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

C203751

# CONTRACT AND
# CONTRACT BONDS

FOR CONTRACT NO. C203751

| | |
|---|---|
| WBS | 42263.3.1 BRNHS-0070(119) |
| T.I.P NO. | B-5121, B-5317 |
| COUNTY OF | WAKE |
| THIS IS THE | ROADWAY & STRUCTURE CONTRACT |
| ROUTE NUMBER | US 70 LENGTH 0.820 MILES |
| LOCATION | BRIDGE #227 ON US-70/US-401/NC-50 OVER PEACE STREET AND BRIDGE #213 ON US-70/NC-50 OVER US-401. |
| CONTRACTOR | ZACHRY CONSTRUCTION CORPORATION |
| ADDRESS | P.O. BOX 33240<br>SAN ANTONIO, TX 78265 |
| BIDS OPENED | JULY 19, 2016 |
| CONTRACT EXECUTION | 8/12/2016 |

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

# PROPOSAL

## INCLUDES ADDENDUM No. 1 DATED 06-09-16

## INCLUDES ADDENDUM No.2 DATED 07-06-16

DATE AND TIME OF BID OPENING: **JULY 19, 2016 AT 2:00 PM**

| | |
|---|---|
| CONTRACT ID | C203751 |
| WBS | 42263.3.1 |

| | |
|---|---|
| FEDERAL-AID NO. | BRNHS-0070(119) |
| COUNTY | WAKE |
| T.I.P. NO. | B-5121, B-5317 |
| MILES | 0.820 |
| ROUTE NO. | US 70 |
| LOCATION | BRIDGE #227 ON US-70/US-401/NC-50 OVER PEACE STREET AND BRIDGE #213 ON US-70/NC-50 OVER US-401. |
| TYPE OF WORK | GRADING, DRAINAGE, PAVING, SIGNING, SIGNALS, 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. C203751 IN WAKE 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. **C203751**; 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 be 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. **C203751** in **Wake County**, for the unit or lump sum prices, as the case may be, bid by the Bidder in his bid and according to the proposal, plans, and specifications prepared by said Department, which proposal, plans, and specifications show the details covering this project, and hereby become a part of this contract.

The published volume entitled *North Carolina Department of Transportation, Raleigh, Standard Specifications for Roads and Structures, January 2012* with all amendments and supplements thereto, is by reference incorporated into and made a part of this contract; that, except as herein modified, all the construction and work included in this contract is to be done in accordance with the specifications contained in said volume, and amendments and supplements thereto, under the direction of the Engineer.

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

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

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

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

*State Contract Officer*

DocuSigned by:
Randy A Garris
A7079FC32A09478...

7/6/2016

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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 **August 29, 2016**, 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 **and except as provided below in the Project Special Provision "Sequence of Construction Activities"**. This delay in availability has been considered in determining the contract time for this project.

The completion date for this contract is **April 29, 2020**.

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

The liquidated damages for this contract are **Two 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.

### SEQUENCE OF CONSTRUCTION ACTIVITIES:

There are certain right of way parcels on the Area II (Peace Street) end of the project that will not be acquired by the date of availability of the project. Also in the Area II portion of the project, certain utility relocations, adjustments, or installations by others will not be completed by the date of availability. The Contractor may begin construction activities in Area I on the date of availability, but will not be allowed to begin activities in Area II until **July 1, 2017**, where work would be adversely impacted by right of way and/or utility delays, as determined by the Engineer.

If some of the Area II portion becomes available before the entire area, the Contractor may request to begin work on the subject portion, provided he executes a supplemental agreement to pursue the work without claims for additional time or compensation for delays or additional cost to his operations which result from the remaining right of way acquisition or utility relocations.

The expected right of way and utility conflicts delays in Area II are listed in the respective Project Special Provisions listed elsewhere in this Contract.

**INTERMEDIATE CONTRACT TIME NUMBER 1 INCENTIVE AND DISINCENTIVE:**
(3-27-07) (Rev. 5-17-16) 108 SPI 1-06

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 shall 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 **August 29, 2016**.

The completion date for this intermediate contract time is **November 1, 2019 (except PVE)**.

It is mutually agreed that time is of the essence in completing **Intermediate Contract Time #1** and opening same to traffic. It is further mutually agreed a delay in completing this work will result in damage due to increased engineering and inspection costs to the Department of Transportation, great hardship to the general public, public inconvenience, obstruction of traffic, interference with business, and increased cost of maintaining traffic.

By reason of the necessity of expeditious completion of the work included in **Intermediate Contract Time #1**, and placing and maintaining traffic on same, it is mutually agreed, the Contractor shall receive an incentive payment of **Ten Thousand Dollars ($10,000.00)** per calendar day for each day prior to **November 1, 2019** that this work is completed. Incentive payment shall be limited to a maximum of **Eight Hundred Thousand Dollars ($800,000.00)**. No incentive payment shall be allowed for any calendar day after **November 1, 2019** that this work remains incomplete. This **November 1, 2019** date shall be utilized in determining incentive payments and it shall not be revised for any reason whatsoever. Incentive payment determined to be due the Contractor shall be paid by the Department within forty-five (45) calendar days after completion of all work. No incentive payment shall be allowed if the contract is terminated under the provisions of Article 108-13 of the *2012 Standard Specifications*.

Disincentive of **Ten Thousand Dollars ($10,000.00)** per calendar day shall be assessed the Contractor for each day beyond **November 1, 2019** for **Intermediate Contract Time #1** that the work is not completed.

The Engineer shall withhold the disincentives as they accrue from the amount of monies due on work performed in the contract.

Upon apparent completion of all 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 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 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 **the following roads** during the following time restrictions:

DAY AND TIME RESTRICTIONS

**NB Capital Blvd.**, including **proposed ramp "C" & existing off-loop to W. Peace St.**
**6:00 a.m. to 7:00 p.m., Monday thru Friday**
**and**
**12:00 p.m. (noon) to 6:00 p.m., Saturday & Sunday**

**SB Capital Blvd.**, including **existing off-ramp to W. Peace St.**
**6:00 a.m. to 9:00 p.m., Monday thru Thursday,**
**6:00 a.m. to 11:00 p.m., Friday**
**and**
**8:00 a.m. to 8:00 p.m., Saturday & Sunday**

**W. Peace St., including on-ramp "D" & existing on-loop to Capital Blvd**
**7:00 a.m. to 9:00 p.m., Monday thru Thursday,**
**7:00 a.m. to 12:00 a.m. (midnight), Friday**
**and**
**8:00 a.m. Saturday thru 9:00 p.m. Sunday**
**Wade Ave./Flyover**

**6:00 a.m. to 11:00 p.m., Monday thru Thursday,**
**6:00 a.m. to 12:00 a.m. (midnight), Friday**
**and**
**7:00 a.m. Saturday thru 9:00 p.m. Sunday**

In addition, the Contractor shall not close or narrow a lane of traffic on **NB Capital Blvd**. (including **proposed ramp "C" & existing off-loop to W. Peace St.**), **SB Capital Blvd.** (including **existing off-ramp to W. Peace St.**), **W. Peace St.** (**including on-ramp "D" & existing on-loop to Capital Blvd.**), and **Wade Ave./Flyover** detain and/or alter the traffic flow on or during holidays, holiday weekends, special events, or any other time when traffic is unusually heavy, including the following schedules:

HOLIDAY AND HOLIDAY WEEKEND LANE CLOSURE RESTRICTIONS

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

2. For **New Year's Day**, between the hours of 6:00 a.m. December 31st and 11:00 p.m. January 2nd. If New Year's Day is on a Friday, Saturday, Sunday or Monday, then until 11:00 p.m. the following Tuesday.

