE CULVERTS, 0.079" THICK	48.000 LF	100.00000	4,800.00
0073	0995000000-E PIPE REMOVAL	1,430.000 LF	12.00000	17,160.00
0074	1011000000-N FINE GRADING	LUMP	LUMP	1,650,000.00
0075	1099500000-E SHALLOW UNDERCUT	2,000.000 CY	5.00000	10,000.00
0076	1099700000-E CLASS IV SUBGRADE STABILIZA- TION	4,300.000 TON	25.00000	107,500.00

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0077	1121000000-E AGGREGATE BASE COURSE	231,500.000 TON	15.00000	3,472,500.00
0078	1220000000-E INCIDENTAL STONE BASE	1,000.000 TON	17.00000	17,000.00
0079	1275000000-E PRIME COAT	4,700.000 GAL	6.00000	28,200.00
0080	1489000000-E ASPHALT CONC BASE COURSE, TYPE B25.0B	5,040.000 TON	37.00000	186,480.00
0081	1491000000-E ASPHALT CONC BASE COURSE, TYPE B25.0C	70,750.000 TON	28.50000	2,016,375.00
0082	1498000000-E ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B	14,210.000 TON	34.50000	490,245.00
0083	1503000000-E ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C	85,420.000 TON	28.50000	2,434,470.00
0084	1519000000-E ASPHALT CONC SURFACE COURSE, TYPE S9.5B	14,040.000 TON	31.00000	435,240.00
0085	1523000000-E ASPHALT CONC SURFACE COURSE, TYPE S9.5C	63,100.000 TON	28.75000	1,814,125.00
0086	1575000000-E ASPHALT BINDER FOR PLANT MIX	12,685.000 TON	620.00000	7,864,700.00
0087	1840000000-E MILLED RUMBLE STRIPS (ASPHALT CONCRETE)	127,800.000 LF	0.10000	12,780.00
0088	1847000000-E ***** PORT CEM CONC PAVEMENT, THROUGH LANES (WITH DOWELS) (12")	410.000 SY	85.00000	34,850.00

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0089	1881000000-E GENERIC PAVING ITEM SPEED MODULATOR	65.000 LF	55.00000	3,575.00
0090	2022000000-E SUBDRAIN EXCAVATION	5,180.000 CY	0.50000	2,590.00
0091	2026000000-E GEOTEXTILE FOR SUBSURFACE DRAINS	15,400.000 SY	0.50000	7,700.00
0092	2036000000-E SUBDRAIN COARSE AGGREGATE	2,590.000 CY	29.00000	75,110.00
0093	2044000000-E 6" PERFORATED SUBDRAIN PIPE	15,400.000 LF	5.00000	77,000.00
0094	2070000000-N SUBDRAIN PIPE OUTLET	31.000 EA	420.00000	13,020.00
0095	2077000000-E 6" OUTLET PIPE	186.000 LF	17.00000	3,162.00
0096	2190000000-N TEMPORARY STEEL PLATE COVERS FOR MASONRY DRAINAGE STRUCTURE	2.000 EA	1,200.00000	2,400.00
0097	2209000000-E ENDWALLS	28.000 CY	900.00000	25,200.00
0098	2220000000-E REINFORCED ENDWALLS	24.000 CY	1,100.00000	26,400.00
0099	2253000000-E PIPE COLLARS	1.500 CY	1,000.00000	1,500.00

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0100	2264000000-E PIPE PLUGS	1.500 CY	980.00000	1,470.00
0101	2275000000-E FLOWABLE FILL	1.000 CY	275.00000	275.00
0102	2286000000-N MASONRY DRAINAGE STRUCTURES	293.000 EA	1,900.00000	556,700.00
0103	2297000000-E MASONRY DRAINAGE STRUCTURES	63.000 CY	1,500.00000	94,500.00
0104	2308000000-E MASONRY DRAINAGE STRUCTURES	251.000 LF	280.00000	70,280.00
0105	2352000000-N FRAME WITH GRATE, STD 840.**** (840.16)	30.000 EA	600.00000	18,000.00
0106	2352000000-N FRAME WITH GRATE, STD 840.**** (840.20)	7.000 EA	600.00000	4,200.00
0107	2354000000-N FRAME WITH GRATE, STD 840.22	5.000 EA	600.00000	3,000.00
0108	2355000000-N FRAME WITH GRATE, STD 840.29	1.000 EA	600.00000	600.00
0109	2364200000-N FRAME WITH TWO GRATES, STD 840.20	40.000 EA	600.00000	24,000.00
0110	2365000000-N FRAME WITH TWO GRATES, STD 840.22	127.000 EA	600.00000	76,200.00
0111	2367000000-N FRAME WITH TWO GRATES, STD 840.29	2.000 EA	600.00000	1,200.00

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0112	2374000000-N FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)	6.000 EA	600.00000	3,600.00
0113	2374000000-N FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)	31.000 EA	600.00000	18,600.00
0114	2374000000-N FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)	33.000 EA	600.00000	19,800.00
0115	2396000000-N FRAME WITH COVER, STD 840.54	2.000 EA	600.00000	1,200.00
0116	2407000000-N STEEL FRAME WITH TWO GRATES, STD 840.37	7.000 EA	1,440.00000	10,080.00
0117	2451000000-N CONCRETE TRANSITIONAL SECTION FOR DROP INLET	14.000 EA	750.00000	10,500.00
0118	2549000000-E 2'-6" CONCRETE CURB & GUTTER	16,130.000 LF	23.00000	370,990.00
0119	2556000000-E SHOULDER BERM GUTTER	8,450.000 LF	29.00000	245,050.00
0120	2570000000-N MODIFIED CONCRETE FLUME	2.000 EA	1,900.00000	3,800.00
0121	2577000000-E CONCRETE EXPRESSWAY GUTTER	40.000 LF	47.00000	1,880.00
0122	2580000000-E CONCRETE VALLEY GUTTER	160.000 LF	45.00000	7,200.00
0123	2591000000-E 4" CONCRETE SIDEWALK	3,120.000 SY	34.00000	106,080.00

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0124	2605000000-N CONCRETE CURB RAMP	16.000 EA	1,750.00000	28,000.00
0125	2612000000-E 6" CONCRETE DRIVEWAY	310.000 SY	59.00000	18,290.00
0126	2619000000-E 4" CONCRETE PAVED DITCH	190.000 SY	56.00000	10,640.00
0127	2627000000-E 4" CONCRETE ISLAND COVER	570.000 SY	46.00000	26,220.00
0128	2655000000-E 5" MONOLITHIC CONCRETE ISLANDS (KEYED IN)	4,170.000 SY	44.00000	183,480.00
0129	2703000000-E CONCRETE BARRIER, TYPE ***** (T1)	270.000 LF	120.00000	32,400.00
0130	2724000000-E PRECAST REINFORCED CONCRETE BARRIER, SINGLE FACED	8,340.000 LF	50.00000	417,000.00
0131	2752000000-E GENERIC PAVING ITEM 1'-6" MODIFIED CURB & GUTTER	4,930.000 LF	21.00000	103,530.00
0132	2752000000-E GENERIC PAVING ITEM 6" CONCRETE CURB	1,310.000 LF	21.00000	27,510.00
0133	2875000000-N CONVERT EXISTING CATCH BASIN TO DROP INLET	5.000 EA	1,500.00000	7,500.00
0134	2893000000-N CONVERT EXISTING CATCH BASIN TO JUNCTION BOX WITH MANHOLE	1.000 EA	3,000.00000	3,000.00
0135	3000000000-N IMPACT ATTENUATOR UNIT, TYPE 350	9.000 EA	14,000.00000	126,000.00

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0136	3030000000-E STEEL BM GUARDRAIL	23,000.000 LF	15.00000	345,000.00
0137	3045000000-E STEEL BM GUARDRAIL, SHOP CURVED	37.500 LF	15.00000	562.50
0138	3105000000-N STEEL BM GUARDRAIL TERMINAL SECTIONS	2.000 EA	26.00000	52.00
0139	3150000000-N ADDITIONAL GUARDRAIL POSTS	25.000 EA	11.00000	275.00
0140	3195000000-N GUARDRAIL ANCHOR UNITS, TYPE AT-1	1.000 EA	400.00000	400.00
0141	3210000000-N GUARDRAIL ANCHOR UNITS, TYPE CAT-1	23.000 EA	475.00000	10,925.00
0142	3215000000-N GUARDRAIL ANCHOR UNITS, TYPE III	6.000 EA	1,550.00000	9,300.00
0143	3270000000-N GUARDRAIL ANCHOR UNITS, TYPE 350	35.000 EA	1,750.00000	61,250.00
0144	3285000000-N GUARDRAIL ANCHOR UNITS, TYPE M-350	15.000 EA	1,650.00000	24,750.00
0145	3317000000-N GUARDRAIL ANCHOR UNITS, TYPE B-77	55.000 EA	1,600.00000	88,000.00
0146	3389200000-E CABLE GUIDERAIL	25,000.000 LF	7.00000	175,000.00
0147	3389500000-N ADDITIONAL GUIDERAIL POSTS	10.000 EA	10.00000	100.00

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0148	3389600000-N CABLE GUIDERAIL ANCHOR UNITS	21.000 EA	1,592.59000	33,444.39
0149	3503000000-E WOVEN WIRE FENCE, 47" FABRIC	24,960.000 LF	2.90000	72,384.00
0150	3509000000-E 4" TIMBER FENCE POSTS, 7'-6" LONG	1,586.000 EA	15.75000	24,979.50
0151	3515000000-E 5" TIMBER FENCE POSTS, 8'-0" LONG	360.000 EA	29.00000	10,440.00
0152	3533000000-E CHAIN LINK FENCE, *** FABRIC (84")	110,598.000 LF	14.00000	1,548,372.00
0153	3539000000-E METAL LINE POSTS FOR *** CHAINLINK FENCE (84")	3,102.000 EA	102.00000	316,404.00
0154	3545000000-E METAL TERMINAL POSTS FOR *** CHAIN LINK FENCE (84")	204.000 EA	200.00000	40,800.00
0155	3628000000-E RIP RAP, CLASS I	950.000 TON	45.00000	42,750.00
0156	3649000000-E RIP RAP, CLASS B	1,820.000 TON	40.00000	72,800.00
0157	3656000000-E GEOTEXTILE FOR DRAINAGE	8,845.000 SY	1.35000	11,940.75
0158	3659000000-N PREFORMED SCOUR HOLES WITH LEVEL SPREADER APRON	9.000 EA	2,000.00000	18,000.00
0159	4048000000-E REINFORCED CONCRETE SIGN FOUN-DATIONS	37.000 CY	690.00000	25,530.00

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0160	4054000000-E PLAIN CONCRETE SIGN FOUNDATIONS	2.000 CY	105.00000	210.00
0161	4057000000-E OVERHEAD FOOTING	141.000 CY	850.00000	119,850.00
0162	4060000000-E SUPPORTS, BREAKAWAY STEEL BEAM	14,801.000 LB	3.00000	44,403.00
0163	4066000000-E SUPPORTS, SIMPLE STEEL BEAM	11,160.000 LB	3.00000	33,480.00
0164	4072000000-E SUPPORTS, 3-LB STEEL U-CHANNEL	1,664.000 LF	5.50000	9,152.00
0165	4078000000-E SUPPORTS, 2-LB STEEL U-CHANNEL	14.000 EA	53.00000	742.00
0166	4082100000-N SUPPORTS, OVERHEAD SIGN STRUC-TURE AT STA ***** (131+30 -COL1-)	LUMP	LUMP	64,000.00
0167	4082100000-N SUPPORTS, OVERHEAD SIGN STRUC-TURE AT STA ***** (36+60 -L-)	LUMP	LUMP	64,000.00
0168	4082100000-N SUPPORTS, OVERHEAD SIGN STRUC-TURE AT STA ***** (63+00 -L-)	LUMP	LUMP	64,000.00
0169	4082100000-N SUPPORTS, OVERHEAD SIGN STRUC-TURE AT STA ***** (81+25 -COL1-)	LUMP	LUMP	110,000.00
0170	4082100000-N SUPPORTS, OVERHEAD SIGN STRUC-TURE AT STA ***** (976+60 -L-)	LUMP	LUMP	47,000.00

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0171	4096000000-N SIGN ERECTION, TYPE D	6.000 EA	85.00000	510.00
0172	4102000000-N SIGN ERECTION, TYPE E	99.000 EA	53.00000	5,247.00
0173	4108000000-N SIGN ERECTION, TYPE F	14.000 EA	85.00000	1,190.00
0174	4109000000-N SIGN ERECTION, TYPE *** (OVER-HEAD) (A)	5.000 EA	850.00000	4,250.00
0175	4110000000-N SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)	25.000 EA	345.00000	8,625.00
0176	4110000000-N SIGN ERECTION, TYPE *** (GROUND MOUNTED) (B)	9.000 EA	210.00000	1,890.00
0177	4114000000-N SIGN ERECTION, MILEMARKERS	14.000 EA	53.00000	742.00
0178	4115000000-N SIGN ERECTION, OVERLAY (OVER- HEAD)	1.000 EA	530.00000	530.00
0179	4116000000-N SIGN ERECTION, OVERLAY (GROUND MOUNTED)	1.000 EA	265.00000	265.00
0180	4116100000-N SIGN ERECTION, RELOCATE, TYPE **** (GROUND MOUNTED) (A)	6.000 EA	370.00000	2,220.00
0181	4155000000-N DISPOSAL OF SIGN SYSTEM, U- CHANNEL	4.000 EA	10.00000	40.00
0182	4234000000-N DISPOSAL OF SIGN, A OR B (OVERHEAD)	3.000 EA	565.00000	1,695.00

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0183	4400000000-E WORK ZONE SIGNS (STATIONARY)	1,225.000 SF	15.00000	18,375.00
0184	4405000000-E WORK ZONE SIGNS (PORTABLE)	864.000 SF	12.00000	10,368.00
0185	4410000000-E WORK ZONE SIGNS (BARRICADE MOUNTED)	358.000 SF	10.00000	3,580.00
0186	4415000000-N FLASHING ARROW BOARD	4.000 EA	2,800.00000	11,200.00
0187	4420000000-N PORTABLE CHANGEABLE MESSAGE SIGN	6.000 EA	9,000.00000	54,000.00
0188	4422000000-N PORTABLE CHANGEABLE MESSAGE SIGN (SHORT TERM)	80.000 DAY	32.00000	2,560.00
0189	4430000000-N DRUMS	725.000 EA	45.00000	32,625.00
0190	4435000000-N CONES	75.000 EA	17.00000	1,275.00
0191	4445000000-E BARRICADES (TYPE III)	715.000 LF	18.00000	12,870.00
0192	4450000000-N FLAGGER	200.000 HR	14.00000	2,800.00
0193	4455000000-N FLAGGER	480.000 DAY	125.00000	60,000.00
0194	4465000000-N TEMPORARY CRASH CUSHIONS	4.000 EA	5,000.00000	20,000.00

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0195	4470000000-N RESET TEMPORARY CRASH CUSHION	2.000 EA	1,275.00000	2,550.00
0196	4480000000-N TMA	4.000 EA	21,000.00000	84,000.00
0197	4485000000-E PORTABLE CONCRETE BARRIER	3,990.000 LF	22.00000	87,780.00
0198	4500000000-E RESET PORTABLE CONCRETE BAR- RIER	1,800.000 LF	5.00000	9,000.00
0199	4507000000-E WATER FILLED BARRIER	3,500.000 LF	50.00000	175,000.00
0200	4508000000-E RESET WATER FILLED BARRIER	1,200.000 LF	5.00000	6,000.00
0201	4510000000-N LAW ENFORCEMENT	240.000 HR	40.00000	9,600.00
0202	4516000000-N SKINNY DRUM	110.000 EA	30.00000	3,300.00
0203	4520000000-N TUBULAR MARKERS (FIXED)	50.000 EA	37.00000	1,850.00
0204	4589000000-N GENERIC TRAFFIC CONTROL ITEM TEMPORARY MEDIAN CROSSOVERS	LUMP	LUMP	125,000.00
0205	4650000000-N TEMPORARY RAISED PAVEMENT MARKERS	1,715.000 EA	5.25000	9,003.75

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0206	4685000000-E THERMOPLAST IC PAVEMENT MARKING LINES (4", 90 MILS)	12,180.000 LF	0.85000	10,353.00
0207	4686000000-E THERMOPLAST IC PAVEMENT MARKING LINES (4", 120 MILS)	18,047.000 LF	0.95000	17,144.65
0208	4687000000-E THERMOPLAST IC PAVEMENT MARKING LINES (4", 240 MILS)	440.000 LF	6.00000	2,640.00
0209	4688000000-E THERMOPLAST IC PAVEMENT MARKING LINES (6", 90 MILS)	115,360.000 LF	1.05000	121,128.00
0210	4690000000-E THERMOPLAST IC PAVEMENT MARKING LINES (6", 120 MILS)	31,716.000 LF	1.25000	39,645.00
0211	4695000000-E THERMOPLAST IC PAVEMENT MARKING LINES (8", 90 MILS)	890.000 LF	2.55000	2,269.50
0212	4697000000-E THERMOPLAST IC PAVEMENT MARKING LINES (8", 120 MILS)	705.000 LF	3.15000	2,220.75
0213	4700000000-E THERMOPLAST IC PAVEMENT MARKING LINES (12", 90 MILS)	17,820.000 LF	1.90000	33,858.00
0214	4702000000-E THERMOPLAST IC PAVEMENT MARKING LINES (12", 120 MILS)	2,750.000 LF	2.80000	7,700.00
0215	4710000000-E THERMOPLAST IC PAVEMENT MARKING LINES (24", 120 MILS)	620.000 LF	7.70000	4,774.00
0216	4721000000-E THERMOPLAST IC PAVEMENT MARKING CHARACTER (120 MILS)	24.000 EA	186.00000	4,464.00

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0217	4725000000-E THERMOPLAST IC PAVEMENT MARKINGSYMBOL (90 MILS)	180.000 EA	186.00000	33,480.00
0218	4770000000-E COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV)	715.000 LF	3.75000	2,681.25
0219	4810000000-E PAINT PAVEMENT MARKING LINES (4")	190,000.000 LF	0.25000	47,500.00
0220	4820000000-E PAINT PAVEMENT MARKING LINES (8")	1,900.000 LF	0.90000	1,710.00
0221	4835000000-E PAINT PAVEMENT MARKING LINES (24")	740.000 LF	3.20000	2,368.00
0222	4845000000-N PAINT PAVEMENT MARKING SYMBOL	90.000 EA	80.00000	7,200.00
0223	4847000000-E POLYUREA PAVEMENT MARKING LINES (4", *****) (HIGHLY REFLECTIVE ELEMENTS)	2,419.000 LF	1.00000	2,419.00
0224	4847100000-E POLYUREA PAVEMENT MARKING LINES (6", *****) (HIGHLY REFLECTIVE ELEMENTS)	18,430.000 LF	1.20000	22,116.00
0225	4847110000-E POLYUREA PAVEMENT MARKING LINES (8", *****) (HIGHLY REFLECTIVE ELEMENTS)	350.000 LF	2.40000	840.00

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0226	4847120000-E POLYUREA PAVEMENT MARKING LINES (12", *****)(HIGHLY REFLECTIVE ELEMENTS)	450.000 LF	3.20000	1,440.00
0227	4850000000-E REMOVAL OF PAVEMENT MARKING LINES (4")	21,000.000 LF	0.80000	16,800.00
0228	4860000000-E REMOVAL OF PAVEMENT MARKING LINES (8")	200.000 LF	3.20000	640.00
0229	4870000000-E REMOVAL OF PAVEMENT MARKING LINES (24")	200.000 LF	7.40000	1,480.00
0230	4875000000-N REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS	18.000 EA	69.00000	1,242.00
0231	4900000000-N PERMANENT RAISED PAVEMENT MARKERS	141.000 EA	11.65000	1,642.65
0232	4905000000-N SNOWPLOWABLE PAVEMENT MARKERS	3,736.000 EA	33.00000	123,288.00
0233	4935000000-N FLEXIBLE DELINEATORS (CRYSTAL)	150.000 EA	100.00000	15,000.00
0234	4940000000-N FLEXIBLE DELINEATORS (YELLOW)	114.000 EA	100.00000	11,400.00
0235	5015000000-E 120' HIGH MOUNT STANDARD	16.000 EA	19,000.00000	304,000.00
0236	5020000000-N PORTABLE DRIVE UNIT	1.000 EA	3,425.00000	3,425.00

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0237	5025000000-E HIGH MOUNT FOUNDATIONS	170.000 CY	671.00000	114,070.00
0238	5030000000-N HIGH MOUNT LUMINAIRES ***** (750W HPS)	128.000 EA	749.00000	95,872.00
0239	5120000000-N ELECTRIC SERVICE POLE ***** (30' CLASS 4)	3.000 EA	2,300.00000	6,900.00
0240	5125000000-E ELECTRIC SERVICE LATERAL ***** (3 #1/0 USE)	75.000 LF	25.00000	1,875.00
0241	5145000000-N LIGHT CONTROL EQUIPMENT, TYPE RW ***** (240/480 V)	3.000 EA	8,650.00000	25,950.00
0242	5155000000-E ELECTRICAL DUCT, TYPE BD, SIZE ***** (2")	477.000 LF	4.00000	1,908.00
0243	5155000000-E ELECTRICAL DUCT, TYPE BD, SIZE ***** (3")	620.000 LF	5.00000	3,100.00
0244	5160000000-E ELECTRICAL DUCT, TYPE JA, SIZE ***** (2")	581.000 LF	9.50000	5,519.50
0245	5160000000-E ELECTRICAL DUCT, TYPE JA, SIZE ***** (3")	239.000 LF	11.75000	2,808.25
0246	5160000000-E ELECTRICAL DUCT, TYPE JA, SIZE ***** (4")	351.000 LF	15.50000	5,440.50
0247	5160000000-E ELECTRICAL DUCT, TYPE JA, SIZE ***** (6")	301.000 LF	16.50000	4,966.50

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0248	5170000000-E ** #8 W/G FEEDER CIRCUIT (-2) LF	560.000	2.45000	1,372.00
0249	5175000000-E ** #6 W/G FEEDER CIRCUIT (-2) LF	1,245.000	2.40000	2,988.00
0250	5180000000-E ** #4 W/G FEEDER CIRCUIT (-2) LF	1,015.000	3.30000	3,349.50
0251	5185000000-E ** #2 W/G FEEDER CIRCUIT (-2) LF	1,865.000	5.50000	10,257.50
0252	5190000000-E ***** * FEEDER CIRCUIT (2 #1 W/G) LF	780.000	8.50000	6,630.00
0253	5205000000-E ** #8 W/G FEEDER CIRCUIT IN *****" CONDUIT (2, 1.5) LF	520.000	6.50000	3,380.00
0254	5210000000-E ** #6 W/G FEEDER CIRCUIT IN *****" CONDUIT (2, 1.5) LF	1,490.000	6.25000	9,312.50
0255	5215000000-E ** #4 W/G FEEDER CIRCUIT IN *****" CONDUIT (2, 1.5) LF	5,695.000	7.50000	42,712.50
0256	5220000000-E ** #2 W/G FEEDER CIRCUIT IN *****" CONDUIT (2, 1.5) LF	4,880.000	9.50000	46,360.00
0257	5225000000-E ** #1 W/G FEEDER CIRCUIT IN *****" CONDUIT (2, 2) LF	4,395.000	12.00000	52,740.00
0258	5240000000-N ELECTRICAL JUNCTION BOXES ***** (PC18) EA	42.000	200.00000	8,400.00
0259	5240000000-N ELECTRICAL JUNCTION BOXES ***** (PC30) EA	9.000	350.00000	3,150.00

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0260	5240000000-N ELECTRICAL JUNCTION BOXES ***** (PC36)	3.000 EA	315.00000	945.00
0261	5326600000-E 16" WATER LINE	2,168.000 LF	125.00000	271,000.00
0262	5558600000-E 16" VALVE	1.000 EA	9,000.00000	9,000.00
0263	5666000000-E FIRE HYDRANT	2.000 EA	8,900.00000	17,800.00
0264	5810000000-E ABANDON 16" UTILITY PIPE	2,343.000 LF	14.00000	32,802.00
0265	5835400000-E 6" ENCASEMENT PIPE	80.000 LF	74.00000	5,920.00
0266	5836200000-E 30" ENCASEMENT PIPE	180.000 LF	330.00000	59,400.00
0267	6000000000-E TEMPORARY SILT FENCE	160,000.000 LF	3.00000	480,000.00
0268	6006000000-E STONE FOR EROSION CONTROL, CLASS A	3,800.000 TON	45.00000	171,000.00
0269	6009000000-E STONE FOR EROSION CONTROL, CLASS B	11,200.000 TON	45.00000	504,000.00
0270	6012000000-E SEDIMENT CONTROL STONE	16,500.000 TON	40.00000	660,000.00
0271	6015000000-E TEMPORARY MULCHING	815.000 ACR	1,000.00000	815,000.00

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0272	6018000000-E SEED FOR TEMPORARY SEEDING	19,400.000 LB	3.50000	67,900.00
0273	6021000000-E FERTILIZER FOR TEMPORARY SEED-ING	79.500 TON	1,025.00000	81,487.50
0274	6024000000-E TEMPORARY SLOPE DRAINS	12,000.000 LF	20.00000	240,000.00
0275	6029000000-E SAFETY FENCE	11,000.000 LF	1.50000	16,500.00
0276	6030000000-E SILT EXCAVATION	150,000.000 CY	1.00000	150,000.00
0277	6036000000-E MATTING FOR EROSION CONTROL	496,000.000 SY	1.50000	744,000.00
0278	6037000000-E COIR FIBER MAT	13,000.000 SY	4.50000	58,500.00
0279	6038000000-E PERMANENT SOIL REINFORCEMENT MAT	7,350.000 SY	5.00000	36,750.00
0280	6042000000-E 1/4" HARDWARE CLOTH	14,500.000 LF	4.25000	61,625.00
0281	6043000000-E LOW PERMEABILITY GEOTEXTILE	3,100.000 SY	4.75000	14,725.00
0282	6046000000-E TEMPORARY PIPE FOR STREAM CROSSING	225.000 LF	135.00000	30,375.00
0283	6069000000-E STILLING BASINS	200.000 CY	3.00000	600.00

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0284	6070000000-N SPECIAL STILLING BASINS	8.000 EA	700.00000	5,600.00
0285	6071010000-E WATTLE	2,100.000 LF	5.50000	11,550.00
0286	6071012000-E COIR FIBER WATTLE	11,250.000 LF	10.00000	112,500.00
0287	6071020000-E POLYACRYLAMIDE (PAM)	8,800.000 LB	6.75000	59,400.00
0288	6071030000-E COIR FIBER BAFFLE	20,000.000 LF	6.50000	130,000.00
0289	6071050000-E *** SKIMMER (1-1/2")	29.000 EA	1,100.00000	31,900.00
0290	6071050000-E *** SKIMMER (2")	17.000 EA	1,225.00000	20,825.00
0291	6071050000-E *** SKIMMER (2-1/2")	9.000 EA	1,225.00000	11,025.00
0292	6071050000-E *** SKIMMER (3")	5.000 EA	1,400.00000	7,000.00
0293	6071050000-E *** SKIMMER (4")	2.000 EA	1,500.00000	3,000.00
0294	6084000000-E SEEDING & MULCHING	480.000 ACR	1,450.00000	696,000.00
0295	6087000000-E MOWING	200.000 ACR	110.00000	22,000.00

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0296	6090000000-E SEED FOR REPAIR SEEDING	8,250.000 LB	4.00000	33,000.00
0297	6093000000-E FERTILIZER FOR REPAIR SEEDING	22.250 TON	985.00000	21,916.25
0298	6096000000-E SEED FOR SUPPLEMENTAL SEEDING	11,075.000 LB	3.85000	42,638.75
0299	6108000000-E FERTILIZER TOPDRESSING	331.750 TON	1,100.00000	364,925.00
0300	6111000000-E IMPERVIOUS DIKE	250.000 LF	30.00000	7,500.00
0301	6114500000-N SPECIALIZED HAND MOWING	150.000 MHR	60.00000	9,000.00
0302	6117000000-N RESPONSE FOR EROSION CONTROL	250.000 EA	410.00000	102,500.00
0303	6120000000-E CULVERT DIVERSION CHANNEL	220.000 CY	30.00000	6,600.00
0304	6123000000-E REFORESTATION	20.000 ACR	1,100.00000	22,000.00
0305	6132000000-N GENERIC EROSION CONTROL ITEM FABRIC INSERT INLET PROTECTION DEVICE	25.000 EA	165.00000	4,125.00
0306	6132000000-N GENERIC EROSION CONTROL ITEM FABRIC INSERT INLET PROTECTION DEVICE CLEANOUT	75.000 EA	55.00000	4,125.00

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0307	6135000000-E GENERIC EROSION CONTROL ITEM COMPOST BLANKET	30.000 ACR	6,375.00000	191,250.00
0308	7048500000-E PEDESTRIAN SIGNAL HEAD (16", 1SECTION W/COUNTDOWN)	6.000 EA	811.00000	4,866.00
0309	7060000000-E SIGNAL CABLE	6,937.000 LF	2.00000	13,874.00
0310	7120000000-E VEHICLE SIGNAL HEAD (12", 3 SECTION)	42.000 EA	600.00000	25,200.00
0311	7132000000-E VEHICLE SIGNAL HEAD (12", 4 SECTION)	3.000 EA	725.00000	2,175.00
0312	7144000000-E VEHICLE SIGNAL HEAD (12", 5 SECTION)	1.000 EA	850.00000	850.00
0313	7252000000-E MESSENGER CABLE (1/4")	1,300.000 LF	1.75000	2,275.00
0314	7264000000-E MESSENGER CABLE (3/8")	3,406.000 LF	2.00000	6,812.00
0315	7279000000-E TRACER WIRE	7,000.000 LF	0.50000	3,500.00
0316	7300000000-E UNPAVED TRENCHING (***** (1, 2"))	2,350.000 LF	4.50000	10,575.00
0317	7300000000-E UNPAVED TRENCHING (***** (2, 2"))	41.000 LF	4.70000	192.70
0318	7300000000-E UNPAVED TRENCHING (***** (4, 2"))	45.000 LF	6.75000	303.75

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0319	7300100000-E UNPAVED TRENCHING FOR TEMP- ORARY LEAD-IN	944.000 LF	6.75000	6,372.00
0320	7301000000-E DIRECTIONAL DRILL (***** (1, 2")	7,070.000 LF	8.75000	61,862.50
0321	7301000000-E DIRECTIONAL DRILL (***** (2, 2")	898.000 LF	11.50000	10,327.00
0322	7324000000-N JUNCTION BOX (STANDARD SIZE)	101.000 EA	175.00000	17,675.00
0323	7348000000-N JUNCTION BOX (OVER-SIZED, HEA-VY DUTY)	16.000 EA	340.00000	5,440.00
0324	7360000000-N WOOD POLE	6.000 EA	750.00000	4,500.00
0325	7372000000-N GUY ASSEMBLY	11.000 EA	265.00000	2,915.00
0326	7408000000-E 1" RISER WITH WEATHERHEAD	1.000 EA	195.00000	195.00
0327	7420000000-E 2" RISER WITH WEATHERHEAD	5.000 EA	365.00000	1,825.00
0328	7432000000-E 2" RISER WITH HEAT SHRINK TUBING	4.000 EA	385.00000	1,540.00
0329	7444000000-E INDUCTIVE LOOP SAWCUT	9,639.000 LF	5.00000	48,195.00
0330	7456000000-E LEAD-IN CABLE (***** (14-2)	18,872.000 LF	0.90000	16,984.80

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0331	7516000000-E COMMUNICATI ONS CABLE (**FIBER) (12) LF	9,000.000	1.50000	13,500.00
0332	7528000000-E DROP CABLE LF	320.000	1.75000	560.00
0333	7540000000-N SPLICE ENCLOSURE EA	6.000	1,100.00000	6,600.00
0334	7541000000-N MODIFY SPLICE ENCLOSURE EA	2.000	935.00000	1,870.00
0335	7552000000-N INTERCONNEC T CENTER EA	5.000	1.75000	8.75
0336	7564000000-N FIBER-OPTIC TRANSCIEVER, DROP & REPEAT EA	5.000	1,750.00000	8,750.00
0337	7566000000-N DELINEATOR MARKER EA	12.000	86.00000	1,032.00
0338	7575160000-E REMOVE EXISTING COMMUNICATIONSCABLE LF	2,200.000	0.60000	1,320.00
0339	7576000000-N METAL STRAIN SIGNAL POLE EA	18.000	6,900.00000	124,200.00
0340	7588000000-N METAL POLE WITH SINGLE MAST ARM EA	1.000	10,900.00000	10,900.00
0341	7613000000-N SOIL TEST EA	19.000	745.00000	14,155.00
0342	7614100000-E DRILLED PIER FOUNDATION CY	144.000	590.00000	84,960.00

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0343	7631000000-N MAST ARM WITH METAL POLE DE- SIGN	1.000	135.00000	135.00
	EA			
0344	7636000000-N SIGN FOR SIGNALS	10.000	195.00000	1,950.00
	EA			
0345	7642200000-N TYPE II PEDESTAL WITH FOUND- ATION	6.000	940.00000	5,640.00
	EA			
0346	7684000000-N SIGNAL CABINET FOUNDATION	6.000	935.00000	5,610.00
	EA			
0347	7756000000-N CONTROLLER WITH CABINET (TYPE 2070L, BASE MOUNTED)	6.000	10,240.00000	61,440.00
	EA			
0348	7780000000-N DETECTOR CARD (TYPE 2070L)	30.000	84.00000	2,520.00
	EA			
0349	7901000000-N CABINET BASE EXTENDER	6.000	424.00000	2,544.00
	EA			
0350	7948000000-N TRAFFIC SIGNAL REMOVAL	2.000	750.00000	1,500.00
	EA			
0351	7960000000-N METAL POLE FOUNDATION REMOVAL	9.000	630.00000	5,670.00
	EA			
0352	7972000000-N METAL POLE REMOVAL	9.000	203.00000	1,827.00
	EA			
0353	7980000000-N GENERIC SIGNAL ITEM MICROWAVE VEHICLE DETECTOR- SINGLE ZONE	2.000	1,520.00000	3,040.00
	EA			

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0354	7990000000-E GENERIC SIGNAL ITEM BACK PULL FIBER OPTIC CABLE	1,100.000 LF	3.00000	3,300.00
0355	7990000000-E GENERIC SIGNAL ITEM TWO-WAY CONCRETE DUCTBANK (ACP)	1,760.000 LF	47.00000	82,720.00
	Section 0001 Total			62,261,771.94

Section 0003 WALL ITEMS

Alt Group

0356	8801000000-E MSE RETAINING WALL NO **** (2)	14,700.000 SF	65.00000	955,500.00
0357	8801000000-E MSE RETAINING WALL NO **** (3)	6,550.000 SF	65.00000	425,750.00
0358	8801000000-E MSE RETAINING WALL NO **** (4)	7,000.000 SF	65.00000	455,000.00
0359	8801000000-E MSE RETAINING WALL NO **** (6)	2,550.000 SF	65.00000	165,750.00
0360	8801000000-E MSE RETAINING WALL NO **** (7)	2,250.000 SF	65.00000	146,250.00
0361	8802014000-E SOLDIER PILE RETAINING WALLS	7,900.000 SF	65.00000	513,500.00
0362	8847000000-E GENERIC RETAINING WALL ITEM SOUND BARRIER WALL	177,990.000 SF	25.00000	4,449,750.00
0363	8847000000-E GENERIC RETAINING WALL ITEM VISUAL BARRIER WALL	56,431.270 SF	25.00000	1,410,781.75

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	Section 0003 Total			8,522,281.75

Section 0004 STRUCTURE ITEMS

Alt Group

0364	8017000000-N CONSTRUCTIO N, MAINTENANCE, & REMOVAL OF TEMP ACCESS AT STA ***** (45+07.87 -RP1C-)	LUMP	LUMP	600,000.00
0365	8017000000-N CONSTRUCTIO N, MAINTENANCE, & REMOVAL OF TEMP ACCESS AT STA ***** (57+07.00 -RP1DB-)	LUMP	LUMP	5,000.00
0366	8017000000-N CONSTRUCTIO N, MAINTENANCE, & REMOVAL OF TEMP ACCESS AT STA ***** (826+15.00 -L- LT)	LUMP	LUMP	700,000.00
0367	8017000000-N CONSTRUCTIO N, MAINTENANCE, & REMOVAL OF TEMP ACCESS AT STA ***** (898+20.00 -L- LT)	LUMP	LUMP	800,000.00
0368	8017000000-N CONSTRUCTIO N, MAINTENANCE, & REMOVAL OF TEMP ACCESS AT STA ***** (94+24.58 -L- LT)	LUMP	LUMP	900,000.00
0369	8091000000-N FOUNDATION EXCAVATION FOR BENT** AT STATION ***** (1, 765+27.44 -L- LT)	LUMP	LUMP	6,600.00
0370	8091000000-N FOUNDATION EXCAVATION FOR BENT** AT STATION ***** (1, 765+27.44 -L- RT)	LUMP	LUMP	14,000.00

State of NC
Dept of Transportation

Date: 06-17-14
Revised: 07-31-14

Contract ID: C203398

Project(s): STATE FUNDED

Letting Date: 08-19-14 Call Order: 001

Bidder: 11092 - Conti Enterprises, Inc.

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars Cts	Bid Amount Dollars Cts
0371	8091000000-N FOUNDATION EXCAVATION FOR BENT** AT STATION ***** (1, 943+21.58 -L-)	LUMP	LUMP	34,000.00
0372	8091000000-N FOUNDATION EXCAVATION FOR BENT** AT STATION ***** (1, 991+23.18 -L-)	LUMP	LUMP	30,000.00
0373	8091000000-N FOUNDATION EXCAVATION FOR BENT** AT STATION ***** (1, 42+10.23 -RP1B-)	LUMP	LUMP	7,200.00
0374	8091000000-N FOUNDATION EXCAVATION FOR BENT** AT STATION ***** (1, 57+07.00 -RP1DB-)	LUMP	LUMP	75,000.00
0375	8091000000-N FOUNDATION EXCAVATION FOR BENT** AT STATION ***** (2, 42+10.23 -RP1B-)	LUMP	LUMP	7,200.00
0376	8091000000-N FOUNDATION EXCAVATION FOR BENT** AT STATION ***** (2, 57+07.00 -RP1DB-)	LUMP	LUMP	90,000.00
0377	8091000000-N FOUNDATION EXCAVATION FOR BENT** AT STATION ***** (3, 57+07.00 -RP1DB-)	LUMP	LUMP	60,000.00
0378	8091000000-N FOUNDATION EXCAVATION FOR BENT** AT STATION ***** (3, 94+24.58 -L- LT)	LUMP	LUMP	8,600.00
0379	8091000000-N FOUNDATION EXCAVATION FOR BENT** AT STATION ***** (3, 94+24.58 -L- RT)	LUMP	LUMP	8,200.00

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Project(s): STATE FUNDED

Letting Date: 08-19-14 Call Order: 001

Bidder: 11092 - Conti Enterprises, Inc.