3. For **Easter**, between the hours of 6:00 a.m. Thursday and 11:00 p.m. Monday.

4. For **Memorial Day**, between the hours of 6:00 a.m. Friday and 11:00 p.m. Tuesday.

5. For **Independence Day**, between the hours of 6:00 a.m. the day before Independence Day and 11:00 p.m. the day after Independence Day.

   If **Independence Day** is on a Friday, Saturday, Sunday or Monday, then between the hours of 6:00 a.m. the Thursday before Independence Day and 11:00 p.m. the Tuesday after Independence Day.

6. For **Labor Day**, between the hours of 6:00 a.m. Friday and 11:00 p.m. Tuesday.

7. For **Thanksgiving Day**, between the hours of 6:00 a.m. Tuesday and 11:00 p.m. Monday.

8. For **Christmas**, between the hours of 6:00 a.m. the Friday before the week of Christmas Day and 11:00 p.m. the following Tuesday after the week of Christmas Day.

9. For the **Rock n Roll Marathon** occurring in Raleigh between four (4) hours before the start and four (4) hours after the end of the Rock n Roll Marathon.

10. For the **Artsplosure**, between the hours of 6:00 p.m. the Thursday of the week of the Artsplosure and 7:00 a.m. the following Monday after the week of the Artsplosure.

11. For the **Ironman** occurring in Raleigh between four (4) hours before the start and four (4) hours after the end of the Ironman.

12. For the **Bike Fest**, between the hours of 6:00 p.m. the Thursday of the week of the Bike Fest and 7:00 a.m. the following Monday after the week of the Bike Fest.

13. For the **IBMA Bluegrass** occurring in Raleigh between four (4) hours before the start and four (4) hours after the end of the IBMA Bluegrass.

14. For the **Christmas Parade** occurring in Raleigh between six (6) hours before the start and six (6) hours after the end of the Christmas Parade.

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

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

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

The liquidated damages are **One Thousand Two Hundred and Fifty Dollars** ($ **1,250.00**) per fifteen **(15)** minute time period.

**INTERMEDIATE CONTRACT TIME NUMBER 3 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 two lanes of traffic on **the following roads** during the following time restrictions:

DAY AND TIME RESTRICTIONS

**NB Capital Blvd.**
**6:00 a.m. to 10:00 p.m., Monday thru Thursday,**
**6:00 a.m. to 12:00 a.m. (midnight), Friday**
**and**
**9:00 a.m. to 8:00 p.m., Saturday & Sunday**

**SB Capital Blvd.**
**6:00 a.m. to 9:00 p.m., Monday thru Thursday,**
**6:00 a.m. to 11:00 p.m., Friday**
**and**
**8:00 a.m. to 12:00 a.m. (midnight), Saturday & Sunday**

In addition, the Contractor shall not close or narrow two lanes of traffic on **NB Capital Blvd.** and **SB Capital Blvd.**, detain and/or alter the traffic flow on or during holidays, holiday weekends, special events, or any other time when traffic is unusually heavy, including the following schedules:

HOLIDAY AND HOLIDAY WEEKEND LANE CLOSURE RESTRICTIONS

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

2. For **New Year's Day**, between the hours of 6:00 a.m. December 31st and 11:00 p.m. January 2nd. If New Year's Day is on a Friday, Saturday, Sunday or Monday, then until 11:00 p.m. the following Tuesday.

3. For **Easter**, between the hours of 6:00 a.m. Thursday and 11:00 p.m. Monday.

4. For **Memorial Day**, between the hours of 6:00 a.m. Friday and 11:00 p.m. Tuesday.

5. For **Independence Day**, between the hours of 6:00 a.m. the day before Independence Day and 11:00 p.m. the day after Independence Day.

   If **Independence Day** is on a Friday, Saturday, Sunday or Monday, then between the hours of 6:00 a.m. the Thursday before Independence Day and 11:00 p.m. the Tuesday after Independence Day.

6. For **Labor Day**, between the hours of 6:00 a.m. Friday and 11:00 p.m. Tuesday.

7. For **Thanksgiving Day**, between the hours of 6:00 a.m. Tuesday and 11:00 p.m. Monday.

8. For **Christmas**, between the hours of 6:00 a.m. the Friday before the week of Christmas Day and 11:00 p.m. the following Tuesday after the week of Christmas Day.

9. For the **Rock n Roll Marathon** occurring in Raleigh between four (4) hours before the start and four (4) hours after the end of the Rock n Roll Marathon.

10. For the **Artsplosure**, between the hours of 6:00 p.m. the Thursday of the week of the Artsplosure and 7:00 a.m. the following Monday after the week of the Artsplosure.

11. For the **Ironman** occurring in Raleigh between four (4) hours before the start and four (4) hours after the end of the Ironman.

12. For the **Bike Fest**, between the hours of 6:00 p.m. the Thursday of the week of the Bike Fest and 7:00 a.m. the following Monday after the week of the Bike Fest.

13. For the **IBMA Bluegrass** occurring in Raleigh between four (4) hours before the start and four (4) hours after the end of the IBMA Bluegrass.

14. For the **Christmas Parade** occurring in Raleigh between six (6) hours before the start and six (6) hours after the end of the Christmas Parade.

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

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

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

The liquidated damages are **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 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 proposed **W. Johnson St.** (when open) & proposed **Harrington St.** (when open) during the following time restrictions:

DAY AND TIME RESTRICTIONS

**6:00 a.m. to 9:00 p.m., Monday thru Thursday,**
**6:00 a.m. to 11:00 p.m., Friday**
**and**
**8:00 a.m. to 8:00 p.m. Saturday & Sunday**

In addition, the Contractor shall not close or narrow a lane of traffic on proposed **W. Johnson St.** (when open) & proposed **Harrington St.** (when open), detain and/or alter the traffic flow on or during holidays, holiday weekends, special events, or any other time when traffic is unusually heavy, including the following schedules:

HOLIDAY AND HOLIDAY WEEKEND LANE CLOSURE RESTRICTIONS

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

2. For **New Year's Day**, between the hours of 6:00 a.m. December 31st and 11:00 p.m. January 2nd. If New Year's Day is on a Friday, Saturday, Sunday or Monday, then until 11:00 p.m. the following Tuesday.

3. For **Easter**, between the hours of 6:00 a.m. Thursday and 11:00 p.m. Monday.

4. For **Memorial Day**, between the hours of 6:00 a.m. Friday and 11:00 p.m. Tuesday.

5. For **Independence Day**, between the hours of 6:00 a.m. the day before Independence Day and 11:00 p.m. the day after Independence Day.

   If **Independence Day** is on a Friday, Saturday, Sunday or Monday, then between the hours of 6:00 a.m. the Thursday before Independence Day and 11:00 p.m. the Tuesday after Independence Day.

6. For **Labor Day**, between the hours of 6:00 a.m. Friday and 11:00 p.m. Tuesday.

7. For **Thanksgiving Day**, between the hours of 6:00 a.m. Tuesday and 11:00 p.m. Monday.

8. For **Christmas**, between the hours of 6:00 a.m. the Friday before the week of Christmas Day and 11:00 p.m. the following Tuesday after the week of Christmas Day.

9. For the **Rock n Roll Marathon** occurring in Raleigh between four (4) hours before the start and four (4) hours after the end of the Rock n Roll Marathon.

10. For the **Artsplosure**, between the hours of 6:00 p.m. the Thursday of the week of the Artsplosure and 7:00 a.m. the following Monday after the week of the Artsplosure.