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars Cts	Bid Amount Dollars Ct
0380	8091000000-N FOUNDATION EXCAVATION FOR BENT** AT STATION ***** (4,57+07.00 -RP1DB-)	LUMP	LUMP	23,000.00
0381	8091000000-N FOUNDATION EXCAVATION FOR BENT** AT STATION ***** (4,94+24.58 -L- RT)	LUMP	LUMP	8,300.00
0382	8091000000-N FOUNDATION EXCAVATION FOR BENT** AT STATION ***** (4,94+43.84 -COL1-)	LUMP	LUMP	16,200.00
0383	8091000000-N FOUNDATION EXCAVATION FOR BENT** AT STATION ***** (5,57+07.00 -RP1DB-)	LUMP	LUMP	15,200.00
0384	8091000000-N FOUNDATION EXCAVATION FOR BENT** AT STATION ***** (5,94+43.84 -COL1-)	LUMP	LUMP	16,200.00
0385	8091000000-N FOUNDATION EXCAVATION FOR BENT** AT STATION ***** (6,57+07.00 -RP1DB-)	LUMP	LUMP	130,000.00
0386	8091000000-N FOUNDATION EXCAVATION FOR BENT** AT STATION ***** (7,57+07.00 -RP1DB-)	LUMP	LUMP	143,000.00
0387	8091000000-N FOUNDATION EXCAVATION FOR BENT** AT STATION ***** (8,57+07.00 -RP1DB-)	LUMP	LUMP	143,000.00
0388	8091000000-N FOUNDATION EXCAVATION FOR BENT** AT STATION ***** (9,57+07.00 -RP1DB-)	LUMP	LUMP	10,000.00

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Bidder: 11092 - Conti Enterprises, Inc.

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars Cts	Bid Amount Dollars Ct
0389	8112730000-N PDA TESTING EA	43.000	2,100.00000	90,300.00
0390	8147000000-E REINFORCED CONCRETE DECK SLAB SF	450,771.000	23.00000	10,367,733.00
0391	8156000000-E CONCRETE WEARING SURFACE SF	4,261.200	8.00000	34,089.60
0392	8161000000-E GROOVING BRIDGE FLOORS SF	418,553.200	0.25000	104,638.30
0393	8175000000-E CLASS AA CONCRETE (BRIDGE) CY	28.900	900.00000	26,010.00
0394	8182000000-E CLASS A CONCRETE (BRIDGE) CY	8,038.900	900.00000	7,235,010.00
0395	8210000000-N BRIDGE APPROACH SLABS, STATION***** (21+01.60 -PXROAD-)	LUMP	LUMP	45,000.00
0396	8210000000-N BRIDGE APPROACH SLABS, STATION***** (42+10.23 -RP1B-)	LUMP	LUMP	32,000.00
0397	8210000000-N BRIDGE APPROACH SLABS, STATION***** (45+07.87 -RP1C-)	LUMP	LUMP	32,000.00
0398	8210000000-N BRIDGE APPROACH SLABS, STATION***** (57+07.00 -RP1DB-)	LUMP	LUMP	36,000.00

State of NC
Dept of Transportation

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Contract ID: C203398

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Bidder: 11092 - Conti Enterprises, Inc.

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars Cts	Bid Amount Dollars Ct
0399	8210000000-N BRIDGE APPROACH SLABS, STATION***** (765+27.44 -L- LT)	LUMP	LUMP	44,000.00
0400	8210000000-N BRIDGE APPROACH SLABS, STATION***** (765+27.44 -L- RT)	LUMP	LUMP	44,000.00
0401	8210000000-N BRIDGE APPROACH SLABS, STATION***** (826+15.00 -L- LT)	LUMP	LUMP	42,000.00
0402	8210000000-N BRIDGE APPROACH SLABS, STATION***** (826+15.00 -L- RT)	LUMP	LUMP	42,000.00
0403	8210000000-N BRIDGE APPROACH SLABS, STATION***** (898+20.00 -L- LT)	LUMP	LUMP	42,000.00
0404	8210000000-N BRIDGE APPROACH SLABS, STATION***** (898+20.00 -L- RT)	LUMP	LUMP	42,000.00
0405	8210000000-N BRIDGE APPROACH SLABS, STATION***** (94+24.58 -L- LT)	LUMP	LUMP	39,000.00
0406	8210000000-N BRIDGE APPROACH SLABS, STATION***** (94+24.58 -L- RT)	LUMP	LUMP	38,000.00
0407	8210000000-N BRIDGE APPROACH SLABS, STATION***** (94+43.84 -COL1-)	LUMP	LUMP	42,000.00

State of NC
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Bidder: 11092 - Conti Enterprises, Inc.

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars Cts	Bid Amount Dollars Ct
0408	8210000000-N BRIDGE APPROACH SLABS, STATION***** (943+21.58 -L-)	LUMP	LUMP	86,000.00
0409	8210000000-N BRIDGE APPROACH SLABS, STATION***** (969+51.52 -L- LT)	LUMP	LUMP	42,000.00
0410	8210000000-N BRIDGE APPROACH SLABS, STATION***** (969+51.52 -L- RT)	LUMP	LUMP	58,000.00
0411	8210000000-N BRIDGE APPROACH SLABS, STATION***** (991+23.18 -L-)	LUMP	LUMP	78,000.00
0412	8217000000-E REINFORCING STEEL (BRIDGE) LB	1,475,503.000	1.00000	1,475,503.00
0413	8224000000-E EPOXY COATED REINFORCING STEEL (BRIDGE) LB	1,055.000	1.15000	1,213.25
0414	8238000000-E SPIRAL COLUMN REINFORCING STEEL (BRIDGE) LB	32,038.000	2.50000	80,095.00
0415	8262000000-E 45" PRESTRESSED CONCRETE GIR- DERS LF	552.220	150.00000	82,833.00
0416	8265000000-E 54" PRESTRESSED CONCRETE GIR- DERS LF	2,038.000	200.00000	407,600.00
0417	8274000000-E MODIFIED 63" PRESTRESSED CONC GIRDERS LF	18,229.640	230.00000	4,192,817.20
0418	8280000000-E APPROX LBS STRUCTURALSTEEL	LUMP	LUMP	13,036,260.46

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Bidder: 11092 - Conti Enterprises, Inc.

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars Cts	Bid Amount Dollars Ct
0419	8364000000-E HP12X53 STEEL PILES	26,420.000 LF	33.00000	871,860.00
0420	8384000000-E HP14X73 STEEL PILES	32,050.000 LF	42.00000	1,346,100.00
0421	8384200000-E HP14X73 GALVANIZED STEEL PILES	12,640.000 LF	52.00000	657,280.00
0422	8385200000-E PP ** X **** GALVANIZED STEEL PILES (24 X 0.625)	20,790.000 LF	140.00000	2,910,600.00
0423	8391000000-N STEEL PILE POINTS	9.000 EA	100.00000	900.00
0424	8392500000-E PREDRILLING FOR PILES	342.000 LF	55.00000	18,810.00
0425	8393000000-N PILE REDRIVES	584.000 EA	420.00000	245,280.00
0426	8482000000-E THREE BAR METAL RAIL	1,076.550 LF	200.00000	215,310.00
0427	8503000000-E CONCRETE BARRIER RAIL	18,709.890 LF	50.00000	935,494.50
0428	8505000000-E VERTICAL CONCRETE BARRIER RAIL	99.000 LF	65.00000	6,435.00
0429	8531000000-E 4" SLOPE PROTECTION	4,569.800 SY	70.00000	319,886.00
0430	8594000000-E RIP RAP, CLASS B	358.000 TON	40.00000	14,320.00

State of NC
Dept of Transportation

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Bidder: 11092 - Conti Enterprises, Inc.

Line	Item	Approx.	Unit Price	Bid Amount
No.	Description	Quantity	Dollars Cts	Dollars Ct
		and Units		
0431	8608000000-E RIP RAP CLASS II (2'-0" THICK)	4,295.000 TON	46.00000	197,570.00
0432	8622000000-E GEOTEXTILE FOR DRAINAGE	4,760.000 SY	1.65000	7,854.00
0433	8650000000-N POT BEARINGS	LUMP	LUMP	220,000.00
0434	8654000000-N DISC BEARINGS	LUMP	LUMP	320,000.00
0435	8657000000-N ELASTOMERIC BEARINGS	LUMP	LUMP	805,000.00
0436	8706000000-N EXPANSION JOINT SEALS	LUMP	LUMP	1,200,000.00
0437	8713000000-N MODULAR EXPANSION JOINT SEALS	LUMP	LUMP	80,000.00
0438	8753200000-E 3'-0" X 3'-3" PRESTRESSED CONCBOX BEAMS	1,683.000 LF	250.00000	420,750.00
0439	8860000000-N GENERIC STRUCTURE ITEM APPROX 980,100 LBS STRUCTURAL STEEL	LUMP	LUMP	1,700,000.00
0440	8860000000-N GENERIC STRUCTURE ITEM POST TENSIONING TENDONS	LUMP	LUMP	130,000.00
0441	8881000000-E GENERIC STRUCTURE ITEM 6,000 PSI CONCRETE	218.700 CY	1,250.00000	273,375.00

State of NC
Dept of Transportation

Date: 06-17-14
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Contract ID: C203398 Project(s): STATE FUNDED
Letting Date: 08-19-14 Call Order: 001
Bidder: 11092 - Conti Enterprises, Inc.

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars Cts	Bid Amount Dollars Ct
0442	8881000000-E GENERIC STRUCTURE ITEM POST TENSIONING ENCASEMENT	17.400 CY	1,600.00000	27,840.00
	Section 0004 Total			54,693,467.31
	Bid Total			125,477,521.00

NON-COLLUSION AND DEBARMENT CERTIFICATION

The bidder certifies that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with this bid, and that the bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor. In addition, submitting this electronic bid constitutes the bidder's certification of Status under penalty of perjury under the laws of the United States and in accordance with the Debarment Certification on file with the Department.

By submitting this bid, the bidder certifies to the best of his knowledge and belief that he and his principals:

- a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
- b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records; making false statements; or receiving stolen property;
- c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph b. of this certification; and
- d. Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

Where the prospective bidder is unable to certify to any of the statements in this certification, the bidder shall submit an explanation in the blanks provided herein. The explanation will not necessarily result in denial of participation in a contract.

Explanation:

NOT ANSWERED

NOT ANSWERED

NOT ANSWERED

NOT ANSWERED

If the prequalified bidder's status changes, he shall immediately submit a new fully executed non-collusion affidavit and debarment certification with an explanation of the change to the Contract Office prior to submitting the bid.

Failure to furnish a certification or an explanation will be grounds for rejection of a bid

AWARD LIMITS ON MULTIPLE PROJECTS

By answering YES to this statement, the bidder acknowledges that they are using the award limits on multiple projects. No

A bidder who desires to bid on more than one project on which bids are to be opened on the same date, and who also desires to avoid receiving an award of more projects than he is equipped to handle, may bid on any number of projects but may limit the total amount of work awarded to him on selected projects by completing the AWARD LIMITS ON MULTIPLE PROJECTS.

The Award Limits on Multiple Projects must be filled in on each project bid for which the Bidder desires protection.

It is the desire of the Bidder to be awarded contracts, the value of which will not exceed a total of NOT ANSWERED for those projects indicated herein, for which bids will be opened on (MM/DD/YY)

The Award Limits shall apply to the following projects:

Contract Number	County
NOT ANSWERED	
NOT ANSWERED	
NOT ANSWERED	
NOT ANSWERED	
NOT ANSWERED	
NOT ANSWERED	

It is agreed that if I am (we are) the low Bidder(s) on indicated projects, the total value of which is more than the above stipulated award limits, the Board of Transportation will award me (us) projects from among those indicated that have a total value not to exceed the award limit and will result in the lowest total bids to the Department of Transportation.

NORTH CAROLINA STATE DEPARTMENT OF TRANSPORTATION
MBE COMMITMENT ITEMS

DATE:06-17-14
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PROPOSAL: C203398
LETTING: L140819 CALL: 001
VENDOR: 11092 Conti Enterprises, Inc.

LINE NO.	ITEM NO.	ITEM DESC.	UNIT TYPE	SUBCONTRACTOR QUANTITY	SUBCONTRACTOR UNIT PRICE	EXTENDED AMOUNT
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MBE SUBCONTRACTOR: 6159 BUSY BLACK TRUCKING LLC
Will Use Quote: Yes

0077	1121000000-E	AGGREGATE BA TON		25000.000	6.41000	160250.00
Partial qty-Trucking of Aggregates Only						

MBE COMMITMENT TOTAL FOR SUBCONTRACTOR: 160,250.00 Committed

MBE SUBCONTRACTOR: 8139 SIMMONS PUBLIC UTILITY SITE WORK INC
Will Use Quote: Yes

0023	0106000000-E	BORROW EXCAV CY		521200.000	0.05200	27102.40
Partial - Seed Restoration of Pit Only						
0267	6000000000-E	TEMPORARY SI LF		160000.000	1.95000	312000.00
0272	6018000000-E	SEED FOR TEM LB		19400.000	2.94000	57036.00
0273	6021000000-E	FERT FOR TEM TON		79.500	580.00000	46110.00
0271	6015000000-E	TEMPORARY MU ACR		815.000	480.00000	391200.00
0275	6029000000-E	SAFETY FENCE LF		11000.000	1.20000	13200.00
0277	6036000000-E	MATTING FOR SY		496000.000	1.15000	570400.00
0279	6038000000-E	PERM SOIL RE SY		7350.000	4.00000	29400.00
0278	6037000000-E	COIR FIBER M SY		13000.000	4.00000	52000.00
0280	6042000000-E	1/4" HARDWAR LF		14500.000	3.65000	52925.00
0285	6071010000-E	WATTLE LF		2100.000	6.00000	12600.00
0286	6071012000-E	COIR FIBER W LF		11250.000	10.00000	112500.00
0287	6071020000-E	POLYACRYLAMI LB		8800.000	7.50000	66000.00
0288	6071030000-E	COIR FIBER B LF		20000.000	6.00000	120000.00
0295	6087000000-E	MOWING ACR		200.000	75.00000	15000.00
0296	6090000000-E	SEED FOR REP LB		8250.000	8.00000	66000.00
0297	6093000000-E	FERT FOR REP TON		22.250	800.00000	17800.00
0298	6096000000-E	SEED FOR SUP LB		11075.000	2.80000	31010.00
0299	6108000000-E	FERTILIZER T TON		331.750	680.00000	225590.00
0301	6114500000-N	SPECIALIZED MHR		150.000	48.00000	7200.00
0302	6117000000-N	RESPONSE FOR EA		250.000	0.01000	2.50
0304	6123000000-E	REFORESTATIO ACR		20.000	980.00000	19600.00
0305	6132000000-N	GENERIC EROS EA		25.000	150.00000	3750.00
0306	6132000000-N	GENERIC EROS EA		75.000	50.00000	3750.00
0307	6135000000-E	GENERIC EROS ACR		30.000	6000.00000	180000.00
0365	8017000000-N	CM&R TEMP AC LS		1.000	650.00000	650.00
Seed Restore Only						
0294	6084000000-E	SEEDING AND ACR		480.000	1580.00000	758400.00
0281	6043000000-E	LOW PERMEABI SY		3100.000	4.50000	13950.00

MBE COMMITMENT TOTAL FOR SUBCONTRACTOR: 3,205,175.90 Committed

MBE SUBCONTRACTOR: 7099 Locklear Contracting Incorporated
Will Use Quote: Yes

NORTH CAROLINA STATE DEPARTMENT OF TRANSPORTATION
MBE COMMITMENT ITEMS

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LINE NO.	ITEM NO.	ITEM DESC.	UNIT TYPE	SUBCONTRACTOR QUANTITY	SUBCONTRACTOR UNIT PRICE	EXTENDED AMOUNT
0001	0000100000-N	MOBILIZATION	LS	1.000	98000.00000	98000.00
	Mob for utility sub only					
0034	0318000000-E	FND CONDIT M	TON	3950.000	38.00000	150100.00
0035	0320000000-E	FND CONDIT G	SY	12310.000	2.15000	26466.50
0036	0342000000-E	*** SIDE DRA	LF	108.000	47.50000	5130.00
0037	0342000000-E	*** SIDE DRA	LF	260.000	59.00000	15340.00
0038	0342000000-E	*** SIDE DRA	LF	20.000	73.00000	1460.00
0039	0343000000-E	15" SIDE DRA	LF	798.000	25.00000	19950.00
0040	0344000000-E	18" SIDE DRA	LF	732.000	29.00000	21228.00
0041	0348000000-E	*** SIDE DRA	EA	15.000	225.00000	3375.00
0042	0348000000-E	*** SIDE DRA	EA	9.000	300.00000	2700.00
0043	0348000000-E	*** SIDE DRA	EA	1.000	475.00000	475.00
0044	0348000000-E	*** SIDE DRA	EA	2.000	625.00000	1250.00
0045	0354000000-E	***" RC PIPE	LF	208.000	121.00000	25168.00
0046	0354000000-E	***" RC PIPE	LF	228.000	245.00000	55860.00
0047	0360000000-E	12" RC PIPE	LF	100.000	27.50000	2750.00
0048	0366000000-E	15" RC PIPE	LF	5304.000	24.00000	127296.00
0049	0372000000-E	18" RC PIPE	LF	4408.000	29.00000	127832.00
0050	0378000000-E	24" RC PIPE	LF	2232.000	36.00000	80352.00
0051	0384000000-E	30" RC PIPE	LF	1684.000	47.00000	79148.00
0052	0390000000-E	36" RC PIPE	LF	1028.000	58.00000	59624.00
0053	0396000000-E	42" RC PIPE	LF	20.000	75.00000	1500.00
0054	0402000000-E	48" RC PIPE	LF	172.000	90.00000	15480.00
0055	0408000000-E	54" RC PIPE	LF	20.000	120.00000	2400.00
0056	0420000000-E	66" RC PIPE	LF	104.000	218.00000	22672.00
0057	0426000000-E	72" RC PIPE	LF	260.000	245.00000	63700.00
0058	0448000000-E	***" RCP CUL	LF	1456.000	99.00000	144144.00
0059	0448000000-E	***" RCP CUL	LF	48.000	135.00000	6480.00
0060	0448000000-E	***" RCP CUL	LF	580.000	184.00000	106720.00
0061	0448000000-E	***" RCP CUL	LF	148.000	237.00000	35076.00
0062	0448000000-E	***" RCP CUL	LF	176.000	260.00000	45760.00
0063	0448200000-E	15" RCP CULV	LF	8096.000	26.50000	214544.00
0064	0448300000-E	18" RCP CULV	LF	2204.000	30.50000	67222.00
0065	0448400000-E	24" RCP CULV	LF	1980.000	40.75000	80685.00
0066	0448500000-E	30" RCP CULV	LF	1928.000	52.00000	100256.00
0067	0448600000-E	36" RCP CULV	LF	1912.000	66.00000	126192.00
0068	0448700000-E	42" RCP CULV	LF	312.000	81.00000	25272.00
0069	0582000000-E	15" CS PIPE	LF	100.000	25.00000	2500.00
0070	0588000000-E	18" CS PIPE	LF	148.000	29.00000	4292.00
0071	0594000000-E	24" CS PIPE	LF	104.000	34.50000	3588.00
0072	0600000000-E	30" CS PIPE	LF	48.000	44.00000	2112.00
0073	0995000000-E	PIPE REMOVAL	LF	1430.000	10.00000	14300.00
0096	2190000000-N	TEMP STL PLT	EA	2.000	1100.00000	2200.00
0097	2209000000-E	ENDWALLS	CY	28.000	875.00000	24500.00
0098	2220000000-E	REINFORCED E	CY	24.000	900.00000	21600.00
0099	2253000000-E	PIPE COLLARS	CY	1.500	900.00000	1350.00
0100	2264000000-E	PIPE PLUGS	CY	1.500	900.00000	1350.00
0101	2275000000-E	FLOWABLE FIL	CY	1.000	275.00000	275.00
0102	2286000000-N	MASNRY DRAIN	EA	293.000	1050.00000	307650.00
0103	2297000000-E	MASNRY DRAIN	CY	63.000	825.00000	51975.00
0104	2308000000-E	MASNRY DRAIN	LF	251.000	245.00000	61495.00