11. For the **Ironman** occurring in Raleigh between four (4) hours before the start and four (4) hours after the end of the Ironman.

12. For the **Bike Fest**, between the hours of 6:00 p.m. the Thursday of the week of the Bike Fest and 7:00 a.m. the following Monday after the week of the Bike Fest.

13. For the **IBMA Bluegrass** occurring in Raleigh between four (4) hours before the start and four (4) hours after the end of the IBMA Bluegrass.

14. For the **Christmas Parade** occurring in Raleigh between six (6) hours before the start and six (6) hours after the end of the Christmas Parade.

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

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

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

The liquidated damages are **One Thousand Dollars** ($ **1,000.00**) per hour.

**INTERMEDIATE CONTRACT TIME NUMBER 5 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 **Capital Blvd. (NB & SB)** during the following time restrictions:

DAY AND TIME RESTRICTIONS

**5:00 a.m. to 12:00 a.m. (midnight), Monday thru Sunday**

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 6 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 **W. Peace St.** during the following time restrictions:

DAY AND TIME RESTRICTIONS

**5:00 a.m. to 12:00 a.m. (midnight), Monday thru Sunday**

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 Dollars** ($ **2,000.00**) per fifteen **(15)** minute time period.

**INTERMEDIATE CONTRACT TIME NUMBER 7 AND LIQUIDATED DAMAGES:**
(2-20-07) (Rev. 10-15-13) 108 SP1 G14 E

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 **NB Capital Blvd.** during the following time restrictions:

DAY AND TIME RESTRICTIONS

**5:00 a.m. to 12:00 a.m. (midnight), Monday thru Sunday**

The maximum allowable time for overhead sign removal and installation is **Thirty (30)** minutes for **NB Capital Blvd.** The Contractor shall reopen the travel lanes to traffic until any resulting traffic queue is depleted.

The time of availability for this intermediate contract time will be the time the Contractor begins to install traffic control devices required for the 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 8 AND LIQUIDATED DAMAGES:**
(2-20-07) (Rev. 6-18-13) 108 SP1 G14 H

The Contractor shall complete the work required of **Area I, Phase I, Step #2** as described on Sheet TMP-4 and shall place and maintain traffic on same.

**The work shall be completed in consecutive weekends of the Contractor's choosing, beginning at 9:00 p.m. on a Friday, and ending at 6:00 a.m. the following Monday for each weekend.**

The date of availability for this intermediate contract time is **the Friday at 9:00 p.m. of the first weekend** the Contractor elects to begin the work.

The completion date for this intermediate contract time is **the Monday at 6:00 a.m. after the Contractor has completed the work required of Area I, Phase I, Step #2.**

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

**INTERMEDIATE CONTRACT TIME NUMBER 9 AND LIQUIDATED DAMAGES:**
(2-20-07) (Rev. 6-18-13) 108 SP1 G14 H

The Contractor shall complete the work required of **Area I, Phase I, Step #3B** as described on Sheet TMP-4A and shall place and maintain traffic on same.

**The work shall be completed in consecutive weekends of the Contractor's choosing, beginning at 9:00 p.m. on a Friday, and ending at 6:00 a.m. the following Monday for each weekend.**

The date of availability for this intermediate contract time is **the Friday at 9:00 p.m. of the first weekend** the Contractor elects to begin the work.

The completion date for this intermediate contract time is **the Monday at 6:00 a.m. after the Contractor has completed the work required of Area I, Phase I, Step #3B.**

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

**INTERMEDIATE CONTRACT TIME NUMBER 10 AND LIQUIDATED DAMAGES:**
(2-20-07) (Rev. 6-18-13) 108 SP1 G14 H

The Contractor shall complete the work required of **Area I, Phase III, Steps #1 thru #6C** as described on Sheet TMP-4B and shall place and maintain traffic on same.

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

The completion date for this intermediate contract time is the date which is **One Hundred Eighty (180)** consecutive calendar days 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.

**INTERMEDIATE CONTRACT TIME NUMBER 11 AND LIQUIDATED DAMAGES:**
(2-20-07) (Rev. 6-18-13) 108 SP1 G14 H

The Contractor shall complete the work required of **Area I, Phase III, Steps #1 thru #3** as described on Sheet TMP-4B and shall place and maintain traffic on same.

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

The completion date for this intermediate contract time is the date which is **Sixty (60)** consecutive calendar days 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.

**INTERMEDIATE CONTRACT TIME NUMBER 12 AND LIQUIDATED DAMAGES:**
(2-20-07) (Rev. 6-18-13) 108 SP1 G14 H

The Contractor shall complete the work required of **Area I, Phase IV, Step #3** as described on Sheet TMP-4C and shall place and maintain traffic on same.

**The work shall be completed in consecutive weekends of the Contractor's choosing, beginning at 9:00 p.m. on a Friday, and ending at 6:00 a.m. the following Monday for each weekend.**

The date of availability for this intermediate contract time is **the Friday at 9:00 p.m. of the first weekend** the Contractor elects to begin the work.

The completion date for this intermediate contract time is **the Monday at 6:00 a.m. after the Contractor has completed the work required of Area I, Phase IV, Step #3.**

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

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

The Contractor shall complete the work required of **Area II, Phase I, Steps #2B thru #2F** as described on Sheet TMP-18A and shall place and maintain traffic on same.

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

The completion date for this intermediate contract time is the date which is **Three Hundred (300)** consecutive calendar days after and including the date the Contractor begins this work.

The liquidated damages are **Ten Thousand Dollars** ($ **10,000.00**) per calendar day.

**INTERMEDIATE CONTRACT TIME NUMBER 14 AND LIQUIDATED DAMAGES:**
(2-20-07) (Rev. 6-18-13) 108 SP1 G14 H

The Contractor shall complete the work required of **Area II, Phase IV, Steps #3B thru #3D** as described on Sheets TMP-18C & TMP-18D and shall place and maintain traffic on same.

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

The completion date for this intermediate contract time is the date which is **Ninety (90)** consecutive calendar days after and including the date the Contractor begins this work.

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

**INTERMEDIATE CONTRACT TIME NUMBER 15 AND LIQUIDATED DAMAGES:**
(2-20-07) (Rev. 6-18-13) 108 SP1 G14 F

The Contractor shall complete the work required of **Area II, Phase V, Step #1B** as described on Sheet TMP-18D and shall place and maintain traffic on same.

**The work shall be completed in consecutive weekends of the Contractor's choosing, beginning at 9:00 p.m. on a Friday, and ending at 6:00 a.m. the following Monday for each weekend.**

The date of availability for this intermediate contract time is **the Friday at 9:00 p.m. of the first weekend** the Contractor elects to begin the work.

The completion date for this intermediate contract time is **the Monday at 6:00 a.m. after the Contractor has completed the work required of Area II, Phase V, Step #1B.**

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

**INTERMEDIATE CONTRACT TIME NUMBER 16 AND LIQUIDATED DAMAGES:**

The Contractor shall complete the work required to switch the existing City of Raleigh - Signal System Fiber "SIG" fiber optic communications network over to the new fiber optic communications networks as shown in the Plans. This includes ensuring that the severing of the City of Raleigh SIG" fiber optic communications network (purposefully or accidentally) does not affect any other system devices located either upstream or downstream of this construction activity that are also part of the City of Raleigh "SIG" fiber optic communications network. Any time the existing or relocated fiber has scheduled or unscheduled breaks, is damaged or cut, for any reason, repair shall be made within 48-hours.