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LINE NO.	ITEM NO.	ITEM DESC.	UNIT TYPE	SUBCONTRACTOR QUANTITY	SUBCONTRACTOR UNIT PRICE	EXTENDED AMOUNT
0105	2352000000-N	FRAME W/GRAT	EA	30.000	475.00000	14250.00
0106	2352000000-N	FRAME W/GRAT	EA	7.000	475.00000	3325.00
0107	2354000000-N	FRAME W/GRAT	EA	5.000	450.00000	2250.00
0108	2355000000-N	FRAME W/GRAT	EA	1.000	450.00000	450.00
0109	2364200000-N	FRAME W/2GRT	EA	40.000	475.00000	19000.00
0110	2365000000-N	FRAME W/2GRT	EA	127.000	475.00000	60325.00
0111	2367000000-N	FRAME W/2GRT	EA	2.000	475.00000	950.00
0112	2374000000-N	FRAME-GRT-HD	EA	6.000	475.00000	2850.00
0113	2374000000-N	FRAME-GRT-HD	EA	31.000	475.00000	14725.00
0114	2374000000-N	FRAME-GRT-HD	EA	33.000	475.00000	15675.00
0115	2396000000-N	FRAME W/COVE	EA	2.000	350.00000	700.00
0116	2407000000-N	STL FRAM W/	EA	7.000	1200.00000	8400.00
0117	2451000000-N	CONC TRANS S	EA	14.000	450.00000	6300.00
0133	2875000000-N	CONVERT CB T	EA	5.000	1000.00000	5000.00
0134	2893000000-N	CONVERT CB T	EA	1.000	1100.00000	1100.00
0261	5326600000-E	16" WATER LI	LF	2168.000	115.00000	249320.00
0262	5558600000-E	16" VALVE	EA	1.000	8200.00000	8200.00
0263	5666000000-E	FIRE HYDRANT	EA	2.000	7950.00000	15900.00
0264	5810000000-E	ABANDON 16"	LF	2343.000	14.00000	32802.00
0265	5835400000-E	6" ENCASEMEN	LF	80.000	30.00000	2400.00
0266	5836200000-E	30" ENCASEME	LF	180.000	160.00000	28800.00

MBE COMMITMENT TOTAL FOR SUBCONTRACTOR:

2,953,516.50 Committed

TOTAL MBE COMMITMENT FOR VENDOR:

Entered: 5.04% or 6318942.40
Required: 5.00% or 6273876.05
<GOAL MET>

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PROPOSAL: C203398
LETTING: L140819 CALL: 001
VENDOR: 11092 Conti Enterprises, Inc.

LINE NO.	ITEM NO.	ITEM DESC.	UNIT TYPE	SUBCONTRACTOR QUANTITY	SUBCONTRACTOR UNIT PRICE	EXTENDED AMOUNT

WBE SUBCONTRACTOR: 4729 THERESA'S CONCRETE SERVICE, INC.						
Will Use Quote: Yes						
0121	2577000000-E	CONC EXPRESS LF		40.000	36.10000	1444.00
0122	2580000000-E	CONCRETE VAL LF		160.000	36.10000	5776.00
0123	2591000000-E	4" CONCRETE SY		3120.000	26.60000	82992.00
0124	2605000000-N	CONCRETE CUR EA		16.000	1425.00000	22800.00
0117	2451000000-N	CONC TRANS S EA		14.000	617.50000	8645.00
0118	2549000000-E	2'-6" CONC C LF		16130.000	17.10000	275823.00
0119	2556000000-E	SHOULDER BER LF		8450.000	22.80000	192660.00
0120	2570000000-N	MODIFIED CON EA		2.000	1140.00000	2280.00
0125	2612000000-E	6" CONCRETE SY		310.000	39.90000	12369.00
0126	2619000000-E	4" CONCRETE SY		190.000	32.30000	6137.00
0127	2627000000-E	4" CONC ISLA SY		570.000	32.30000	18411.00
0128	2655000000-E	5" MONO CONC SY		4170.000	34.20000	142614.00
0131	2752000000-E	GENERIC PAVI LF		4930.000	15.20000	74936.00
0132	2752000000-E	GENERIC PAVI LF		1310.000	15.20000	19912.00

WBE COMMITMENT TOTAL FOR SUBCONTRACTOR:

866,799.00 Committed

WBE SUBCONTRACTOR: 5659 SOUTHERN CONCRETE & CONSTRUCTION INC
Will Use Quote: Yes

0429	8531000000-E	4" SLOPE PRO SY		4569.800	63.00000	287897.40
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WBE COMMITMENT TOTAL FOR SUBCONTRACTOR:

287,897.40 Committed

WBE SUBCONTRACTOR: 7975 ADVANCED FIBER NETWORK, LLC
Will Use Quote: No

0315	7279000000-E	TRACER WIRE LF		7000.000	0.35000	2450.00
0328	7432000000-E	2" RISER WIT EA		4.000	75.00000	300.00
0331	7516000000-E	COMMUNICATIO LF		9000.000	1.25000	11250.00
0332	7528000000-E	DROP CABLE LF		320.000	1.25000	400.00
0333	7540000000-N	SPLICE ENCLO EA		6.000	1200.00000	7200.00
0334	7541000000-N	MOD SPLICE E EA		2.000	800.00000	1600.00
0335	7552000000-N	INTERCONNECT EA		5.000	1200.00000	6000.00
0336	7564000000-N	FIBER-OPTIC EA		5.000	1700.00000	8500.00
0337	7566000000-N	DELINEATOR M EA		12.000	125.00000	1500.00
0338	7575160000-E	REM EXT COMM LF		2200.000	0.85000	1870.00
0354	7990000000-E	GENERIC SIGN LF		1100.000	0.85000	935.00
0001	0000100000-N	MOBILIZATION LS		1.000	300.00000	300.00

Mob for Fiber Work Only

WBE COMMITMENT TOTAL FOR SUBCONTRACTOR:

42,305.00 Not Committed

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LINE NO.	ITEM NO.	ITEM DESC.	UNIT TYPE	SUBCONTRACTOR QUANTITY	SUBCONTRACTOR UNIT PRICE	EXTENDED AMOUNT

WBE SUBCONTRACTOR: 5796 A-1 PAVEMENT MARKING LLC						
Will Use Quote: No						
0205	4650000000-N	TEMP RAISED	EA	1715.000	5.00000	8575.00
0206	4685000000-E	THERMO PVT M	LF	12180.000	0.80000	9744.00
0207	4686000000-E	THERMO PVT M	LF	18047.000	0.90000	16242.30
0208	4687000000-E	THERMO PVT M	LF	440.000	5.75000	2530.00
0209	4688000000-E	THERMO PVT M	LF	115360.000	1.00000	115360.00
0210	4690000000-E	THERMO PVT M	LF	31716.000	1.20000	38059.20
0211	4695000000-E	THERMO PVT M	LF	890.000	2.50000	2225.00
0212	4697000000-E	THERMO PVT M	LF	705.000	3.00000	2115.00
0213	4700000000-E	12"WIDE THER	LF	17820.000	1.80000	32076.00
0214	4702000000-E	12"WIDE THER	LF	2750.000	2.62000	7205.00
0215	4710000000-E	24"WIDE THER	LF	620.000	7.25000	4495.00
0216	4721000000-E	THERMO PVT M	EA	24.000	175.00000	4200.00
0217	4725000000-E	THERMO PVT S	EA	180.000	175.00000	31500.00
0218	4770000000-E	4" COLD APPL	LF	715.000	3.50000	2502.50
0219	4810000000-E	PAINT PVMT M	LF	190000.000	0.22000	41800.00
0220	4820000000-E	PAINT PVMT M	LF	1900.000	0.85000	1615.00
0221	4835000000-E	PAINT PVT MK	LF	740.000	3.00000	2220.00
0222	4845000000-N	PAINT PVT MK	EA	90.000	75.00000	6750.00
0223	4847000000-E	POLYUREA LIN	LF	2419.000	0.98000	2370.62
0224	4847100000-E	POLYUREA LIN	LF	18430.000	1.11000	20457.30
0225	4847110000-E	POLYUREA LIN	LF	350.000	2.25000	787.50
0226	4847120000-E	POLYUREA LIN	LF	450.000	3.00000	1350.00
0227	4850000000-E	LINE REMOVAL	LF	21000.000	0.75000	15750.00
0228	4860000000-E	LINE REMOVAL	LF	200.000	3.00000	600.00
0229	4870000000-E	LINE REMOVAL	LF	200.000	7.00000	1400.00
0230	4875000000-N	REMOVAL OF S	EA	18.000	65.00000	1170.00
0231	4900000000-N	PERM RAISED	EA	141.000	11.00000	1551.00
0232	4905000000-N	SNOWPLB PVMT	EA	3736.000	31.00000	115816.00
0233	4935000000-N	FLEX DELINAT	EA	150.000	95.00000	14250.00
0234	4940000000-N	FLEX DELINAT	EA	114.000	95.00000	10830.00

WBE COMMITMENT TOTAL FOR SUBCONTRACTOR:

515,546.42 **Not Committed**

WBE SUBCONTRACTOR: 4761 TRAFFIC CONTROL SAFETY SERVICES, INC.

Will Use Quote: Yes

0183	4400000000-E	WORK ZONE SI	SF	1225.000	4.50000	5512.50
0184	4405000000-E	WORK ZONE SI	SF	864.000	8.00000	6912.00
0185	4410000000-E	WORK ZONE SI	SF	358.000	5.00000	1790.00
0186	4415000000-N	FLASHING ARR	EA	4.000	2500.00000	10000.00
0187	4420000000-N	PORTABLE CHA	EA	6.000	8500.00000	51000.00
0188	4422000000-N	PORT CHANGE	DAY	80.000	30.00000	2400.00
0189	4430000000-N	DRUMS	EA	725.000	38.25000	27731.25
0190	4435000000-N	CONES	EA	75.000	15.88000	1191.00
0191	4445000000-E	BARRICADES (LF	715.000	16.50000	11797.50
0194	4465000000-N	TEMPORARY CR	EA	4.000	4000.00000	16000.00
0195	4470000000-N	RESET CRASH	EA	2.000	1200.00000	2400.00
0196	4480000000-N	TMA	EA	4.000	19260.00000	77040.00

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0197	4485000000-E	PORT CONC BA	LF	3990.000	19.88000	79321.20
0198	4500000000-E	RESET PORT C	LF	1800.000	3.50000	6300.00
0199	4507000000-E	WATER FILLED	LF	3500.000	47.00000	164500.00
0200	4508000000-E	RESET WATER	LF	1200.000	2.00000	2400.00
0202	4516000000-N	SKINNY DRUM	EA	110.000	27.00000	2970.00
0203	4520000000-N	TUBULAR MARK	EA	50.000	35.00000	1750.00
0159	4048000000-E	REINF CONC F	CY	37.000	650.00000	24050.00
0160	4054000000-E	PLN CONC FOU	CY	2.000	100.00000	200.00
0161	4057000000-E	OVERHEAD FOO	CY	141.000	800.00000	112800.00
0162	4060000000-E	SUPPORT, BRE	LB	14801.000	3.00000	44403.00
0163	4066000000-E	SUPPORTS, SI	LB	11160.000	3.00000	33480.00
0164	4072000000-E	SUPPORT, 3-L	LF	1664.000	5.25000	8736.00
0165	4078000000-E	SUPPORT, 2-L	EA	14.000	50.00000	700.00
0166	4082100000-N	SUPPORT, OVR	LS	1.000	60000.00000	60000.00
0167	4082100000-N	SUPPORT, OVR	LS	1.000	60000.00000	60000.00
0168	4082100000-N	SUPPORT, OVR	LS	1.000	60000.00000	60000.00
0169	4082100000-N	SUPPORT, OVR	LS	1.000	105000.00000	105000.00
0170	4082100000-N	SUPPORT, OVR	LS	1.000	45000.00000	45000.00
0171	4096000000-N	SIGN ERECTIO	EA	6.000	80.00000	480.00
0172	4102000000-N	SIGN ERECTIO	EA	99.000	50.00000	4950.00
0173	4108000000-N	SIGN ERECTIO	EA	14.000	80.00000	1120.00
0174	4109000000-N	SIGN ERECTIO	EA	5.000	800.00000	4000.00
0175	4110000000-N	SIGN ERECTIO	EA	25.000	325.00000	8125.00
0176	4110000000-N	SIGN ERECTIO	EA	9.000	200.00000	1800.00
0177	4114000000-N	SIGN ERECTIO	EA	14.000	50.00000	700.00
0178	4115000000-N	SIGN ERECTIO	EA	1.000	500.00000	500.00
0179	4116000000-N	SIGN ERECTIO	EA	1.000	250.00000	250.00
0180	4116100000-N	SIGN ERECT,	EA	6.000	350.00000	2100.00
0181	4155000000-N	DISPOSE SIGN	EA	4.000	1.00000	4.00
0182	4234000000-N	DISPOSE SIGN	EA	3.000	534.00000	1602.00

WBE COMMITMENT TOTAL FOR SUBCONTRACTOR:

1,051,015.45 **Committed**

WBE SUBCONTRACTOR: 4898 BULLINGTON CONSTRUCTION INC
Will Use Quote: Yes

0149	3503000000-E	WOVEN WIRE F	LF	24960.000	2.75000	68640.00
0150	3509000000-E	4" TIMBER PO	EA	1586.000	15.00000	23790.00
0151	3515000000-E	5" TIMBER PO	EA	360.000	27.00000	9720.00
0152	3533000000-E	CHN LK FENCE	LF	110598.000	12.85000	1421184.30
0153	3539000000-E	MET LINE PST	EA	3102.000	98.50000	305547.00
0154	3545000000-E	MET TERM PST	EA	204.000	188.00000	38352.00
0135	3000000000-N	IMPACT ATTEN	EA	9.000	11880.00000	106920.00
0136	3030000000-E	STL BM GUARD	LF	23000.000	14.50000	333500.00
0137	3045000000-E	SBGR SHOP CU	LF	37.500	18.00000	675.00
0138	3105000000-N	SBGR TERM SE	EA	2.000	95.00000	190.00
0139	3150000000-N	ADDIT GUARDR	EA	25.000	40.00000	1000.00
0140	3195000000-N	GR ANCHOR TY	EA	1.000	550.00000	550.00
0141	3210000000-N	GR ANCHOR TY	EA	23.000	475.00000	10925.00
0142	3215000000-N	GR ANCHOR TY	EA	6.000	1425.00000	8550.00
0143	3270000000-N	GR ANCHOR TY	EA	35.000	1720.00000	60200.00

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0144	3285000000-N	GR ANCHOR TY	EA	15.000	1550.00000	23250.00
0145	3317000000-N	GR ANCHOR TY	EA	55.000	1385.00000	76175.00
0146	3389200000-E	CABLE GUIDER	LF	25000.000	6.80000	170000.00
0147	3389500000-N	ADDITIONAL G	EA	10.000	62.00000	620.00
0148	3389600000-N	CBL GUIDERAI	EA	21.000	2180.00000	45780.00

WBE COMMITMENT TOTAL FOR SUBCONTRACTOR:

2,705,568.30 **Committed**

WBE SUBCONTRACTOR: 3230 HIATT & MASON ENTERPRISES, INC
Will Use Quote: Yes

0004	0000900000-N	GENERIC MISC	LS	1.000	790.00000	790.00
		Rebar install only				
0129	2703000000-E	CONC BARRIER	LF	270.000	5.00000	1350.00
0390	8147000000-E	REINF CONCRE	SF	450771.000	1.01000	455278.71
		Rebar Install Only				
0395	8210000000-N	BRG APPR SLA	LS	1.000	2400.00000	2400.00
		Rebar Install Only				
0396	8210000000-N	BRG APPR SLA	LS	1.000	1500.00000	1500.00
		Rebar Install Only				
0397	8210000000-N	BRG APPR SLA	LS	1.000	1500.00000	1500.00
0398	8210000000-N	BRG APPR SLA	LS	1.000	1500.00000	1500.00
		Rebar Install Only				
0399	8210000000-N	BRG APPR SLA	LS	1.000	2400.00000	2400.00
		Rebar Install Only				
0400	8210000000-N	BRG APPR SLA	LS	1.000	2400.00000	2400.00
		Rebar Install Only				
0401	8210000000-N	BRG APPR SLA	LS	1.000	2100.00000	2100.00
		Rebar Install Only				
0402	8210000000-N	BRG APPR SLA	LS	1.000	2100.00000	2100.00
		Rebar Install Only				
0403	8210000000-N	BRG APPR SLA	LS	1.000	2100.00000	2100.00
		Rebar Install Only				
0404	8210000000-N	BRG APPR SLA	LS	1.000	2100.00000	2100.00
		Rebar Install Only				
0405	8210000000-N	BRG APPR SLA	LS	1.000	2100.00000	2100.00
		Rebar Install Only				
0406	8210000000-N	BRG APPR SLA	LS	1.000	2100.00000	2100.00
		Rebar Install Only				
0407	8210000000-N	BRG APPR SLA	LS	1.000	1900.00000	1900.00
		Rebar Install Only				
0408	8210000000-N	BRG APPR SLA	LS	1.000	5300.00000	5300.00
		Rebar Install Only				
0409	8210000000-N	BRG APPR SLA	LS	1.000	2300.00000	2300.00
		Rebar Install Only				
0410	8210000000-N	BRG APPR SLA	LS	1.000	3200.00000	3200.00
		Rebar Install Only				
0411	8210000000-N	BRG APPR SLA	LS	1.000	4400.00000	4400.00
		Rebar Install Only				
0412	8217000000-E	REINF STEEL	LB	1475503.000	0.61700	910385.35
		Furnish & Install Rebar				

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LINE NO.	ITEM NO.	ITEM DESC.	UNIT TYPE	SUBCONTRACTOR QUANTITY	SUBCONTRACTOR UNIT PRICE	EXTENDED AMOUNT
0413	8224000000-E	EPOXY COAT R LB		1055.000	0.14250	150.34
		Rebar Install Only				
0414	8238000000-E	SPIRAL COL R LB		32038.000	0.14250	4565.42
		Rebar Install Only				
0427	8503000000-E	CONCRETE BAR LF		18709.890	3.00000	56129.67
0440	8860000000-N	GENERIC STRU LS		1.000	6400.00000	6400.00
		Rebar Install Only				

WBE COMMITMENT TOTAL FOR SUBCONTRACTOR:

1,476,449.48 **Committed**

WBE SUBCONTRACTOR: 12921 CHERRY CONTRACTING INC. DBA - CHERRY PRECAST
Will Use Quote: No

0362	8847000000-E	GENERIC RET SF		177990.000	10.50000	1868895.00
		Supply of Precast Soundwall material Only				
0363	8847000000-E	GENERIC RET SF		56431.270	11.35000	640494.91
		Supply of Precast Soundwall material Only				
0361	8802014000-E	SOLDIER PILE SF		7900.000	12.00000	94800.00
		Supply of Precast wall material Only				
0130	2724000000-E	PC REINF BAR LF		8340.000	45.00000	375300.00
		Supply of Precast material Only				

WBE COMMITMENT TOTAL FOR SUBCONTRACTOR:

2,979,489.91
Not Committed

WBE SUBCONTRACTOR: 4880 TRICOR CONSTRUCTION, INC.
Will Use Quote: No

0356	8801000000-E	MSE RETAIN W SF		14700.000	25.00000	367500.00
0357	8801000000-E	MSE RETAIN W SF		6550.000	25.00000	163750.00
0358	8801000000-E	MSE RETAIN W SF		7000.000	25.00000	175000.00
0359	8801000000-E	MSE RETAIN W SF		2550.000	25.00000	63750.00
0360	8801000000-E	MSE RETAIN W SF		2250.000	25.00000	56250.00
		Intsall Wall Only				

WBE COMMITMENT TOTAL FOR SUBCONTRACTOR:

826,250.00
Not Committed

TOTAL WBE COMMITMENT FOR VENDOR:

Entered: 5.09% or 6387729.63
Required: 5.00% or 6273876.05
<GOAL MET>

THIS PROPOSAL CONTAINS THE FOLLOWING ERRORS/WARNINGS (IF ANY)

DBE Warning : DBEName Locklear Contracti not chosen from list (MBE #3)

This Bid contains 1 amendment files

00001 07-31-14 MODIFY QUANTITY

Electronic Bid Submission

By submitting this bid electronically, I hereby acknowledge that all requirements included in the hard copy proposal, addendum, amendments, plans, standard specifications, supplemental specifications and special provisions are part of the bid and contract. Further, I acknowledge that I have read, understand, accept, acknowledge and agree to comply with all statements in this electronic bid.