The time of availability for this intermediate contract time is the time the Contractor elects to begin this work or when notified of an unscheduled break or cut has occurred in the fiber.

The completion time for this intermediate contract time is **forty-eight (48)** hours after any fiber connection is severed whether scheduled or unscheduled.

The liquidated damages are **Five Hundred Dollars** ($ **500.00**) per hour.

**INTERMEDIATE CONTRACT TIME NUMBER 17 AND LIQUIDATED DAMAGES:**
(2-20-07) (Rev. 6-18-13) 108 SP1 G14 H

The Contractor shall complete the work required of **Area I, Phase I, Step #4B** as described on Sheet **TMP-4A** and shall place and maintain traffic on same.

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

The completion date for this intermediate contract time is the date which is **Twenty One (21)** consecutive calendar days after and including the date the Contractor begins this work.

The liquidated damages are **Five Hundred Dollars ($ 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 on Tuesday **May 24, 2016** at 10:00 am at:

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

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

Only bidders who have attended and properly registered at the above scheduled pre-bid conference and who have met all other prequalification requirements will be considered

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

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

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

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

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

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

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

**DELAY IN RIGHT OF ENTRY:**
(7-1-95) (Rev. 7-15-14) 108 SP1 G22

The Contractor will not be allowed right of entry to the following parcel(s) prior to the listed date(s) unless otherwise permitted by the Engineer.

| Parcel No. | Property Owner | Date |
|---|---|---|
| 1 | State of North Carolina | 1-31-17 |
| 2 | Wake County | 1-31-17 |
| 4 | Thomas E. Carter | 1-31-17 |
| 5 | William L. Carter and Wife | 1-31-17 |
| 7 | Archie Linwood King Successor Trustee | 1-31-17 |
| 8 | MCC Outdoor LLC & Morris Communication | 1-31-17 |
| 10 | Morris Communication | 1-31-17 |
| 11 | Margie Marie Fuller | 1-31-17 |
| 13 | City of Raleigh | 1-31-17 |
| 14 | State of North Carolina | 1-31-17 |
| 15 | The Cotton Mill Condo | 1-31-17 |
| 16 | 622 Capital, LLC | 1-31-17 |
| 17 | Amerco Real Estate Company | 1-31-17 |
| 19 | Wilco Hess, LLC | 1-31-17 |
| 23 | Henry J. Vapala | 6-27-16 |
| 30 | Marlowe Farms & Land, Inc. | 1-31-17 |
| 31 | 436 Partners, LLC | 5-30-16 |
| 32 | Formerly BWB West, LLC, Now Smokey Hollow, LLC | 1-31-17 |
| 33 | Hester & Hester | 1-31-17 |
| 34 | Mann Family Properties of Raleigh | 1-31-17 |
| 35 | Chaucher Investments, Inc. | 1-31-17 |
| 36 | Edwin E. Flythe, Jr. | 1-31-17 |
| 37 | Richard Gardner | 1-31-17 |
| 38 | Margaret Altman Mann | 1-31-17 |
| 39 | James H. Anderson Co. | 1-31-17 |
| 40 | The Crossland | 1-31-17 |

**NO MAJOR CONTRACT ITEMS:**
(2-19-02) (Rev. 8-21-07) 104 SP1 G31

None of the items included in this contract will be major items.

**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** |
|---|---|
| 109 - 122 | Guardrail |
| 123 - 129 | Fencing |
| 133 - 150 | Signing |
| 174 - 181 | Long-Life Pavement Markings |
| 182 - 184 | Removable Tape |
| 194 - 195 | Permanent Pavement Markers |
| 197, 364 - 378 | Lighting |
| 198 - 234 | Utility Construction |
| 235 - 262 | Erosion Control |
| 263 - 312 | Signals/ITS System |
| 328 - 332 | Drilled Piers |
| 379 | Architectural Metal Fascia |

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

Revise the *2012 Standard Specifications* as follows:

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

The base index price for DIESEL #2 FUEL is **$ 1.5868** per gallon. Where any of the following are included as pay items in the contract, they will be eligible for fuel price adjustment.

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

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

## SCHEDULE OF ESTIMATED COMPLETION PROGRESS:

(7-15-08) (Rev. 5-19-15) 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:

| | | | |
|---|---|---|---|
| 2017 | (7/01/16 - 6/30/17) | **37** | % of Total Amount Bid |
| 2018 | (7/01/17 - 6/30/18) | **35** | % of Total Amount Bid |
| 2019 | (7/01/18 - 6/30/19) | **23** | % of Total Amount Bid |
| 2020 | (7/01/19 - 6/30/20) | **5** | % 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.

## DISADVANTAGED BUSINESS ENTERPRISE:

(10-16-07)(Rev. 4-19-16) 102-15(J) SP1 G61

### Description

The purpose of this Special Provision is to carry out the U.S. Department of Transportation's policy of ensuring nondiscrimination in the award and administration of contracts financed in whole or in part with Federal funds. This provision is guided by 49 CFR Part 26.

### Definitions

*Additional DBE Subcontractors* - Any DBE submitted at the time of bid that will not be used to meet the DBE goal. No submittal of a Letter of Intent is required.

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

*Contract Goal Requirement* - The approved DBE participation at time of award, but not greater than the advertised contract goal.

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

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

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

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

*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 DBE certification, such that an applicant is required to apply only once for a DBE certification that will be honored by all recipients of USDOT funds in the state and not limited to the Department of Transportation only. The Certification Program is in accordance with 49 CFR Part 26.

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

**Forms and Websites Referenced in this Provision**

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

DBE-IS *Subcontractor Payment Information* - Form for reporting the payments made to all DBE firms working on the project. This form is for paper bid projects only. http://www.ncdot.org/doh/forms/files/DBE-IS.xls

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

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

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

*Letter of Intent* - Form signed by the Contractor and the DBE subcontractor, manufacturer or regular dealer that affirms that a portion of said contract is going to be performed by the signed DBE for the amount listed at the time of bid.
http://connect.ncdot.gov/letting/LetCentral/Letter%20of%20Intent%20to%20Perform%20as%20a%20Subcontractor.pdf

*Listing of DBE Subcontractors Form* - Form for entering DBE subcontractors on a project that will meet this DBE goal. This form is for paper bids only.
http://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/08%20DBE%20Subcontractors%20(Federal).docx

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

**DBE Goal**

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

Disadvantaged Business Enterprises **12.0** %

(A) *If the DBE goal is more than zero*, the Contractor shall exercise all necessary and reasonable steps to ensure that DBEs participate in at least the percent of the contract as set forth above as the DBE goal.

(B) *If the DBE goal is zero*, the Contractor shall make an effort to recruit and use DBEs during the performance of the contract. Any DBE participation obtained shall be reported to the Department.

**Directory of Transportation Firms (Directory)**

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

At the time of bid, bidders shall submit <u>all</u> DBE participation that they anticipate to use during the life of the contract. Only those identified to meet the DBE goal will be considered committed, even though the listing shall include both committed DBE subcontractors and

additional DBE subcontractors. Additional DBE subcontractor participation submitted at the time of bid will be used toward the Department's overall race-neutral goal. Only those firms with current DBE certification at the time of bid opening will be acceptable for listing in the bidder's submittal of DBE participation. The Contractor shall indicate the following required information:

(A) Electronic Bids

Bidders shall submit a listing of DBE participation in the appropriate section of Expedite, the bidding software of Bid Express®.

(1) Submit the names and addresses of DBE firms identified to participate in the contract. If the bidder uses the updated listing of DBE firms shown in Expedite, the bidder may use the dropdown menu to access the name and address of the DBE firm.