I Hereby certify that I have the authority to submit this bid.

Signature

Agency

Date

Contract Item Sheets For C203398

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
ROADWAY ITEMS						
0001	0000100000-N	800	MOBILIZATION	Lump Sum LS	6,000,000.00	6,000,000.00
0002	0000400000-N	801	CONSTRUCTION SURVEYING	Lump Sum LS	1,500,000.00	1,500,000.00
0003	0000900000-N	SP	GENERIC MISCELLANEOUS ITEM TEMPORARY GUARD BUILDING	Lump Sum LS	35,000.00	35,000.00
0004	0000900000-N	SP	GENERIC MISCELLANEOUS ITEM TEMPORARY SPRUNG STRUCTURE AT THE YADKIN ROAD DETOUR	Lump Sum LS	75,000.00	75,000.00
0005	0001000000-E	200	CLEARING & GRUBBING .. ACRE(S)	Lump Sum LS	2,500,000.00	2,500,000.00
0006	0008000000-E	200	SUPPLEMENTARY CLEARING & GRUB- BING	5 ACR	5,000.00	25,000.00
0007	0022000000-E	225	UNCLASSIFIED EXCAVATION	1,930,500 CY	5.00	9,652,500.00
0008	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (19+83.14 -Y3-)	Lump Sum LS	38,000.00	38,000.00
0009	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (41+90.04 -RP1B-)	Lump Sum LS	18,000.00	18,000.00
0010	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (45+07.87 -RP1C-)	Lump Sum LS	20,650.00	20,650.00
0011	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (49+52.23 -Y1-)	Lump Sum LS	48,000.00	48,000.00
0012	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (55+93.07 -RP1DB-)	Lump Sum LS	26,000.00	26,000.00
0013	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (765+21.45 -L- RT)	Lump Sum LS	35,000.00	35,000.00
0014	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (765+33.36 -L- LT)	Lump Sum LS	29,000.00	29,000.00
0015	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (826+14.99 -L- LT)	Lump Sum LS	28,000.00	28,000.00

Contract Item Sheets For C203398

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0016	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (826+15.02 -L- RT)	Lump Sum LS	28,000.00	28,000.00
0017	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (898+00.42 -L- RT)	Lump Sum LS	36,000.00	36,000.00
0018	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (898+39.37 -L- LT)	Lump Sum LS	36,000.00	36,000.00
0019	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (91+81.18 -COL1-)	Lump Sum LS	15,000.00	15,000.00
0020	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (91+87.85 -L- RT)	Lump Sum LS	15,000.00	15,000.00
0021	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (91+88.69 -L- LT)	Lump Sum LS	15,000.00	15,000.00
0022	0036000000-E	225	UNDERCUT EXCAVATION	80,800 CY	5.00	404,000.00
0023	0106000000-E	230	BORROW EXCAVATION	521,200 CY	0.50	260,600.00
0024	0134000000-E	240	DRAINAGE DITCH EXCAVATION	53,810 CY	7.40	398,194.00
0025	0141000000-E	240	BERM DITCH CONSTRUCTION	3,320 LF	7.00	23,240.00
0026	0156000000-E	250	REMOVAL OF EXISTING ASPHALT PAVEMENT	56,500 SY	2.50	141,250.00
0027	0177000000-E	250	BREAKING OF EXISTING ASPHALT PAVEMENT	3,570 SY	1.25	4,462.50
0028	0192000000-N	260	PROOF ROLLING	80 HR	120.00	9,600.00
0029	0195000000-E	265	SELECT GRANULAR MATERIAL	101,000 CY	1.00	101,000.00
0030	0196000000-E	270	GEOTEXTILE FOR SOIL STABILIZA- TION	83,400 SY	0.75	62,550.00
0031	0199000000-E	SP	TEMPORARY SHORING	9,650 SF	20.00	193,000.00
0032	0223000000-E	275	ROCK PLATING	2,630 SY	49.00	128,870.00

Contract Item Sheets For C203398

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0033	0255000000-E	SP	GENERIC GRADING ITEM HAULING & DISPOSAL OF PETROLEUM CONTAMINATED SOIL	120 TON	110.00	13,200.00
0034	0318000000-E	300	FOUNDATION CONDITIONING MATE- RIAL, MINOR STRUCTURES	3,950 TON	40.00	158,000.00
0035	0320000000-E	300	FOUNDATION CONDITIONING GEO- TEXTILE	12,310 SY	2.50	30,775.00
0036	0342000000-E	310	*** SIDE DRAIN PIPE (30")	108 LF	110.00	11,880.00
0037	0342000000-E	310	*** SIDE DRAIN PIPE (36")	260 LF	120.00	31,200.00
0038	0342000000-E	310	*** SIDE DRAIN PIPE (42")	20 LF	130.00	2,600.00
0039	0343000000-E	310	15" SIDE DRAIN PIPE	798 LF	50.00	39,900.00
0040	0344000000-E	310	18" SIDE DRAIN PIPE	732 LF	55.00	40,260.00
0041	0348000000-E	310	*** SIDE DRAIN PIPE ELBOWS (15")	15 EA	400.00	6,000.00
0042	0348000000-E	310	*** SIDE DRAIN PIPE ELBOWS (18")	9 EA	600.00	5,400.00
0043	0348000000-E	310	*** SIDE DRAIN PIPE ELBOWS (24")	1 EA	800.00	800.00
0044	0348000000-E	310	*** SIDE DRAIN PIPE ELBOWS (30")	2 EA	900.00	1,800.00
0045	0354000000-E	310	**** RC PIPE CULVERTS, CLASS ***** (48", V)	208 LF	250.00	52,000.00
0046	0354000000-E	310	**** RC PIPE CULVERTS, CLASS ***** (66", V)	228 LF	350.00	79,800.00
0047	0360000000-E	310	12" RC PIPE CULVERTS, CLASS III	100 LF	45.00	4,500.00
0048	0366000000-E	310	15" RC PIPE CULVERTS, CLASS III	5,304 LF	50.00	265,200.00

Contract Item Sheets For C203398

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0049	0372000000-E	310	18" RC PIPE CULVERTS, CLASS III	4,408 LF	55.00	242,440.00
0050	0378000000-E	310	24" RC PIPE CULVERTS, CLASS III	2,232 LF	60.00	133,920.00
0051	0384000000-E	310	30" RC PIPE CULVERTS, CLASS III	1,684 LF	150.00	252,600.00
0052	0390000000-E	310	36" RC PIPE CULVERTS, CLASS III	1,028 LF	180.00	185,040.00
0053	0396000000-E	310	42" RC PIPE CULVERTS, CLASS III	20 LF	210.00	4,200.00
0054	0402000000-E	310	48" RC PIPE CULVERTS, CLASS III	172 LF	240.00	41,280.00
0055	0408000000-E	310	54" RC PIPE CULVERTS, CLASS III	20 LF	280.00	5,600.00
0056	0420000000-E	310	66" RC PIPE CULVERTS, CLASS III	104 LF	350.00	36,400.00
0057	0426000000-E	310	72" RC PIPE CULVERTS, CLASS III	260 LF	400.00	104,000.00
0058	0448000000-E	310	***** RC PIPE CULVERTS, CLASS IV (48")	1,456 LF	300.00	436,800.00
0059	0448000000-E	310	***** RC PIPE CULVERTS, CLASS IV (54")	48 LF	340.00	16,320.00
0060	0448000000-E	310	***** RC PIPE CULVERTS, CLASS IV (60")	580 LF	380.00	220,400.00
0061	0448000000-E	310	***** RC PIPE CULVERTS, CLASS IV (66")	148 LF	550.00	81,400.00
0062	0448000000-E	310	***** RC PIPE CULVERTS, CLASS IV (72")	176 LF	600.00	105,600.00
0063	0448200000-E	310	15" RC PIPE CULVERTS, CLASS IV	8,096 LF	55.00	445,280.00
0064	0448300000-E	310	18" RC PIPE CULVERTS, CLASS IV	2,204 LF	60.00	132,240.00

Contract Item Sheets For C203398

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0065	0448400000-E	310	24" RC PIPE CULVERTS, CLASS IV	1,980 LF	65.00	128,700.00
0066	0448500000-E	310	30" RC PIPE CULVERTS, CLASS IV	1,928 LF	180.00	347,040.00
0067	0448600000-E	310	36" RC PIPE CULVERTS, CLASS IV	1,912 LF	220.00	420,640.00
0068	0448700000-E	310	42" RC PIPE CULVERTS, CLASS IV	312 LF	250.00	78,000.00
0069	0582000000-E	310	15" CS PIPE CULVERTS, 0.064" THICK	100 LF	45.00	4,500.00
0070	0588000000-E	310	18" CS PIPE CULVERTS, 0.064" THICK	148 LF	60.00	8,880.00
0071	0594000000-E	310	24" CS PIPE CULVERTS, 0.064" THICK	104 LF	80.00	8,320.00
0072	0600000000-E	310	30" CS PIPE CULVERTS, 0.079" THICK	48 LF	100.00	4,800.00
0073	0995000000-E	340	PIPE REMOVAL	1,430 LF	12.00	17,160.00
0074	1011000000-N	500	FINE GRADING	Lump Sum LS	1,650,000.00	1,650,000.00
0075	1099500000-E	505	SHALLOW UNDERCUT	2,000 CY	5.00	10,000.00
0076	1099700000-E	505	CLASS IV SUBGRADE STABILIZATION	4,300 TON	25.00	107,500.00
0077	1121000000-E	520	AGGREGATE BASE COURSE	231,500 TON	15.00	3,472,500.00
0078	1220000000-E	545	INCIDENTAL STONE BASE	1,000 TON	17.00	17,000.00
0079	1275000000-E	600	PRIME COAT	4,700 GAL	6.00	28,200.00
0080	1489000000-E	610	ASPHALT CONC BASE COURSE, TYPE B25.0B	5,040 TON	37.00	186,480.00
0081	1491000000-E	610	ASPHALT CONC BASE COURSE, TYPE B25.0C	70,750 TON	28.50	2,016,375.00
0082	1498000000-E	610	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B	14,210 TON	34.50	490,245.00
0083	1503000000-E	610	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C	85,420 TON	28.50	2,434,470.00

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Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0084	1519000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5B	14,040 TON	31.00	435,240.00
0085	1523000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5C	63,100 TON	28.75	1,814,125.00
0086	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	12,685 TON	620.00	7,864,700.00
0087	1840000000-E	665	MILLED RUMBLE STRIPS (ASPHALT CONCRETE)	127,800 LF	0.10	12,780.00
0088	1847000000-E	710	***** PORT CEM CONC PAVEMENT, THROUGH LANES (WITH DOWELS) (12")	410 SY	85.00	34,850.00
0089	1881000000-E	SP	GENERIC PAVING ITEM SPEED MODULATOR	65 LF	55.00	3,575.00
0090	2022000000-E	815	SUBDRAIN EXCAVATION	5,180 CY	0.50	2,590.00
0091	2026000000-E	815	GEOTEXTILE FOR SUBSURFACE DRAINS	15,400 SY	0.50	7,700.00
0092	2036000000-E	815	SUBDRAIN COARSE AGGREGATE	2,590 CY	29.00	75,110.00
0093	2044000000-E	815	6" PERFORATED SUBDRAIN PIPE	15,400 LF	5.00	77,000.00
0094	2070000000-N	815	SUBDRAIN PIPE OUTLET	31 EA	420.00	13,020.00
0095	2077000000-E	815	6" OUTLET PIPE	186 LF	17.00	3,162.00
0096	2190000000-N	828	TEMPORARY STEEL PLATE COVERS FOR MASONRY DRAINAGE STRUCTURE	2 EA	1,200.00	2,400.00
0097	2209000000-E	838	ENDWALLS	28 CY	900.00	25,200.00
0098	2220000000-E	838	REINFORCED ENDWALLS	24 CY	1,100.00	26,400.00
0099	2253000000-E	840	PIPE COLLARS	1.5 CY	1,000.00	1,500.00
0100	2264000000-E	840	PIPE PLUGS	1.5 CY	980.00	1,470.00
0101	2275000000-E	SP	FLOWABLE FILL	1 CY	275.00	275.00
0102	2286000000-N	840	MASONRY DRAINAGE STRUCTURES	293 EA	1,900.00	556,700.00

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Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0103	2297000000-E	840	MASONRY DRAINAGE STRUCTURES	63 CY	1,500.00	94,500.00
0104	2308000000-E	840	MASONRY DRAINAGE STRUCTURES	251 LF	280.00	70,280.00
0105	2352000000-N	840	FRAME WITH GRATE, STD 840.**** (840.16)	30 EA	600.00	18,000.00
0106	2352000000-N	840	FRAME WITH GRATE, STD 840.**** (840.20)	7 EA	600.00	4,200.00
0107	2354000000-N	840	FRAME WITH GRATE, STD 840.22	5 EA	600.00	3,000.00
0108	2355000000-N	840	FRAME WITH GRATE, STD 840.29	1 EA	600.00	600.00
0109	2364200000-N	840	FRAME WITH TWO GRATES, STD 840.20	40 EA	600.00	24,000.00
0110	2365000000-N	840	FRAME WITH TWO GRATES, STD 840.22	127 EA	600.00	76,200.00
0111	2367000000-N	840	FRAME WITH TWO GRATES, STD 840.29	2 EA	600.00	1,200.00
0112	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)	6 EA	600.00	3,600.00
0113	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)	31 EA	600.00	18,600.00
0114	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)	33 EA	600.00	19,800.00
0115	2396000000-N	840	FRAME WITH COVER, STD 840.54	2 EA	600.00	1,200.00
0116	2407000000-N	840	STEEL FRAME WITH TWO GRATES, STD 840.37	7 EA	1,440.00	10,080.00
0117	2451000000-N	852	CONCRETE TRANSITIONAL SECTION FOR DROP INLET	14 EA	750.00	10,500.00
0118	2549000000-E	846	2'-6" CONCRETE CURB & GUTTER	16,130 LF	23.00	370,990.00
0119	2556000000-E	846	SHOULDER BERM GUTTER	8,450 LF	29.00	245,050.00
0120	2570000000-N	SP	MODIFIED CONCRETE FLUME	2 EA	1,900.00	3,800.00

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Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0121	2577000000-E	846	CONCRETE EXPRESSWAY GUTTER	40 LF	47.00	1,880.00
0122	2580000000-E	846	CONCRETE VALLEY GUTTER	160 LF	45.00	7,200.00
0123	2591000000-E	848	4" CONCRETE SIDEWALK	3,120 SY	34.00	106,080.00
0124	2605000000-N	848	CONCRETE CURB RAMP	16 EA	1,750.00	28,000.00
0125	2612000000-E	848	6" CONCRETE DRIVEWAY	310 SY	59.00	18,290.00
0126	2619000000-E	850	4" CONCRETE PAVED DITCH	190 SY	56.00	10,640.00
0127	2627000000-E	852	4" CONCRETE ISLAND COVER	570 SY	46.00	26,220.00
0128	2655000000-E	852	5" MONOLITHIC CONCRETE ISLANDS (KEYED IN)	4,170 SY	44.00	183,480.00
0129	2703000000-E	854	CONCRETE BARRIER, TYPE ***** (T1)	270 LF	120.00	32,400.00
0130	2724000000-E	857	PRECAST REINFORCED CONCRETE BARRIER, SINGLE FACED	8,340 LF	50.00	417,000.00
0131	2752000000-E	SP	GENERIC PAVING ITEM 1'-6" MODIFIED CURB & GUTTER	4,930 LF	21.00	103,530.00
0132	2752000000-E	SP	GENERIC PAVING ITEM 6" CONCRETE CURB	1,310 LF	21.00	27,510.00
0133	2875000000-N	859	CONVERT EXISTING CATCH BASIN TO DROP INLET	5 EA	1,500.00	7,500.00
0134	2893000000-N	859	CONVERT EXISTING CATCH BASIN TO JUNCTION BOX WITH MANHOLE	1 EA	3,000.00	3,000.00
0135	3000000000-N	SP	IMPACT ATTENUATOR UNIT, TYPE 350	9 EA	14,000.00	126,000.00
0136	3030000000-E	862	STEEL BM GUARDRAIL	23,000 LF	15.00	345,000.00
0137	3045000000-E	862	STEEL BM GUARDRAIL, SHOP CURVED	37.5 LF	15.00	562.50
0138	3105000000-N	862	STEEL BM GUARDRAIL TERMINAL SECTIONS	2 EA	26.00	52.00

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Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0139	3150000000-N	862	ADDITIONAL GUARDRAIL POSTS	25 EA	11.00	275.00
0140	3195000000-N	862	GUARDRAIL ANCHOR UNITS, TYPE AT-1	1 EA	400.00	400.00
0141	3210000000-N	862	GUARDRAIL ANCHOR UNITS, TYPE CAT-1	23 EA	475.00	10,925.00
0142	3215000000-N	862	GUARDRAIL ANCHOR UNITS, TYPE III	6 EA	1,550.00	9,300.00
0143	3270000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE 350	35 EA	1,750.00	61,250.00
0144	3285000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE M-350	15 EA	1,650.00	24,750.00
0145	3317000000-N	862	GUARDRAIL ANCHOR UNITS, TYPE B-77	55 EA	1,600.00	88,000.00
0146	3389200000-E	865	CABLE GUIDERAIL	25,000 LF	7.00	175,000.00
0147	3389500000-N	865	ADDITIONAL GUIDERAIL POSTS	10 EA	10.00	100.00
0148	3389600000-N	865	CABLE GUIDERAIL ANCHOR UNITS	21 EA	1,592.59	33,444.39
0149	3503000000-E	866	WOVEN WIRE FENCE, 47" FABRIC	24,960 LF	2.90	72,384.00
0150	3509000000-E	866	4" TIMBER FENCE POSTS, 7'-6" LONG	1,586 EA	15.75	24,979.50
0151	3515000000-E	866	5" TIMBER FENCE POSTS, 8'-0" LONG	360 EA	29.00	10,440.00
0152	3533000000-E	866	CHAIN LINK FENCE, *** FABRIC (84")	110,598 LF	14.00	1,548,372.00
0153	3539000000-E	866	METAL LINE POSTS FOR *** CHAIN LINK FENCE (84")	3,102 EA	102.00	316,404.00
0154	3545000000-E	866	METAL TERMINAL POSTS FOR *** CHAIN LINK FENCE (84")	204 EA	200.00	40,800.00
0155	3628000000-E	876	RIP RAP, CLASS I	950 TON	45.00	42,750.00
0156	3649000000-E	876	RIP RAP, CLASS B	1,820 TON	40.00	72,800.00

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Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0157	3656000000-E	876	GEOTEXTILE FOR DRAINAGE	8,845 SY	1.35	11,940.75
0158	3659000000-N	SP	PREFORMED SCOUR HOLES WITH LEVEL SPREADER APRON	9 EA	2,000.00	18,000.00
0159	4048000000-E	902	REINFORCED CONCRETE SIGN FOUNDATIONS	37 CY	690.00	25,530.00
0160	4054000000-E	902	PLAIN CONCRETE SIGN FOUNDATIONS	2 CY	105.00	210.00
0161	4057000000-E	SP	OVERHEAD FOOTING	141 CY	850.00	119,850.00
0162	4060000000-E	903	SUPPORTS, BREAKAWAY STEEL BEAM	14,801 LB	3.00	44,403.00
0163	4066000000-E	903	SUPPORTS, SIMPLE STEEL BEAM	11,160 LB	3.00	33,480.00
0164	4072000000-E	903	SUPPORTS, 3-LB STEEL U-CHANNEL	1,664 LF	5.50	9,152.00
0165	4078000000-E	903	SUPPORTS, 2-LB STEEL U-CHANNEL	14 EA	53.00	742.00
0166	4082100000-N	SP	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (131+30 -COL1-)	Lump Sum LS	64,000.00	64,000.00
0167	4082100000-N	SP	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (36+60 -L-)	Lump Sum LS	64,000.00	64,000.00
0168	4082100000-N	SP	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (63+00 -L-)	Lump Sum LS	64,000.00	64,000.00
0169	4082100000-N	SP	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (81+25 -COL1-)	Lump Sum LS	110,000.00	110,000.00
0170	4082100000-N	SP	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (976+60 -L-)	Lump Sum LS	47,000.00	47,000.00
0171	4096000000-N	904	SIGN ERECTION, TYPE D	6 EA	85.00	510.00
0172	4102000000-N	904	SIGN ERECTION, TYPE E	99 EA	53.00	5,247.00
0173	4108000000-N	904	SIGN ERECTION, TYPE F	14 EA	85.00	1,190.00

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Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0174	4109000000-N	904	SIGN ERECTION, TYPE *** (OVER-HEAD) (A)	5 EA	850.00	4,250.00
0175	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)	25 EA	345.00	8,625.00
0176	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (B)	9 EA	210.00	1,890.00
0177	4114000000-N	904	SIGN ERECTION, MILEMARKERS	14 EA	53.00	742.00
0178	4115000000-N	904	SIGN ERECTION, OVERLAY (OVER-HEAD)	1 EA	530.00	530.00
0179	4116000000-N	904	SIGN ERECTION, OVERLAY (GROUND MOUNTED)	1 EA	265.00	265.00
0180	4116100000-N	904	SIGN ERECTION, RELOCATE, TYPE **** (GROUND MOUNTED) (A)	6 EA	370.00	2,220.00
0181	4155000000-N	907	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	4 EA	10.00	40.00
0182	4234000000-N	907	DISPOSAL OF SIGN, A OR B (OVERHEAD)	3 EA	565.00	1,695.00
0183	4400000000-E	1110	WORK ZONE SIGNS (STATIONARY)	1,225 SF	15.00	18,375.00
0184	4405000000-E	1110	WORK ZONE SIGNS (PORTABLE)	864 SF	12.00	10,368.00
0185	4410000000-E	1110	WORK ZONE SIGNS (BARRICADE MOUNTED)	358 SF	10.00	3,580.00
0186	4415000000-N	1115	FLASHING ARROW BOARD	4 EA	2,800.00	11,200.00
0187	4420000000-N	1120	PORTABLE CHANGEABLE MESSAGE SIGN	6 EA	9,000.00	54,000.00
0188	4422000000-N	1120	PORTABLE CHANGEABLE MESSAGE SIGN (SHORT TERM)	80 DAY	32.00	2,560.00
0189	4430000000-N	1130	DRUMS	725 EA	45.00	32,625.00
0190	4435000000-N	1135	CONES	75 EA	17.00	1,275.00

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Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0191	4445000000-E	1145	BARRICADES (TYPE III)	715 LF	18.00	12,870.00
0192	4450000000-N	1150	FLAGGER	200 HR	14.00	2,800.00
0193	4455000000-N	1150	FLAGGER	480 DAY	125.00	60,000.00
0194	4465000000-N	1160	TEMPORARY CRASH CUSHIONS	4 EA	5,000.00	20,000.00
0195	4470000000-N	1160	RESET TEMPORARY CRASH CUSHION	2 EA	1,275.00	2,550.00
0196	4480000000-N	1165	TMA	4 EA	21,000.00	84,000.00
0197	4485000000-E	1170	PORTABLE CONCRETE BARRIER	3,990 LF	22.00	87,780.00
0198	4500000000-E	1170	RESET PORTABLE CONCRETE BARRIER	1,800 LF	5.00	9,000.00
0199	4507000000-E	1170	WATER FILLED BARRIER	3,500 LF	50.00	175,000.00
0200	4508000000-E	1170	RESET WATER FILLED BARRIER	1,200 LF	5.00	6,000.00
0201	4510000000-N	SP	LAW ENFORCEMENT	240 HR	40.00	9,600.00
0202	4516000000-N	1180	SKINNY DRUM	110 EA	30.00	3,300.00
0203	4520000000-N	1266	TUBULAR MARKERS (FIXED)	50 EA	37.00	1,850.00
0204	4589000000-N	SP	GENERIC TRAFFIC CONTROL ITEM TEMPORARY MEDIAN CROSSEOVERS	Lump Sum LS	125,000.00	125,000.00
0205	4650000000-N	1251	TEMPORARY RAISED PAVEMENT MARKERS	1,715 EA	5.25	9,003.75
0206	4685000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)	12,180 LF	0.85	10,353.00
0207	4686000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)	18,047 LF	0.95	17,144.65
0208	4687000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 240 MILS)	440 LF	6.00	2,640.00
0209	4688000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (6", 90 MILS)	115,360 LF	1.05	121,128.00

Contract Item Sheets For C203398

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0210	4690000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (6", 120 MILS)	31,716 LF	1.25	39,645.00
0211	4695000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)	890 LF	2.55	2,269.50
0212	4697000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (8", 120 MILS)	705 LF	3.15	2,220.75
0213	4700000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (12", 90 MILS)	17,820 LF	1.90	33,858.00
0214	4702000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (12", 120 MILS)	2,750 LF	2.80	7,700.00
0215	4710000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (24", 120 MILS)	620 LF	7.70	4,774.00
0216	4721000000-E	1205	THERMOPLASTIC PAVEMENT MARKING CHARACTER (120 MILS)	24 EA	186.00	4,464.00
0217	4725000000-E	1205	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)	180 EA	186.00	33,480.00
0218	4770000000-E	1205	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV)	715 LF	3.75	2,681.25
0219	4810000000-E	1205	PAINT PAVEMENT MARKING LINES (4")	190,000 LF	0.25	47,500.00
0220	4820000000-E	1205	PAINT PAVEMENT MARKING LINES (8")	1,900 LF	0.90	1,710.00
0221	4835000000-E	1205	PAINT PAVEMENT MARKING LINES (24")	740 LF	3.20	2,368.00
0222	4845000000-N	1205	PAINT PAVEMENT MARKING SYMBOL	90 EA	80.00	7,200.00
0223	4847000000-E	1205	POLYUREA PAVEMENT MARKING LINES (4", *****) (HIGHLY REFLECTIVE ELEMENTS)	2,419 LF	1.00	2,419.00
0224	4847100000-E	1205	POLYUREA PAVEMENT MARKING LINES (6", *****) (HIGHLY REFLECTIVE ELEMENTS)	18,430 LF	1.20	22,116.00
0225	4847110000-E	1205	POLYUREA PAVEMENT MARKING LINES (8", *****) (HIGHLY REFLECTIVE ELEMENTS)	350 LF	2.40	840.00

Contract Item Sheets For C203398

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0226	4847120000-E	1205	POLYUREA PAVEMENT MARKING LINES (12", *****) (HIGHLY REFLECTIVE ELEMENTS)	450 LF	3.20	1,440.00
0227	4850000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (4")	21,000 LF	0.80	16,800.00
0228	4860000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (8")	200 LF	3.20	640.00
0229	4870000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (24")	200 LF	7.40	1,480.00
0230	4875000000-N	1205	REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS	18 EA	69.00	1,242.00
0231	4900000000-N	1251	PERMANENT RAISED PAVEMENT MARKERS	141 EA	11.65	1,642.65
0232	4905000000-N	1253	SNOWPLOWABLE PAVEMENT MARKERS	3,736 EA	33.00	123,288.00
0233	4935000000-N	1267	FLEXIBLE DELINEATORS (CRYSTAL)	150 EA	100.00	15,000.00
0234	4940000000-N	1267	FLEXIBLE DELINEATORS (YELLOW)	114 EA	100.00	11,400.00
0235	5015000000-E	1401	120' HIGH MOUNT STANDARD	16 EA	19,000.00	304,000.00
0236	5020000000-N	1401	PORTABLE DRIVE UNIT	1 EA	3,425.00	3,425.00
0237	5025000000-E	SP	HIGH MOUNT FOUNDATIONS	170 CY	671.00	114,070.00
0238	5030000000-N	1403	HIGH MOUNT LUMINAIRES ***** (750W HPS)	128 EA	749.00	95,872.00
0239	5120000000-N	1407	ELECTRIC SERVICE POLE ***** (30' CLASS 4)	3 EA	2,300.00	6,900.00
0240	5125000000-E	1407	ELECTRIC SERVICE LATERAL ***** (3 #1/0 USE)	75 LF	25.00	1,875.00
0241	5145000000-N	1408	LIGHT CONTROL EQUIPMENT, TYPE RW ***** (240/480 V)	3 EA	8,650.00	25,950.00
0242	5155000000-E	1409	ELECTRICAL DUCT, TYPE BD, SIZE ***** (2")	477 LF	4.00	1,908.00

Contract Item Sheets For C203398

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0243	5155000000-E	1409	ELECTRICAL DUCT, TYPE BD, SIZE ***** (3")	620 LF	5.00	3,100.00
0244	5160000000-E	1409	ELECTRICAL DUCT, TYPE JA, SIZE ***** (2")	581 LF	9.50	5,519.50
0245	5160000000-E	1409	ELECTRICAL DUCT, TYPE JA, SIZE ***** (3")	239 LF	11.75	2,808.25
0246	5160000000-E	1409	ELECTRICAL DUCT, TYPE JA, SIZE ***** (4")	351 LF	15.50	5,440.50
0247	5160000000-E	1409	ELECTRICAL DUCT, TYPE JA, SIZE ***** (6")	301 LF	16.50	4,966.50
0248	5170000000-E	1410	** #8 W/G FEEDER CIRCUIT (-2)	560 LF	2.45	1,372.00
0249	5175000000-E	1410	** #6 W/G FEEDER CIRCUIT (-2)	1,245 LF	2.40	2,988.00
0250	5180000000-E	1410	** #4 W/G FEEDER CIRCUIT (-2)	1,015 LF	3.30	3,349.50
0251	5185000000-E	1410	** #2 W/G FEEDER CIRCUIT (-2)	1,865 LF	5.50	10,257.50
0252	5190000000-E	1410	***** FEEDER CIRCUIT (2 #1 W/G)	780 LF	8.50	6,630.00
0253	5205000000-E	1410	** #8 W/G FEEDER CIRCUIT IN ***** CONDUIT (2, 1.5)	520 LF	6.50	3,380.00
0254	5210000000-E	1410	** #6 W/G FEEDER CIRCUIT IN ***** CONDUIT (2, 1.5)	1,490 LF	6.25	9,312.50
0255	5215000000-E	1410	** #4 W/G FEEDER CIRCUIT IN ***** CONDUIT (2, 1.5)	5,695 LF	7.50	42,712.50
0256	5220000000-E	1410	** #2 W/G FEEDER CIRCUIT IN ***** CONDUIT (2, 1.5)	4,880 LF	9.50	46,360.00

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Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0257	5225000000-E	1410	** #1 W/G FEEDER CIRCUIT IN ***** CONDUIT (2, 2)	4,395 LF	12.00	52,740.00
0258	5240000000-N	1411	ELECTRICAL JUNCTION BOXES ***** (PC18)	42 EA	200.00	8,400.00
0259	5240000000-N	1411	ELECTRICAL JUNCTION BOXES ***** (PC30)	9 EA	350.00	3,150.00
0260	5240000000-N	1411	ELECTRICAL JUNCTION BOXES ***** (PC36)	3 EA	315.00	945.00
0261	5326600000-E	1510	16" WATER LINE	2,168 LF	125.00	271,000.00
0262	5558600000-E	1515	16" VALVE	1 EA	9,000.00	9,000.00
0263	5666000000-E	1515	FIRE HYDRANT	2 EA	8,900.00	17,800.00
0264	5810000000-E	1530	ABANDON 16" UTILITY PIPE	2,343 LF	14.00	32,802.00
0265	5835400000-E	1540	6" ENCASEMENT PIPE	80 LF	74.00	5,920.00
0266	5836200000-E	1540	30" ENCASEMENT PIPE	180 LF	330.00	59,400.00
0267	6000000000-E	1605	TEMPORARY SILT FENCE	160,000 LF	3.00	480,000.00
0268	6006000000-E	1610	STONE FOR EROSION CONTROL, CLASS A	3,800 TON	45.00	171,000.00
0269	6009000000-E	1610	STONE FOR EROSION CONTROL, CLASS B	11,200 TON	45.00	504,000.00
0270	6012000000-E	1610	SEDIMENT CONTROL STONE	16,500 TON	40.00	660,000.00
0271	6015000000-E	1615	TEMPORARY MULCHING	815 ACR	1,000.00	815,000.00
0272	6018000000-E	1620	SEED FOR TEMPORARY SEEDING	19,400 LB	3.50	67,900.00
0273	6021000000-E	1620	FERTILIZER FOR TEMPORARY SEED- ING	79.5 TON	1,025.00	81,487.50
0274	6024000000-E	1622	TEMPORARY SLOPE DRAINS	12,000 LF	20.00	240,000.00

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Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0275	6029000000-E	SP	SAFETY FENCE	11,000 LF	1.50	16,500.00
0276	6030000000-E	1630	SILT EXCAVATION	150,000 CY	1.00	150,000.00
0277	6036000000-E	1631	MATTING FOR EROSION CONTROL	496,000 SY	1.50	744,000.00
0278	6037000000-E	SP	COIR FIBER MAT	13,000 SY	4.50	58,500.00
0279	6038000000-E	SP	PERMANENT SOIL REINFORCEMENT MAT	7,350 SY	5.00	36,750.00
0280	6042000000-E	1632	1/4" HARDWARE CLOTH	14,500 LF	4.25	61,625.00
0281	6043000000-E	SP	LOW PERMEABILITY GEOTEXTILE	3,100 SY	4.75	14,725.00
0282	6046000000-E	1636	TEMPORARY PIPE FOR STREAM CROSSING	225 LF	135.00	30,375.00
0283	6069000000-E	1638	STILLING BASINS	200 CY	3.00	600.00
0284	6070000000-N	1639	SPECIAL STILLING BASINS	8 EA	700.00	5,600.00
0285	6071010000-E	SP	WATTLE	2,100 LF	5.50	11,550.00
0286	6071012000-E	SP	COIR FIBER WATTLE	11,250 LF	10.00	112,500.00
0287	6071020000-E	SP	POLYACRYLAMIDE (PAM)	8,800 LB	6.75	59,400.00
0288	6071030000-E	1640	COIR FIBER BAFFLE	20,000 LF	6.50	130,000.00
0289	6071050000-E	SP	*** SKIMMER (1-1/2")	29 EA	1,100.00	31,900.00
0290	6071050000-E	SP	*** SKIMMER (2")	17 EA	1,225.00	20,825.00
0291	6071050000-E	SP	*** SKIMMER (2-1/2")	9 EA	1,225.00	11,025.00
0292	6071050000-E	SP	*** SKIMMER (3")	5 EA	1,400.00	7,000.00
0293	6071050000-E	SP	*** SKIMMER (4")	2 EA	1,500.00	3,000.00

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Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0294	6084000000-E	1660	SEEDING & MULCHING	480 ACR	1,450.00	696,000.00
0295	6087000000-E	1660	MOWING	200 ACR	110.00	22,000.00
0296	6090000000-E	1661	SEED FOR REPAIR SEEDING	8,250 LB	4.00	33,000.00
0297	6093000000-E	1661	FERTILIZER FOR REPAIR SEEDING	22.25 TON	985.00	21,916.25
0298	6096000000-E	1662	SEED FOR SUPPLEMENTAL SEEDING	11,075 LB	3.85	42,638.75
0299	6108000000-E	1665	FERTILIZER TOPDRESSING	331.75 TON	1,100.00	364,925.00
0300	6111000000-E	SP	IMPERVIOUS DIKE	250 LF	30.00	7,500.00
0301	6114500000-N	1667	SPECIALIZED HAND MOWING	150 MHR	60.00	9,000.00
0302	6117000000-N	SP	RESPONSE FOR EROSION CONTROL	250 EA	410.00	102,500.00
0303	6120000000-E	SP	CULVERT DIVERSION CHANNEL	220 CY	30.00	6,600.00
0304	6123000000-E	1670	REFORESTATION	20 ACR	1,100.00	22,000.00
0305	6132000000-N	SP	GENERIC EROSION CONTROL ITEM FABRIC INSERT INLET PROTECTION DEVICE	25 EA	165.00	4,125.00
0306	6132000000-N	SP	GENERIC EROSION CONTROL ITEM FABRIC INSERT INLET PROTECTION DEVICE CLEANOUT	75 EA	55.00	4,125.00
0307	6135000000-E	SP	GENERIC EROSION CONTROL ITEM COMPOST BLANKET	30 ACR	6,375.00	191,250.00
0308	7048500000-E	1705	PEDESTRIAN SIGNAL HEAD (16", 1 SECTION W/COUNTDOWN)	6 EA	811.00	4,866.00
0309	7060000000-E	1705	SIGNAL CABLE	6,937 LF	2.00	13,874.00
0310	7120000000-E	1705	VEHICLE SIGNAL HEAD (12", 3 SECTION)	42 EA	600.00	25,200.00
0311	7132000000-E	1705	VEHICLE SIGNAL HEAD (12", 4 SECTION)	3 EA	725.00	2,175.00
0312	7144000000-E	1705	VEHICLE SIGNAL HEAD (12", 5 SECTION)	1 EA	850.00	850.00

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Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0313	7252000000-E	1710	MESSENGER CABLE (1/4")	1,300 LF	1.75	2,275.00
0314	7264000000-E	1710	MESSENGER CABLE (3/8")	3,406 LF	2.00	6,812.00
0315	7279000000-E	1715	TRACER WIRE	7,000 LF	0.50	3,500.00
0316	7300000000-E	1715	UNPAVED TRENCHING (*****) (1, 2")	2,350 LF	4.50	10,575.00
0317	7300000000-E	1715	UNPAVED TRENCHING (*****) (2, 2")	41 LF	4.70	192.70
0318	7300000000-E	1715	UNPAVED TRENCHING (*****) (4, 2")	45 LF	6.75	303.75
0319	7300100000-E	1715	UNPAVED TRENCHING FOR TEMP- ORARY LEAD-IN	944 LF	6.75	6,372.00
0320	7301000000-E	1715	DIRECTIONAL DRILL (*****) (1, 2")	7,070 LF	8.75	61,862.50
0321	7301000000-E	1715	DIRECTIONAL DRILL (*****) (2, 2")	898 LF	11.50	10,327.00
0322	7324000000-N	1716	JUNCTION BOX (STANDARD SIZE)	101 EA	175.00	17,675.00
0323	7348000000-N	1716	JUNCTION BOX (OVER-SIZED, HEA- VY DUTY)	16 EA	340.00	5,440.00
0324	7360000000-N	1720	WOOD POLE	6 EA	750.00	4,500.00
0325	7372000000-N	1721	GUY ASSEMBLY	11 EA	265.00	2,915.00
0326	7408000000-E	1722	1" RISER WITH WEATHERHEAD	1 EA	195.00	195.00
0327	7420000000-E	1722	2" RISER WITH WEATHERHEAD	5 EA	365.00	1,825.00
0328	7432000000-E	1722	2" RISER WITH HEAT SHRINK TUBING	4 EA	385.00	1,540.00
0329	7444000000-E	1725	INDUCTIVE LOOP SAWCUT	9,639 LF	5.00	48,195.00
0330	7456000000-E	1726	LEAD-IN CABLE (***** (14-2)	18,872 LF	0.90	16,984.80