(2) Submit the contract line numbers of work to be performed by each DBE firm. When no figures or firms are entered, the bidder will be considered to have no DBE participation.

(3) The bidder shall be responsible for ensuring that the DBE is certified at the time of bid by checking the Directory of Transportation Firms. If the firm is not certified at the time of the bid-letting, that DBE's participation will not count towards achieving the DBE goal.

(B) Paper Bids

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

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

(b) If bidders have no DBE participation, they shall indicate this on the *Listing of DBE Subcontractors* by entering the word "None" or the number "0." This form shall be completed in its entirety. **Blank forms will not be deemed to represent zero participation**. Bids submitted that do not have DBE 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 DBE is certified at the time of bid by checking the Directory of Transportation Firms. If the

firm is not certified at the time of the bid-letting, that DBE's participation will not count towards achieving the corresponding goal.

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

**DBE Prime Contractor**

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

For example, if the DBE goal is 45% and the DBE bidder will only perform 40% of the contract work, the prime will list itself at 40%, and the additional 5% shall be obtained through additional DBE participation with DBE subcontractors or documented through a good faith effort.

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

**Written Documentation – Letter of Intent**

The bidder shall submit written documentation for each DBE that will be used to meet the DBE goal of the contract, indicating the bidder's commitment to use the DBE in the contract. This documentation shall be submitted on the Department's form titled *Letter of Intent*.

The documentation shall be received in the office of the State Contractor Utilization Engineer or at DBE@ncdot.gov no later than 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 DBE to be used toward the DBE goal, or if the form is incomplete (i.e. both signatures are not present), the DBE participation will not count toward meeting the DBE goal. If the lack of this participation drops the commitment below the DBE goal, the Contractor shall submit evidence of good faith efforts, 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 the DBE goal, the apparent lowest responsive bidder shall submit to the Department documentation of adequate good faith efforts made to reach the DBE goal.

A hard copy and an electronic copy of this information shall be received in the office of the State Contractor Utilization Engineer or at DBE@ncdot.gov no later than 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 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 DBE quotations shall be a part of the good faith effort submittal. This documentation may include written subcontractor quotations, telephone log notations of verbal quotations, or other types of quotation documentation.

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

Adequate good faith efforts mean that the 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 DBE participation. Adequate good faith efforts also mean that the bidder actively and aggressively sought DBE participation. Mere *pro forma* efforts are not considered good faith efforts.

The Department will consider the quality, quantity, and intensity of the different kinds of efforts a 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 goal and are not intended to be exclusive or exhaustive, nor is it intended to be a mandatory checklist.

(A) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising, written notices, use of verifiable electronic means through the use of the NCDOT Directory of Transportation Firms) the interest of all certified DBEs who have the capability to perform the work of the contract. The bidder must solicit this interest within at least 10 days prior to bid opening to allow the DBEs to respond to the solicitation. Solicitation shall provide the opportunity to DBEs within the Division and surrounding Divisions where the project is located. The bidder must determine with certainty if the DBEs are interested by taking appropriate steps to follow up initial solicitations.

(B) Selecting portions of the work to be performed by DBEs in order to increase the likelihood that the DBE goals will be achieved.

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

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

(C) Providing interested DBEs with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.

(D) (1) Negotiating in good faith with interested DBEs. It is the bidder's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to facilitate DBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of DBEs that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBEs to perform the work.

(2) A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBEs is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable. Also, the ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidding contractors are not, however, required to accept higher quotes from DBEs if the price difference is excessive or unreasonable.

(E) Not rejecting DBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The 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 DBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or bidder.

(G) Making efforts to assist interested DBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.

(H) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; Federal, State, and local minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBEs. Contact within 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 DBE quotes.

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

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

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

**Non-Good Faith Appeal**

The State Contractual Services Engineer will notify the contractor verbally and in writing of non-good faith. A contractor may appeal a determination of non-good faith made by the Goal Compliance Committee. If a contractor wishes to appeal the determination made by the Committee, they shall provide written notification to the State Contractual Services Engineer or at DBE@ncdot.gov. The appeal shall be made within 2 business days of notification of the determination of non-good faith.

**Counting DBE Participation Toward Meeting DBE Goal**

(A) Participation

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

(B) Joint Checks

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

(C) Subcontracts (Non-Trucking)

A DBE may enter into subcontracts. Work that a DBE subcontracts to another DBE firm may be counted toward the contract goal requirement. Work that a DBE subcontracts to a non-DBE firm does <u>not</u> count toward the contract goal requirement. If a DBE contractor or subcontractor subcontracts a significantly greater portion of the work of the contract than would be expected on the basis of standard industry practices, it shall be presumed that the DBE is not performing a commercially useful function. The DBE may present evidence to rebut this presumption to the Department. The Department's decision on the rebuttal of this presumption is subject to review by the Federal Highway Administration but is not administratively appealable to USDOT.

(D) Joint Venture

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

(E) Suppliers

A contractor may count toward its DBE requirement 60 percent of its expenditures for materials and supplies required to complete the contract and obtained from a DBE regular dealer and 100 percent of such expenditures from a DBE manufacturer.

(F) Manufacturers and Regular Dealers

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

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

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

**Commercially Useful Function**

(A) DBE Utilization

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

(B) DBE Utilization in Trucking

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

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

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

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

(4) The DBE may subcontract the work to another DBE firm, including an owner-operator who is certified as a DBE. The DBE who subcontracts work to another DBE receives credit for the total value of the transportation services the subcontracted DBE provides on the contract.

(5) The DBE may also subcontract the work to a non-DBE firm, including from an owner-operator. The DBE who subcontracts the work to a non-DBE is entitled to credit for the total value of transportation services provided by the non-DBE subcontractor not to exceed the value of transportation services provided by DBE-owned trucks on the contract. Additional participation by non-DBE subcontractors receives credit only for the fee or commission it receives as a result of the subcontract arrangement. The value of services performed under subcontract agreements between the DBE and the Contractor will not count towards the DBE contract requirement.

(6) A DBE may lease truck(s) from an established equipment leasing business open to the general public. The lease must indicate that the DBE has exclusive use of and control over the truck. This requirement does not preclude the leased truck from working for others during the term of the lease with the consent of the DBE, so long as the lease gives the DBE absolute priority for use of the leased truck. This type of lease may count toward the DBE's credit as long as the driver is under the DBE's payroll.

(7) Subcontracted/leased trucks shall display clearly on the dashboard the name of the DBE that they are subcontracted/leased to and their own company name if it is not identified on the truck itself. Magnetic door signs are not permitted.

**DBE Replacement**

When a Contractor has relied on a commitment to a DBE firm (or an approved substitute DBE firm) to meet all or part of a contract goal requirement, the contractor shall not terminate the DBE 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 DBE subcontractor, a non-DBE subcontractor, or with the Contractor's own forces or those of an affiliate. A DBE may only be terminated after receiving the Engineer's written approval based upon a finding of good cause for the termination. The prime contractor must give the DBE firm five (5) calendar days to respond to the prime contractor's notice of termination and advise the prime contractor

and the Department of the reasons, if any, why the firm objects to the proposed termination of its subcontract and why the Department should not approve the action.

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

The Contractor shall comply with the following for replacement of a committed DBE:

(A) Performance Related Replacement

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

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

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

(a) The names, addresses, and telephone numbers of DBEs who were contacted.
(b) A description of the information provided to DBEs regarding the plans and specifications for portions of the work to be performed.

(3) A list of reasons why DBE quotes were not accepted.