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Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0331	7516000000-E	1730	COMMUNICATIONS CABLE (**FIBER) (12)	9,000 LF	1.50	13,500.00
0332	7528000000-E	1730	DROP CABLE	320 LF	1.75	560.00
0333	7540000000-N	1731	SPLICE ENCLOSURE	6 EA	1,100.00	6,600.00
0334	7541000000-N	1731	MODIFY SPLICE ENCLOSURE	2 EA	935.00	1,870.00
0335	7552000000-N	1731	INTERCONNECT CENTER	5 EA	1.75	8.75
0336	7564000000-N	1732	FIBER-OPTIC TRANSCEIVER, DROP & REPEAT	5 EA	1,750.00	8,750.00
0337	7566000000-N	1733	DELINEATOR MARKER	12 EA	86.00	1,032.00
0338	7575160000-E	1734	REMOVE EXISTING COMMUNICATIONS CABLE	2,200 LF	0.60	1,320.00
0339	7576000000-N	SP	METAL STRAIN SIGNAL POLE	18 EA	6,900.00	124,200.00
0340	7588000000-N	SP	METAL POLE WITH SINGLE MAST ARM	1 EA	10,900.00	10,900.00
0341	7613000000-N	SP	SOIL TEST	19 EA	745.00	14,155.00
0342	7614100000-E	SP	DRILLED PIER FOUNDATION	144 CY	590.00	84,960.00
0343	7631000000-N	SP	MAST ARM WITH METAL POLE DE- SIGN	1 EA	135.00	135.00
0344	7636000000-N	1745	SIGN FOR SIGNALS	10 EA	195.00	1,950.00
0345	7642200000-N	1743	TYPE II PEDESTAL WITH FOUND- ATION	6 EA	940.00	5,640.00
0346	7684000000-N	1750	SIGNAL CABINET FOUNDATION	6 EA	935.00	5,610.00
0347	7756000000-N	1751	CONTROLLER WITH CABINET (TYPE 2070L, BASE MOUNTED)	6 EA	10,240.00	61,440.00
0348	7780000000-N	1751	DETECTOR CARD (TYPE 2070L)	30 EA	84.00	2,520.00
0349	7901000000-N	1753	CABINET BASE EXTENDER	6 EA	424.00	2,544.00

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Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0350	7948000000-N	1757	TRAFFIC SIGNAL REMOVAL	2 EA	750.00	1,500.00
0351	7960000000-N	SP	METAL POLE FOUNDATION REMOVAL	9 EA	630.00	5,670.00
0352	7972000000-N	SP	METAL POLE REMOVAL	9 EA	203.00	1,827.00
0353	7980000000-N	SP	GENERIC SIGNAL ITEM MICROWAVE VEHICLE DETECTOR- SINGLE ZONE	2 EA	1,520.00	3,040.00
0354	7990000000-E	SP	GENERIC SIGNAL ITEM BACK PULL FIBER OPTIC CABLE	1,100 LF	3.00	3,300.00
0355	7990000000-E	SP	GENERIC SIGNAL ITEM TWO-WAY CONCRETE DUCTBANK (ACP)	1,760 LF	47.00	82,720.00

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Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0356	8801000000-E	SP	MSE RETAINING WALL NO **** (2)	14,700 SF	65.00	955,500.00
0357	8801000000-E	SP	MSE RETAINING WALL NO **** (3)	6,550 SF	65.00	425,750.00
0358	8801000000-E	SP	MSE RETAINING WALL NO **** (4)	7,000 SF	65.00	455,000.00
0359	8801000000-E	SP	MSE RETAINING WALL NO **** (6)	2,550 SF	65.00	165,750.00
0360	8801000000-E	SP	MSE RETAINING WALL NO **** (7)	2,250 SF	65.00	146,250.00
0361	8802014000-E	SP	SOLDIER PILE RETAINING WALLS	7,900 SF	65.00	513,500.00
0362	8847000000-E	SP	GENERIC RETAINING WALL ITEM SOUND BARRIER WALL	177,990 SF	25.00	4,449,750.00
0363	8847000000-E	SP	GENERIC RETAINING WALL ITEM VISUAL BARRIER WALL	56,431.27 SF	25.00	1,410,781.75

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Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0364	8017000000-N	SP	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMP ACCESS AT STA ***** (45+07.87 -RP1C-)	Lump Sum LS	600,000.00	600,000.00
0365	8017000000-N	SP	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMP ACCESS AT STA ***** (57+07.00 -RP1DB-)	Lump Sum LS	5,000.00	5,000.00
0366	8017000000-N	SP	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMP ACCESS AT STA ***** (826+15.00 -L- LT)	Lump Sum LS	700,000.00	700,000.00
0367	8017000000-N	SP	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMP ACCESS AT STA ***** (898+20.00 -L- LT)	Lump Sum LS	800,000.00	800,000.00
0368	8017000000-N	SP	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMP ACCESS AT STA ***** (94+24.58 -L- LT)	Lump Sum LS	900,000.00	900,000.00
0369	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (1, 765+27.44 -L- LT)	Lump Sum LS	6,600.00	6,600.00
0370	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (1, 765+27.44 -L- RT)	Lump Sum LS	14,000.00	14,000.00
0371	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (1, 943+21.58 -L-)	Lump Sum LS	34,000.00	34,000.00
0372	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (1, 991+23.18 -L-)	Lump Sum LS	30,000.00	30,000.00
0373	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (1,42+10.23 -RP1B-)	Lump Sum LS	7,200.00	7,200.00
0374	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (1,57+07.00 -RP1DB-)	Lump Sum LS	75,000.00	75,000.00
0375	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (2,42+10.23 -RP1B-)	Lump Sum LS	7,200.00	7,200.00

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Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0376	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (2,57+07.00 -RP1DB-)	Lump Sum LS	90,000.00	90,000.00
0377	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (3,57+07.00 -RP1DB-)	Lump Sum LS	60,000.00	60,000.00
0378	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (3,94+24.58 -L- LT)	Lump Sum LS	8,600.00	8,600.00
0379	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (3,94+24.58 -L- RT)	Lump Sum LS	8,200.00	8,200.00
0380	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (4,57+07.00 -RP1DB-)	Lump Sum LS	23,000.00	23,000.00
0381	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (4,94+24.58 -L- RT)	Lump Sum LS	8,300.00	8,300.00
0382	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (4,94+43.84 -COL1-)	Lump Sum LS	16,200.00	16,200.00
0383	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (5,57+07.00 -RP1DB-)	Lump Sum LS	15,200.00	15,200.00
0384	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (5,94+43.84 -COL1-)	Lump Sum LS	16,200.00	16,200.00
0385	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (6,57+07.00 -RP1DB-)	Lump Sum LS	130,000.00	130,000.00
0386	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (7,57+07.00 -RP1DB-)	Lump Sum LS	143,000.00	143,000.00
0387	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (8,57+07.00 -RP1DB-)	Lump Sum LS	143,000.00	143,000.00
0388	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (9,57+07.00 -RP1DB-)	Lump Sum LS	10,000.00	10,000.00
0389	8112730000-N	450	PDA TESTING	43 EA	2,100.00	90,300.00

Contract Item Sheets For C203398

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0390	8147000000-E	420	REINFORCED CONCRETE DECK SLAB	450,771 SF	23.00	10,367,733.00
0391	8156000000-E	SP	CONCRETE WEARING SURFACE	4,261.2 SF	8.00	34,089.60
0392	8161000000-E	420	GROOVING BRIDGE FLOORS	418,553.2 SF	0.25	104,638.30
0393	8175000000-E	420	CLASS AA CONCRETE (BRIDGE)	28.9 CY	900.00	26,010.00
0394	8182000000-E	420	CLASS A CONCRETE (BRIDGE)	8,038.9 CY	900.00	7,235,010.00
0395	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (21+01.60 -PXROAD-)	Lump Sum LS	45,000.00	45,000.00
0396	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (42+10.23 -RP1B-)	Lump Sum LS	32,000.00	32,000.00
0397	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (45+07.87 -RP1C-)	Lump Sum LS	32,000.00	32,000.00
0398	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (57+07.00 -RP1DB-)	Lump Sum LS	36,000.00	36,000.00
0399	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (765+27.44 -L- LT)	Lump Sum LS	44,000.00	44,000.00
0400	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (765+27.44 -L- RT)	Lump Sum LS	44,000.00	44,000.00
0401	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (826+15.00 -L- LT)	Lump Sum LS	42,000.00	42,000.00
0402	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (826+15.00 -L- RT)	Lump Sum LS	42,000.00	42,000.00
0403	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (898+20.00 -L- LT)	Lump Sum LS	42,000.00	42,000.00
0404	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (898+20.00 -L- RT)	Lump Sum LS	42,000.00	42,000.00

Contract Item Sheets For C203398

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0405	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (94+24.58 -L- LT)	Lump Sum LS	39,000.00	39,000.00
0406	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (94+24.58 -L- RT)	Lump Sum LS	38,000.00	38,000.00
0407	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (94+43.84 -COL1-)	Lump Sum LS	42,000.00	42,000.00
0408	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (943+21.58 -L-)	Lump Sum LS	86,000.00	86,000.00
0409	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (969+51.52 -L- LT)	Lump Sum LS	42,000.00	42,000.00
0410	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (969+51.52 -L- RT)	Lump Sum LS	58,000.00	58,000.00
0411	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (991+23.18 -L-)	Lump Sum LS	78,000.00	78,000.00
0412	8217000000-E	425	REINFORCING STEEL (BRIDGE)	1,475,503 LB	1.00	1,475,503.00
0413	8224000000-E	425	EPOXY COATED REINFORCING STEEL (BRIDGE)	1,055 LB	1.15	1,213.25
0414	8238000000-E	425	SPIRAL COLUMN REINFORCING STEEL (BRIDGE)	32,038 LB	2.50	80,095.00
0415	8262000000-E	430	45" PRESTRESSED CONCRETE GIR- DERS	552.22 LF	150.00	82,833.00
0416	8265000000-E	430	54" PRESTRESSED CONCRETE GIR- DERS	2,038 LF	200.00	407,600.00
0417	8274000000-E	430	MODIFIED 63" PRESTRESSED CONC GIRDERS	18,229.64 LF	230.00	4,192,817.20
0418	8280000000-E	440	APPROX LBS STRUCTURAL STEEL	10,229,100 LS	13,036,260.46	13,036,260.46
0419	8364000000-E	450	HP12X53 STEEL PILES	26,420 LF	33.00	871,860.00
0420	8384000000-E	450	HP14X73 STEEL PILES	32,050 LF	42.00	1,346,100.00

Contract Item Sheets For C203398

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0421	8384200000-E	450	HP14X73 GALVANIZED STEEL PILES	12,640 LF	52.00	657,280.00
0422	8385200000-E	450	PP ** X **** GALVANIZED STEEL PILES (24 X 0.625)	20,790 LF	140.00	2,910,600.00
0423	8391000000-N	450	STEEL PILE POINTS	9 EA	100.00	900.00
0424	8392500000-E	450	PREDRILLING FOR PILES	342 LF	55.00	18,810.00
0425	8393000000-N	450	PILE REDRIVES	584 EA	420.00	245,280.00
0426	8482000000-E	460	THREE BAR METAL RAIL	1,076.55 LF	200.00	215,310.00
0427	8503000000-E	460	CONCRETE BARRIER RAIL	18,709.89 LF	50.00	935,494.50
0428	8505000000-E	460	VERTICAL CONCRETE BARRIER RAIL	99 LF	65.00	6,435.00
0429	8531000000-E	462	4" SLOPE PROTECTION	4,569.8 SY	70.00	319,886.00
0430	8594000000-E	876	RIP RAP, CLASS B	358 TON	40.00	14,320.00
0431	8608000000-E	876	RIP RAP CLASS II (2'-0" THICK)	4,295 TON	46.00	197,570.00
0432	8622000000-E	876	GEOTEXTILE FOR DRAINAGE	4,760 SY	1.65	7,854.00
0433	8650000000-N	SP	POT BEARINGS	Lump Sum LS	220,000.00	220,000.00
0434	8654000000-N	SP	DISC BEARINGS	Lump Sum LS	320,000.00	320,000.00
0435	8657000000-N	430	ELASTOMERIC BEARINGS	Lump Sum LS	805,000.00	805,000.00
0436	8706000000-N	SP	EXPANSION JOINT SEALS	Lump Sum LS	1,200,000.00	1,200,000.00
0437	8713000000-N	SP	MODULAR EXPANSION JOINT SEALS	Lump Sum LS	80,000.00	80,000.00
0438	8753200000-E	430	3'-0" X 3'-3" PRESTRESSED CONC BOX BEAMS	1,683 LF	250.00	420,750.00
0439	8860000000-N	SP	GENERIC STRUCTURE ITEM APPROX 980,100 LBS STRUCTURAL STEEL	Lump Sum LS	1,700,000.00	1,700,000.00

Contract Item Sheets For C203398

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0440	8860000000-N	SP	GENERIC STRUCTURE ITEM POST TENSIONING TENDONS	Lump Sum LS	130,000.00	130,000.00
0441	8881000000-E	SP	GENERIC STRUCTURE ITEM 6,000 PSI CONCRETE	218.7 CY	1,250.00	273,375.00
0442	8881000000-E	SP	GENERIC STRUCTURE ITEM POST TENSIONING ENCASEMENT	17.4 CY	1,600.00	27,840.00

TOTAL AMOUNT OF BID FOR ENTIRE PROJECT

\$125,477,521.00 ✓

0816/Sep08/Q18444241.67/D2074137156000/E442

Contract No. C203398
County Cumberland

Rev. 5-19-11

**EXECUTION OF CONTRACT
NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION**

CORPORATION

The Contractor being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with this Contract, that the Contractor has not been convicted of violating N.C.G.S. § 133-24 within the last three years, and that the Contractor intends to do the work with its own bonafide employees or subcontractors and did not bid for the benefit of another contractor.

By submitting this Execution of Contract, Non-Collusion Affidavit and Debarment Certification, the Contractor is certifying his status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF CONTRACTOR

Conti Enterprises, Inc.

Full name of Corporation

2045 Lincoln Highway Edison, NJ 08817

Address as Prequalified

Attest

Kristen Jimenez
Secretary/Assistant Secretary
Select appropriate title

By

Robert A. Scerbo
President/Vice President/Assistant Vice President
Select appropriate title

Kristen Jimenez
Print or type Signer's name

Robert A. Scerbo
Print or type Signer's name

CORPORATE SEAL

AFFIDAVIT MUST BE NOTARIZED

Subscribed and sworn to before me this the

10th day of September 2014

Gina Setzer
Signature of Notary Public

NOTARY SEAL

of Middlesex County

State of New Jersey

My Commission Expires 12/31/2018

Gina M. Setzer
Notary Public
New Jersey

My Commission Expires

DEBARMENT CERTIFICATION

Conditions for certification:

1. The prequalified bidder shall provide immediate written notice to the Department if at any time the bidder learns that his certification was erroneous when he submitted his debarment certification or explanation filed with the Department, or has become erroneous because of changed circumstances.
2. The terms *covered transaction, debarred, suspended, ineligible, lower tier covered transaction, participant, person, primary covered transaction, principal, proposal, and voluntarily excluded*, as used in this provision, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. A copy of the Federal Rules requiring this certification and detailing the definitions and coverages may be obtained from the Contract Officer of the Department.
3. The prequalified bidder agrees by submitting this form, that he will not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in NCDOT contracts, unless authorized by the Department.
4. For Federal Aid projects, the prequalified bidder further agrees that by submitting this form he will include the Federal-Aid Provision titled *Required Contract Provisions Federal-Aid Construction Contract (Form FHWA PR 1273)* provided by the Department, without subsequent modification, in all lower tier covered transactions.
5. The prequalified bidder may rely upon a certification of a participant in a lower tier covered transaction that he is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless he knows that the certification is erroneous. The bidder may decide the method and frequency by which he will determine the eligibility of his subcontractors.
6. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this provision. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
7. Except as authorized in paragraph 6 herein, the Department may terminate any contract if the bidder knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available by the Federal Government.

Contract No. C203398
County Cumberland

Rev. 5-19-11

DEBARMENT CERTIFICATION

The prequalified bidder certifies to the best of his knowledge and belief, that he and his principals:

- a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
- b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records; making false statements; or receiving stolen property;
- c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph b. of this certification; and
- d. Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
- e. Will submit a revised Debarment Certification immediately if his status changes and will show in his bid proposal an explanation for the change in status.

If the prequalified bidder cannot certify that he is not debarred, he shall provide an explanation with this submittal. An explanation will not necessarily result in denial of participation in a contract.

Failure to submit a non-collusion affidavit and debarment certification will result in the prequalified bidder's bid being considered non-responsive.

☐ Check here if an explanation is attached to this certification.

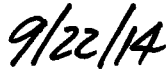
Contract No. C203398

County Cumberland

ACCEPTED BY THE
DEPARTMENT OF TRANSPORTATION

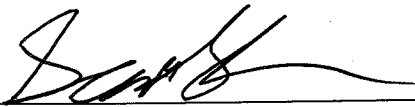


Contract Officer



Date

Execution of Contract and Bonds
Approved as to Form:



Attorney General

Contract No.
County

C203398
Cumberland

Rev 5-17-11

Bond No. 106139922

CONTRACT PAYMENT BOND

Date of Payment Bond Execution September 9, 2014

Name of Principal Contractor Conti Enterprises, Inc.

Name of Surety: Travelers Casualty and Surety Company

Name of Contracting Body: North Carolina Department of Transportation
Raleigh, North Carolina

Amount of Bond: One Hundred Twenty Five Million Four Hundred Seventy Seven Thousand
Five Hundred Twenty One and 00/100 Dollars (\$125,477,521.00)

Contract ID No.: C203398

County Name: Cumberland

KNOW ALL MEN BY THESE PRESENTS, That we, the PRINCIPAL CONTRACTOR (hereafter, PRINCIPAL) and SURETY above named, are held and firmly bound unto the above named Contracting Body, hereinafter called the Contracting Body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the principal entered into a certain contract with the Contracting Body, numbered as shown above and hereto attached:

NOW THEREFORE, if the principal shall promptly make payment to all persons supplying labor and material in the prosecution of the work provided for in said contract, and any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the surety being hereby waived, then this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bound parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Contract No.
County

C203398
Cumberland

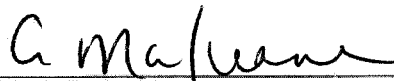
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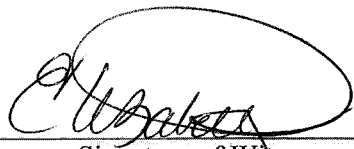
CONTRACT PAYMENT BOND

Affix Seal of Surety Company

Travelers Casualty and Surety Company
Print or type Surety Company Name

By AnnMarie Keane, Attorney-in-Fact
Print, stamp or type name of Attorney-in-Fact


Signature of Attorney-in-Fact


Signature of Witness

Elizabeth Riga
Print or type Signer's name

One Tower Square, Hartford, CT 06183
Address of Attorney-in-Fact

Contract No.
County

C203398
Cumberland

Rev 5-17-11

CONTRACT PAYMENT BOND

CORPORATION

SIGNATURE OF CONTRACTOR (Principal)

Conti Enterprises, Inc.

Full name of Corporation

2045 Lincoln Highway, Edison, NJ 08817

Address as prequalified

By



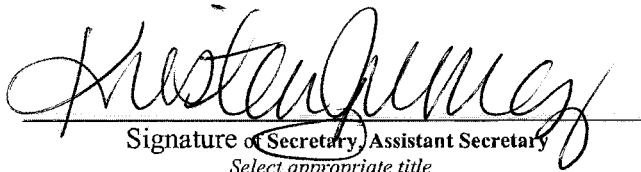
Signature of President Vice President Assistant Vice President
Select appropriate title

Robert A Scerbo

Print or type Signer's name

Affix Corporate Seal

Attest



Signature of Secretary Assistant Secretary
Select appropriate title

Krista Jimenez

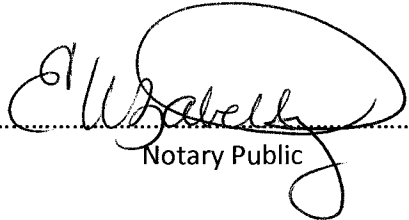
Print or type Signer's name

ACKNOWLEDGMENT OF SURETY COMPANY

STATE OF NEW JERSEY

COUNTY OF SOMERSET

On this **9th** day of **September 2014**, before me personally came **AnnMarie Keane**, to me known, who, being by me duly sworn, did depose and say; that he is the Attorney-in-Fact of the **Travelers Casualty and Surety Company** the corporation described in which executed the above instrument; that he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by the Board of Directors of said corporation; and that he signed his name thereto by the authority of the Power of Attorney of said Company, of which a Certified Copy is hereto attached, and that he signed said Instrument as an Attorney-in-Fact of said company by like authority.


.....
Notary Public

ELIZABETH RIGA
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires on March 13, 2018

TRAVELERS CASUALTY AND SURETY COMPANY

HARTFORD, CONNECTICUT 06183

FINANCIAL STATEMENT AS OF DECEMBER 31, 2013

CAPITAL STOCK \$ 25,000,000

ASSETS		LIABILITIES & SURPLUS	
CASH AND INVESTED CASH	\$ 649,717,644	UNEARNED PREMIUMS	\$ 1,815,607,881
BONDS	9,393,587,928	LOSSES	6,046,835,704
STOCKS	3,741,038,088	REINSURANCE PAYABLE ON PAID LOSSES & LOSS ADJ. EXPENSES	227,906,838
OTHER INVESTED ASSETS	791,986,945	LOSS ADJUSTMENT EXPENSES	1,330,905,016
PREMIUM BALANCES	1,301,193,954	COMMISSIONS	123,861,818
INVESTMENT INCOME DUE AND ACCRUED	107,464,278	TAXES, LICENSES AND FEES	73,245,066
NET DEFERRED TAX ASSET	267,602,003	OTHER EXPENSES	128,115,292
RECEIVABLES FROM PARENT, SUBSIDIARIES AND AFFILIATES	59,598,326	CEDED REINSURANCE NET PREMIUMS PAYABLE	63,012,674
UNDISTRIBUTED PAYMENTS	39,716,722	AMOUNTS WITHHELD / RETAINED BY COMPANY FOR OTHERS	36,598,504
EQUITIES AND DEPOSITS IN POOLS & ASSOCIATIONS	17,554,791	REMITTANCES AND ITEMS NOT ALLOCATED	(8,288,581)
REINSURANCE RECOVERABLE	36,744,128	PAYABLE FOR SECURITIES	16,524,294
FUNDS HELD BY / DEPOSITED WITH REINSURERS	2,365,030	PAYABLE FOR SECURITIES LENDING	29,781,863
AMOUNTS RECEIVABLE UNDER HIGH DEDUCTIBLE POLICIES	15,403,171	POLICYHOLDER DIVIDENDS	9,565,160
SECURITIES LENDING REINVESTED COLLATERAL ASSETS	29,781,863	RETROACTIVE REINSURANCE RESERVE CEDED	(20,624,174)
STATE SURCHARGES RECEIVABLE	9,594,907	CURRENT FEDERAL AND FOREIGN INCOME TAXES	31,751,766
GUARANTY FUNDS RECEIVABLE OR ON DEPOSIT	743,917	OTHER ACCRUED EXPENSES AND LIABILITIES	1,155,823
OTHER ASSETS	327,774	TOTAL LIABILITIES	\$ 9,905,754,944
		CAPITAL STOCK	\$ 25,000,000
		PAID IN SURPLUS	2,629,824,585
		OTHER SURPLUS	3,903,821,920
		TOTAL SURPLUS TO POLICYHOLDERS	\$ 6,558,646,505
TOTAL ASSETS	\$ 16,464,401,449	TOTAL LIABILITIES & SURPLUS	\$ 16,464,401,449

STATE OF CONNECTICUT)
COUNTY OF HARTFORD) SS.
CITY OF HARTFORD)

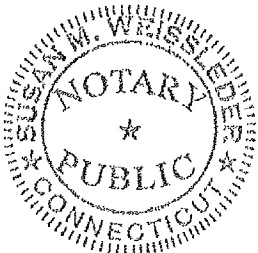
MICHAEL J. DOODY, BEING DULY SWORN, SAYS THAT HE IS SECOND VICE PRESIDENT, OF TRAVELERS CASUALTY AND SURETY COMPANY,
AND THAT TO THE BEST OF HIS KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT STATEMENT OF THE FINANCIAL
CONDITION OF SAID COMPANY AS OF THE 31ST DAY OF DECEMBER, 2013.

Michael J. Doody
SECOND VICE PRESIDENT

SUBSCRIBED AND SWORN TO BEFORE ME THIS
19TH DAY OF MARCH, 2014

NOTARY PUBLIC

SUSAN M. WEISSLEDER
Notary Public
My Commission Expires November 30, 2017



September 9, 2014



POWER OF ATTORNEY

Farmington Casualty Company
 Fidelity and Guaranty Insurance Company
 Fidelity and Guaranty Insurance Underwriters, Inc.
 St. Paul Fire and Marine Insurance Company
 St. Paul Guardian Insurance Company

St. Paul Mercury Insurance Company
 Travelers Casualty and Surety Company
 Travelers Casualty and Surety Company of America
 United States Fidelity and Guaranty Company

Attorney-In Fact No. 227511

Certificate No. 005852550

KNOW ALL MEN BY THESE PRESENTS: That Farmington Casualty Company, St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company are corporations duly organized under the laws of the State of Connecticut, that Fidelity and Guaranty Insurance Company is a corporation duly organized under the laws of the State of Iowa, and that Fidelity and Guaranty Insurance Underwriters, Inc., is a corporation duly organized under the laws of the State of Wisconsin (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint

A. C. Marquis, Jr., Peter H. Forenza, Robert B. Pitts, John J. Sciortino, William X. Linney, III, AnnMarie Keane, Joseph T. Charczenko, Jr., Fred Nicholson, Richard A. Nocella, Robert S. Rapp, Jr., Elizabeth Riga, Gary V. Rispoli, and Joseph J. Kent

of the City of Branchburg, State of New Jersey, their true and lawful Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

IN WITNESS WHEREOF, the Companies have caused this instrument to be signed and their corporate seals to be hereto affixed, this 4th day of April, 2014.

Farmington Casualty Company
 Fidelity and Guaranty Insurance Company
 Fidelity and Guaranty Insurance Underwriters, Inc.
 St. Paul Fire and Marine Insurance Company
 St. Paul Guardian Insurance Company

St. Paul Mercury Insurance Company
 Travelers Casualty and Surety Company
 Travelers Casualty and Surety Company of America
 United States Fidelity and Guaranty Company



State of Connecticut
 City of Hartford ss.

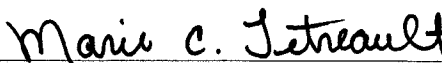
By: 

Robert L. Raney, Senior Vice President

On this the 4th day of April, 2014, before me personally appeared Robert L. Raney, who acknowledged himself to be the Senior Vice President of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

In Witness Whereof, I hereunto set my hand and official seal.
 My Commission expires the 30th day of June, 2016.




 Marie C. Tetreault, Notary Public

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, which resolutions are now in full force and effect, reading as follows:

RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

FURTHER RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

FURTHER RESOLVED, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

FURTHER RESOLVED, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, Kevin E. Hughes, the undersigned, Assistant Secretary, of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 9th day of September, 20 14.


Kevin E. Hughes, Assistant Secretary



To verify the authenticity of this Power of Attorney, call 1-800-421-3880 or contact us at www.travelersbond.com. Please refer to the Attorney-In-Fact number, the above-named individuals and the details of the bond to which the power is attached.

Contract No.
County

C203398
Cumberland

Rev 5-17-11

Bond No. 106139922

CONTRACT PERFORMANCE BOND

Date of Performance Bond Execution: September 9, 2014

Name of Principal Contractor: Conti Enterprises, Inc.

Name of Surety: Travelers Casualty and Surety Company

Name of Contracting Body: North Carolina Department of Transportation
Raleigh, North Carolina

Amount of Bond: One Hundred Twenty Five Million Four Hundred Seventy Seven Thousand
Five Hundred Twenty One and 00/100 Dollars (\$125,477,521.00)

Contract ID No.: C203398

County Name: Cumberland

KNOW ALL MEN BY THESE PRESENTS, That we, the PRINCIPAL CONTRACTOR (hereafter, PRINCIPAL) and SURETY above named, are held and firmly bound unto the above named Contracting Body, hereinafter called the Contracting Body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the principal entered into a certain contract with the Contracting Body, numbered as shown above and hereto attached:

NOW THEREFORE, if the principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term of said contract and any extensions thereof that may be granted by the Contracting Body, with or without notice to the Surety, and during the life of any guaranty required under the contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the surety being hereby waived, then this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bound parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Contract No.
County

C203398
Cumberland


Rev 5-17-11

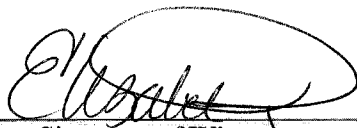
CONTRACT PERFORMANCE BOND

Affix Seal of Surety Company

Travelers Casualty and Surety Company
Print or type Surety Company Name

By AnnMarie Keane, Attorney-in-Fact
Print, stamp or type name of Attorney-in-Fact


Signature of Attorney-in-Fact


Signature of Witness

Elizabeth Riga
Print or type Signer's name

One Tower Square, Hartford, CT 06183
Address of Attorney-in-Fact

Contract No.
County

C203398
Cumberland

Rev 5-17-11

CONTRACT PERFORMANCE BOND

CORPORATION

SIGNATURE OF CONTRACTOR (Principal)


Conti Enterprises, Inc.

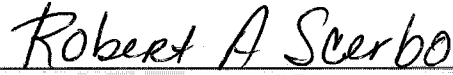
Full name of Corporation

2045 Lincoln Highway, Edison, NJ 08817

Address as prequalified

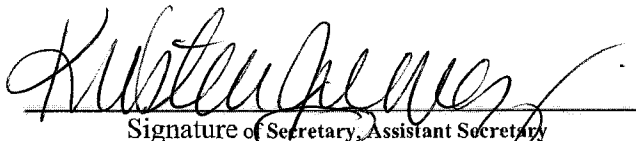
By



Signature of President, Vice President, Assistant Vice President
Select appropriate title


Print or type Signer's name

Affix Corporate Seal

Attest


Signature of Secretary, Assistant Secretary
Select appropriate title

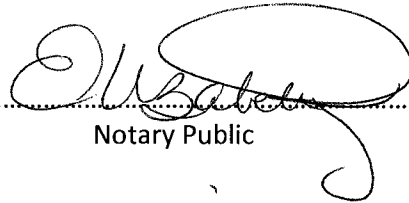

Print or type Signer's name

ACKNOWLEDGMENT OF SURETY COMPANY

STATE OF NEW JERSEY

COUNTY OF SOMERSET

On this **9th** day of **September 2014**, before me personally came **AnnMarie Keane**, to me known, who, being by me duly sworn, did depose and say; that he is the Attorney-in-Fact of the **Travelers Casualty and Surety Company** the corporation described in which executed the above instrument; that he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by the Board of Directors of said corporation; and that he signed his name thereto by the authority of the Power of Attorney of said Company, of which a Certified Copy is hereto attached, and that he signed said Instrument as an Attorney-in-Fact of said company by like authority.



.....

Notary Public

ELIZABETH RIGA
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires on March 13, 2018

TRAVELERS CASUALTY AND SURETY COMPANY

HARTFORD, CONNECTICUT 06183

FINANCIAL STATEMENT AS OF DECEMBER 31, 2013

CAPITAL STOCK \$ 25,000,000

ASSETS		LIABILITIES & SURPLUS	
CASH AND INVESTED CASH	\$ 649,717,644	UNEARNED PREMIUMS	\$ 1,815,607,881
BONDS	9,393,587,928	LOSSES	6,046,635,704
STOCKS	3,741,038,088	REINSURANCE PAYABLE ON PAID LOSSES & LOSS ADJ. EXPENSES	227,908,838
OTHER INVESTED ASSETS	791,966,945	LOSS ADJUSTMENT EXPENSES	1,330,905,016
PREMIUM BALANCES	1,301,193,954	COMMISSIONS	123,861,818
INVESTMENT INCOME DUE AND ACCRUED	107,464,278	TAXES, LICENSES AND FEES	73,245,066
NET DEFERRED TAX ASSET	267,602,003	OTHER EXPENSES	128,115,292
RECEIVABLES FROM PARENT, SUBSIDIARIES AND AFFILIATES	58,598,326	CEDED REINSURANCE NET PREMIUMS PAYABLE	63,012,874
UNDISTRIBUTED PAYMENTS	39,716,722	AMOUNTS WITHHELD / RETAINED BY COMPANY FOR OTHERS	36,598,504
EQUITIES AND DEPOSITS IN POOLS & ASSOCIATIONS	17,554,791	REMITTANCES AND ITEMS NOT ALLOCATED	(8,288,581)
REINSURANCE RECOVERABLE	36,744,128	PAYABLE FOR SECURITIES	16,524,294
FUNDS HELD BY / DEPOSITED WITH REINSURERS	2,365,030	PAYABLE FOR SECURITIES LENDING	29,781,863
AMOUNTS RECEIVABLE UNDER HIGH DEDUCTIBLE POLICIES	15,403,171	POLICYHOLDER DIVIDENDS	9,565,160
SECURITIES LENDING REINVESTED COLLATERAL ASSETS	29,781,863	RETROACTIVE REINSURANCE RESERVE CEDED	(20,624,174)
STATE SURCHARGES RECEIVABLE	9,594,907	CURRENT FEDERAL AND FOREIGN INCOME TAXES	31,751,766
GUARANTY FUNDS RECEIVABLE OR ON DEPOSIT	743,917	OTHER ACCRUED EXPENSES AND LIABILITIES	1,155,823
OTHER ASSETS	327,774	TOTAL LIABILITIES	\$ 9,905,754,944
		CAPITAL STOCK	\$ 25,000,000
		PAID IN SURPLUS	2,629,824,585
		OTHER SURPLUS	3,903,821,920
		TOTAL SURPLUS TO POLICYHOLDERS	\$ 6,558,646,505
TOTAL ASSETS	\$ 16,464,401,449	TOTAL LIABILITIES & SURPLUS	\$ 16,464,401,449

STATE OF CONNECTICUT)
COUNTY OF HARTFORD) SS.
CITY OF HARTFORD)

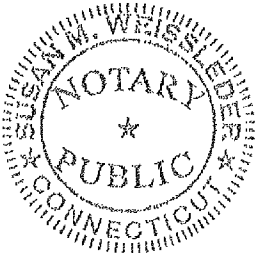
MICHAEL J. DOODY, BEING DULY SWORN, SAYS THAT HE IS SECOND VICE PRESIDENT, OF TRAVELERS CASUALTY AND SURETY COMPANY,
AND THAT TO THE BEST OF HIS KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT STATEMENT OF THE FINANCIAL
CONDITION OF SAID COMPANY AS OF THE 31ST DAY OF DECEMBER, 2013.

Michael J. Doody
SECOND VICE PRESIDENT

SUBSCRIBED AND SWORN TO BEFORE ME THIS
19TH DAY OF MARCH, 2014

Susan M. Weissleder
NOTARY PUBLIC

SUSAN M. WEISSLEDER
Notary Public
My Commission Expires November 30, 2017



September 9, 2014



POWER OF ATTORNEY

Farmington Casualty Company
 Fidelity and Guaranty Insurance Company
 Fidelity and Guaranty Insurance Underwriters, Inc.
 St. Paul Fire and Marine Insurance Company
 St. Paul Guardian Insurance Company

St. Paul Mercury Insurance Company
 Travelers Casualty and Surety Company
 Travelers Casualty and Surety Company of America
 United States Fidelity and Guaranty Company

Attorney-In Fact No. 227511

Certificate No. 005852553

KNOW ALL MEN BY THESE PRESENTS: That Farmington Casualty Company, St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company are corporations duly organized under the laws of the State of Connecticut, that Fidelity and Guaranty Insurance Company is a corporation duly organized under the laws of the State of Iowa, and that Fidelity and Guaranty Insurance Underwriters, Inc., is a corporation duly organized under the laws of the State of Wisconsin (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint

A. C. Marquis, Jr., Peter H. Forenza, Robert B. Pitts, John J. Sciortino, William X. Linney, III, AnnMarie Keane, Joseph T. Charczenko, Jr., Fred Nicholson, Richard A. Nocella, Robert S. Rapp, Jr., Elizabeth Riga, Gary V. Rispoli, and Joseph J. Kent

of the City of Branchburg, State of New Jersey, their true and lawful Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

IN WITNESS WHEREOF, the Companies have caused this instrument to be signed and their corporate seals to be hereto affixed, this 4th day of April, 2014.

Farmington Casualty Company
 Fidelity and Guaranty Insurance Company
 Fidelity and Guaranty Insurance Underwriters, Inc.
 St. Paul Fire and Marine Insurance Company
 St. Paul Guardian Insurance Company

St. Paul Mercury Insurance Company
 Travelers Casualty and Surety Company
 Travelers Casualty and Surety Company of America
 United States Fidelity and Guaranty Company



State of Connecticut
 City of Hartford ss.

By: Robert L. Raney
 Robert L. Raney, Senior Vice President

On this the 4th day of April, 2014, before me personally appeared Robert L. Raney, who acknowledged himself to be the Senior Vice President of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

In Witness Whereof, I hereunto set my hand and official seal.
 My Commission expires the 30th day of June, 2016.



Marie C. Tetreault
 Marie C. Tetreault, Notary Public

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, which resolutions are now in full force and effect, reading as follows:

RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

FURTHER RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

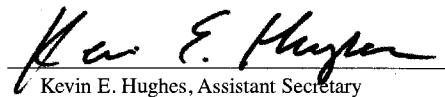
FURTHER RESOLVED, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

FURTHER RESOLVED, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, Kevin E. Hughes, the undersigned, Assistant Secretary, of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 9th day of September, 20 14.

WARNING: THIS POWER OF ATTORNEY IS INVALID WITHOUT THE RED BORDER


Kevin E. Hughes, Assistant Secretary



To verify the authenticity of this Power of Attorney, call 1-800-421-3880 or contact us at www.travelersbond.com. Please refer to the Attorney-In-Fact number, the above-named individuals and the details of the bond to which the power is attached.