(4) Efforts made to assist the DBEs contacted, if needed, in obtaining bonding or insurance required by the Contractor.

(B) Decertification Replacement

(1) When a committed DBE is decertified by the Department after the SAF (*Subcontract Approval Form*) has been received by the Department, the Department will not require the Contractor to solicit replacement DBE participation equal to the remaining work to be performed by the decertified firm. The participation equal to the remaining work performed by the decertified firm will count toward the contract goal requirement.

(2) When a committed DBE is decertified prior to the Department receiving the SAF (*Subcontract Approval Form*) for the named DBE firm, the Contractor shall take all necessary and reasonable steps to replace the DBE subcontractor with another DBE subcontractor to perform at least the same amount of work to meet the DBE goal requirement. If a DBE firm is not found to do the same amount of work, a good faith effort must be submitted to NCDOT (see A herein for required documentation).

**Changes in the Work**

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

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

When the Engineer makes changes that result in an alteration of plans or details of construction, and a portion or all of the work had been expected to be performed by a committed DBE, the Contractor shall seek participation by DBEs 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 DBE, the Contractor shall seek additional participation by DBEs equal to the reduced DBE participation caused by the changes.

**Reports and Documentation**

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

When using transportation services to meet the contract commitment, the 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 DBE 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 DBE credit.

**Reporting Disadvantaged Business Enterprise Participation**

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

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

(B) Removal of an approved 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 DBEs, it shall be the prime contractor's responsibility to report all monthly and final payment information in the correct reporting manner.

Failure on the part of the 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-DBE lessees shall evaluate the value of services provided during the month of the reporting period only.

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

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

**Failure to Meet Contract Requirements**

Failure to meet contract requirements in accordance with Subarticle 102-15(J) of the *2012 Standard Specifications* may be cause to disqualify the Contractor.

**CERTIFICATION FOR FEDERAL-AID CONTRACTS:**

(3-21-90) SP1 G85

The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

(A) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of

Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(B) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, *Disclosure Form to Report Lobbying*, in accordance with its instructions.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by *Section 1352, Title 31, U.S. Code*. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

The prospective participant also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such subrecipients shall certify and disclose accordingly.

**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).

**U.S. DEPARTMENT OF TRANSPORTATION HOTLINE:**
(11-22-94) 108-5 SP1 G100

To report bid rigging activities call: **1-800-424-9071**

The U.S. Department of Transportation (DOT) operates the above toll-free hotline Monday through Friday, 8:00 a.m. to 5:00 p.m. eastern time. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should use the hotline to report such activities.

The hotline is part of the DOT's continuing effort to identify and investigate highway construction contract fraud and abuse is operated under the direction of the DOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

**CARGO PREFERENCE ACT:**
(2-16-16)

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

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

"(1) To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels.

(2) To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b) (1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590.

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

**SUBSURFACE INFORMATION:**
(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.

**VALUE ENGINEERING PROPOSAL:**
(05-19-15) 104 SP01 G116

Revise the *2012 Standard Specifications* as follows:

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

Pending execution of a formal supplemental agreement implementing an approved VEP and transferal of final plans (hard copy and electronic) sealed by an engineer licensed in the State of

North Carolina incorporating an approved VEP to the Resident Engineer and the State Value Management Engineer, the Contractor shall remain obligated to perform the work in accordance with the terms of the existing contract.

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

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

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

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

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

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

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

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

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

Unless and until a supplemental agreement is executed and issued by the Department and final plans (hard copy and electronic) sealed by an engineer licensed in the State of North Carolina incorporating an approved VEP have been provided to the Resident Engineer and the State Value

Management Engineer, the Contractor shall remain obligated to perform the work in accordance with the terms of the existing contract.

**RESOURCE CONSERVATION AND ENV. SUSTAINABLE PRACTICES:**
(5-21-13) (Rev. 5-19-15) 104-13 SP1 G118

In accordance with North Carolina Executive Order 156, NCGS 130A-309.14(3), and NCGS 136-28.8, it is the objective of the Department to aid in the reduction of materials that become a part of our solid waste stream, to divert materials from landfills, to find ways to recycle and reuse materials, to consider and minimize, where economically feasible, the environmental impacts associated with agency land use and acquisition, construction, maintenance and facility management for the benefit of the Citizens of North Carolina.

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

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

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

**DOMESTIC STEEL:**
(4-16-13) 106 SP1 G120

Revise the *2012 Standard Specifications* as follows:

**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.

**REMOVABLE PAVEMENT MARKINGS - (Partial Payments for Materials):**
(7-1-95) (Rev. 8-16-11) 1205-10 SP1 G124

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

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

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

**BID DOCUMENTATION:**
(1-1-02) (Rev.8-18-15) 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. The Bid Documentation can be in the form of electronic submittal (i.e. thumb drive) or paper. If the Bidder elects to submit the Bid Documentation in electronic format, the Department requires a backup submittal (i.e. a second thumb drive) in case one is corrupted.

*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 draft copy of the Escrow Agreement will be mailed to the Bidder after 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 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.

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

**Affidavit**

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

**Verification**

Upon delivery of the bid documentation, the Department's Contract Officer and the 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.

**IRAN DIVESTMENT ACT:**
(5-17-16) SP01 G151

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

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

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

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

**GIFTS FROM VENDORS AND CONTRACTORS:**
(12-15-09) 107-1 SP1 G152

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

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

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

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

**LIABILITY INSURANCE:**
(5-20-14) SP1 G160

Revise the *2012 Standard Specifications* as follows:

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

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

**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 Certified Designer on the erosion and sediment control/stormwater component of all reclamation plans and if

applicable, the certification number of the Level III Certified Designer on the design of the project erosion and sediment control/stormwater plan.

**Preconstruction Meeting**

Furnish the names of the *Certified Erosion and Sediment Control/Stormwater Supervisor, Certified Foremen, Certified Installers* and *Certified 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 C*ease 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".

**SUBLETTING OF CONTRACT:**
(11-18-2014) 108-6 SP1 G186

Revise the *2012 Standard Specifications* as follows:

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

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

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

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

**POTENTIAL MATERIAL STORAGE AND STAGING AREA:**
(12-15-15) SPI 8-45 (Rev)

There is a site adjacent to the project which may become available for material storage and staging. The site is parcel 13 as shown on the project plans. If the Contractor desires to use this site, he shall make his own arrangements with the owner for lease, rent, purchase, or otherwise secure permission to use the site. Such arrangements shall include, but not be limited to all conditions on the use of the site, subsequent cleanups, and agreed upon reimbursements. The

Department does not guarantee the site is available or that the Contractor can be successful in securing its use. No reimbursement will be made by the Department to the Contractor for any costs incurred by him regarding use of the site, as the cost of same shall be included in the unit prices bid on the various items included in the contract.

The contact for further information is Billy Jackson in Facilities Management (919) 996-2984.

# PROJECT SPECIAL PROVISIONS

## ROADWAY

### CLEARING AND GRUBBING - METHOD II:

(9-17-02) (Rev.8-18-15) 200 SP2 R02A

Perform clearing on this project to the limits established by Method "II" shown on Standard Drawing No. 200.02 of the *2012 Roadway Standard Drawings*. Conventional clearing methods may be used except where permit drawings or conditions have been included in the proposal which require certain areas to be cleared by hand methods.

### 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.

### BUILDING REMOVAL:

(1-1-02) (Rev. 4-16-13) 215 SP2 R15 C

Remove the buildings, underground storage tanks and appurtenances listed below in accordance with Section 215 of the *2012 Standard Specifications*:

**Parcel 004** -SS 11+30 to SS 12+25 RT of SL -Y1RPC
TWO 1 STORY BRICK BUILDINGS

**Parcel 007** – SS 17+00 to SS 18+00 Left of SL –L
2 STORY BLOCK BUILDING

**Parcel 008** – SS 16+90 to SS 18+90 RT of SL –L
SS 10+20 to SS 11+30 LT of SL –Y4-
1 STORY BLOCK BUILDING

**Parcel 010** – SS 16+90 to SS 18+90, RT of SL -L
2 STORY BLOCK BUILDING
1 STORY BLOCK BUILDING
2 STORY METAL BUILDING

**Parcel 011** – SS 18 + 90, SL L to SS 21 +20, SL L
2 STORY BLOCK BUILDING
1 STORY BLOCK BUILDING W/CANOPY

**Parcel 013** – SS 22+50 to SS 41+50 LT of SL –L
1 STORY METAL BUILDING
2 STORY METAL BUILDING

**Parcel 026** – SS 48+00, SL L to SS 57+00, SL L
1 STORY FRAME VINYL BUILDING WITH PORCH – **DO NOT REMOVE BUILDING UNTIL INSPECTED**

**Parcel 033** – SS 14+70, SL Y6 to SS 15+69, SL Y6 LT
1 STORY BLOCK BUILDING

**Parcel 034** – SS 15+70 to SS 16+80 Right of Survey Line –Y6-
1 STORY BLOCK BUILDING

**Parcel 035** – SS 16+41, SL Y6 to SS 19+00, SL Y6 LT
TWO 1 STORY BLOCK BUILDING

When the description of the work for an item indicates a building partially inside and partially outside the right of way and/or construction area, but does not require the building to be cut off, the entire building shall be removed.

**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*.

## ROCK AND BROKEN PAVEMENT FILLS:

(2-16-16) 235 SP2 R85

Revise the *2012 Standard Specifications* as follows:

**Page 2-22, Article 235-2 MATERIALS**, add the following after line 19:

| **Item** | **Section** |
|---|---|
| Geotextile for Rock and Broken Pavement Fills, Type 2 | 1056 |

Provide Type 2 geotextile for filtration geotextiles. Use rip rap and No. 57 stone from either a quarry or onsite material to fill voids in rock and broken pavement fills. Provide small and large size rip rap with stone sizes that meet Class A and B in accordance with Table 1042-1 and No. 57 stone with a gradation that meets Table 1005-1 or use similar size onsite material approved by the Engineer.

**Page 2-23, Subarticle 235-3(B) Embankment Formation**, lines 18-19, delete the third sentence in the seventh paragraph.

**Page 2-23, Subarticle 235-3(B) Embankment Formation**, lines 21-23, replace the eighth paragraph with the following:

Before placing embankment fill material or filtration geotextiles over rock and broken pavement, fill voids in the top of rock and broken pavement fill with rip rap and No. 57 stone. Place and compact larger rip rap first followed by smaller rip rap. Then, fill any remaining voids with No. 57 stone so geotextiles are not torn, ripped or otherwise damaged when installed and covered. Compact rip rap and No. 57 stone with tracked equipment or other approved methods. Install filtration geotextiles on top of rock, broken pavement, rip rap and No. 57 stone in accordance with Article 270-3 before placing remaining embankment fill material.

Remove any rocks, debris or pavement pieces from the roadbed larger than 2" within 12" of the subgrade or finished grade, whichever is lower.

**Page 2-24, Article 235-5 MEASUREMENT AND PAYMENT**, line 13, add the following to the end of the first paragraph:

Payment for rip rap, No. 57 stone and geotextiles to construct embankments with rock and broken pavement fills will be considered incidental to the work in Sections 225, 226, 230 and 240.

**BLASTING:**
(2-16-16) 220 SP2 R88B

Revise the *2012 Standard Specifications* as follows:

**Page 2-8, Article 220-1 DESCRIPTION**, line 22, delete "cushion, ".

**Page 2-8, Article 220-1 DESCRIPTION**, line 23, add the following after the third sentence:

Unless required otherwise in the contract, design blasts for the vibration and air overpressure limits in this section.

**Page 2-9, Subarticle 220-3(A) Vibration and Air Overpressure Limits**, line 18, add the following to the end of Subarticle 220-3(A):

Unless required otherwise in the contract or directed, design production and trench blasts in accordance with the following:

(1) Production Blasting

(a) For rock cut slopes steeper than 1.5:1 (H:V) without pre-splitting, do not use production blast holes more than 4" in diameter within 10 ft of finished slope faces or neat lines
(b) Do not drill production holes below bottom of adjacent pre-split blast holes
(c) Use delay blasting to detonate production blast holes towards a free face

(2) Trench Blasting

(a) Do not use trench blast holes more than 3" in diameter
(b) Do not use ANFO or other bulk loaded products
(c) Use cartridge explosives or other explosive types designed for trench blasting
(d) Use charges with a diameter of 1/2" to 3/4" less than the trench blast hole diameter

**PIPE INSTALLATION:**
(11-20-12) (Rev. 8-18-15) 300 SP3 R01

Revise the *2012 Standard Specifications* as follows:

**Page 3-1, Article 300-2, Materials,** line 15, in the materials table, replace "Flowable Fill" and "Geotextiles" with the following:

| Item | Section |
|---|---|
| Flowable Fill, Excavatable | 1000-6 |
| Grout, Type 2 | 1003 |
| Geotextiles, Type 4 | 1056 |

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

Provide foundation conditioning geotextile and geotextile to wrap pipe joints in accordance with Section 1056 for Type 4 geotextile.

**Page 3-3, Subarticle 300-6(A), Rigid Pipe,** line 2, in the first paragraph, replace "an approved non-shrink grout." with "grout." and line 4, in the second paragraph, replace "filtration geotextile" with "geotextile".

**Page 3-3, Article 300-7, Backfilling,** lines 37-38, in the first and second sentences of the fifth paragraph, replace "Excavatable flowable fill" with "Flowable fill".

**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 | Section |
|---|---|
| Flowable Fill | 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 | Pay Unit |
|---|---|
| Flowable Fill | Cubic Yard |

**ASPHALT PAVEMENTS - SUPERPAVE:**
(6-19-12) (Rev. 1-19-16) 605, 609, 610, 650 SP6 R01

Revise the *2012 Standard Specifications* as follows:

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

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

**TABLE 605-1**
**APPLICATION RATES FOR TACK COAT**

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

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

**TABLE 605-2**
**APPLICATION TEMPERATURE FOR TACK COAT**

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

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

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

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

Warm mix asphalt (WMA) is allowed for use at the Contractor's option in accordance with the NCDOT Approved Products List for WMA Technologies available at:

**https://connect.ncdot.gov/resources/Materials/MaterialsResources/Warm%20Mix%20Asphalt%20Approved%20List.pdf**

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

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

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

**TABLE 610-1**
**MIXING TEMPERATURE AT THE ASPHALT PLANT**

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

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

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

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

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

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

**TABLE 610-5**
**PLACEMENT TEMPERATURES FOR ASPHALT**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$PA = (165 - LR\#)\ 5$$

Where:

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

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

| TABLE 650-1<br>OGAFC GRADATION CRITERIA | | | |
|---|---|---|---|
| *Sieve Size (mm)* | *Type FC-1* | *Type FC-1 Modified* | *Type FC-2 Modified* |
| 19.0 | - | - | 100 |
| 12.5 | 100 | 100 | 80 - 100 |
| 9.50 | 75 - 100 | 75 - 100 | 55 - 80 |
| 4.75 | 25 - 45 | 25 - 45 | 15 - 30 |
| 2.36 | 5 - 15 | 5 - 15 | 5 - 15 |
| 0.075 | 1.0 - 3.0 | 1.0 - 3.0 | 2.0 - 4.0 |

**ASPHALT BINDER CONTENT OF ASPHALT PLANT MIXES:**

(11-21-00) (Rev. 7-17-12) 609 SP6 R15

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

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

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

**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 **$ 332.86** 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, 2016**.

**CONVERT EXISTING JUNCTION BOX TO SLAB TOP JUNCTION BOX:**
(1-1-02) (Rev. 7-18-06) 840, 859 SP8 R50

At the proper phase of construction, convert the existing Junction Box at locations indicated in the plans or where directed, to Slab Top Junction Box in accordance with the details in the plans and the applicable requirements of Sections 840 and 859 of the *2012 Standard Specifications*.

*Convert Existing Junction Box to Slab Top Junction Box* will be measured and paid as each, completed and accepted. Such price and payment is considered full compensation for all equipment, materials, labor, tools, and incidentals necessary to complete each conversion satisfactorily.

Payment will be made under:

| **Pay Item** | **Pay Unit** |
|---|---|
| Convert Existing Junction Box to Slab Top Junction Box | Each |

**FRAME WITH GRATES (Driveway Drop Inlet):**
(3-21-00) (Rev.7-18-06) SPI 8-35

**Description**

Provide grates for driveway drop inlets that are fabricated steel or cast iron. Provide grates that are of a design and weight that is recommended by the manufacturer as being adequate for HS-20 loadings. Furnish a manufacturer's certification stating that the grates and frame furnished on the project have been designed and manufactured to be adequate for an HS-20 loading. Provide grates with a minimum clear waterway opening of 50 $in^2$ per 1'-0" length of grate.

If the frame and grate is made from fabricated steel, the requirements of Article 1074-9 of the *2012 Standard Specifications* will be applicable. If the grate and frame is made from iron castings, the requirements of Article 1074-7 of the *2012 Standard Specifications* will be applicable.

**Measurement and Payment**

*Frame with Grates, Driveway Drop Inlet* will be measured and paid for as the actual number of linear feet that have been incorporated into the completed and accepted work. Such price and payment will be full compensation for furnishing the grates and frame, and all labor and incidentals necessary to complete the work.

Payment will be made under:

| **Pay Item** | **Pay Unit** |
|---|---|
| Frame with Grates, Driveway Drop Inlet | Linear Foot |

## GUARDRAIL ANCHOR UNITS, TYPE 350 (TL-3):

(4-20-04) (Rev. 7-21-15) 862 SP08 R065

### 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

Furnish guardrail anchor units listed on the NCDOT Approved Products List at https://apps.dot.state.nc.us/vendor/approvedproducts/ or approved equal.

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. 7-21-15) SP08 R075

### 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

Furnish impact attenuator units listed on the Approved Products List at https://apps.dot.state.nc.us/vendor/approvedproducts/ or approved equal. 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 NON-GATING Impact Attenuator Units.

If the median width is greater than 40 feet, the Contractor may use GATING or NON-GATING Impact Attenuator Units.

### 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 |

## VINYL COATED CHAIN LINK FENCE, 60" FABRIC:

(7-1-95) (Rev. 7-18-06) SP8 R80(Rev)

### Description

Construct a vinyl coated galvanized steel chain link fence (60" fabric) mounted on vinyl coated galvanized steel posts in accordance with the *Standard Specifications*, plans, and these provisions. Apply the vinyl coating over the galvanizing.

### Materials

Provide steel pipe posts meeting the requirement of Subarticle 1050-3 of the *Standard Specifications* for vinyl coated steel pipe posts.

Provide vinyl coated chain link fabric that complies with the plans and Article 1050-6 of the *Standard Specifications*.

Provide vinyl coated fittings and accessories meeting the requirements of Article 1050-7 of the *Standard Specifications* except where otherwise required by the plans.

Provide vinyl coated tension wire, hog rings, and tie wire meeting the requirements of Article 1050-7 of the *Standard Specifications*.

### Construction Methods

Erect the vinyl coated chain link fence as indicated on the plans, in accordance with the applicable provisions of Article 866-3 of the *Standard Specifications*, or as directed by the Engineer.

### Measurement and Payment

*Vinyl Coated Chain Link Fence, 60" Fabric* will be measured and paid in linear feet, of fence measured in place from center of each post or gate post to center of end post or gate post exclusive of gate sections, that has been completed and accepted.

*Metal Line Posts, 60" Chain Link Fence, Vinyl Coated* will be measured and paid in units of each for the several sizes and kinds of posts actually installed on the project. For extra length metal posts, the actual length of post in place in excess of the standard pay length for each post shall be measured in linear feet, and half of such length shall be converted to an equivalent number of standard length posts of the same size for which a pay item has been established. In converting to equivalent numbers of standard length posts, any fractional portion of a post remaining from the division of a total number of linear feet by a standard post length shall be considered as equal to one post.

*Metal Terminal Posts, 60" Chain Link Fence, Vinyl Coated* will be measured and paid in units of each for all end, corner and brace posts installed on the project.

Payment will be made under:

| Pay Item | Pay Unit |
|---|---|
| Vinyl Coated Chain Link Fence, 60" Fabric | Linear Foot |
| Metal Line Post, 60" Chain Link Fence, Vinyl Coated | Each |
| Metal Terminal Post, 60" Chain Link Fence, Vinyl Coated | Each |

## CHAIN LINK FENCE WITH BARBED WIRE, 96" FABRIC, VINYL COATED:

(7-1-95) (Rev. 7-18-06) SP8 R80(Rev)

### Description

Construct a vinyl coated galvanized steel chain link fence (96" fabric) with barbed wire on extension arms, mounted on vinyl coated galvanized steel posts in accordance with Section 866 of the *Standard Specifications*, the plans, and these provisions. Apply the vinyl coating over the galvanizing.

### Materials

Provide steel pipe posts meeting the requirement of Subarticle 1050-3 of the *Standard Specifications* for vinyl coated steel pipe posts.

Provide vinyl coated chain link fabric that complies with the plans and Article 1050-6 of the *Standard Specifications*.

Provide barbed wire that complies with the plans and Article 1050-4 of the *Standard Specifications*.

Provide vinyl coated fittings and accessories meeting the requirements of Article 1050-7 of the *Standard Specifications* except where otherwise required by the plans.

Provide vinyl coated tension wire, hog rings, and tie wire meeting the requirements of Article 1050-7 of the *Standard Specifications*.

### Construction Methods

Erect the vinyl coated chain link fence as indicated on the plans, in accordance with the applicable provisions of Article 866-3 of the *Standard Specifications*, or as directed by the Engineer. Place three strands of barbed wire placed at the top of the fence fabric. Attach the barbed wire to extension arms that are to be fitted to the post tops.

Provide extension arms constructed to locate the top most strand of barbed wire approximately 12 inches above and approximately 12 inches out from the top rail. Space all strands of barbed wire at an approximately equal distance from each other. Make provisions for supporting the top rail. The arm shall make a 45 degree angle with the post, and be an item of standard manufacture. Have samples of extension arms to be used on the project approved prior to their installation.

Fabricate the extension arms from pressed steel or malleable wrought iron, or either of these materials in conjunction with a cast base. Provide a minimum weight of the arm material of 14 gauge. Provide a complete arm assembly of sufficient strength to support the barbed wire when stretched to proper tension. Galvanize all arms in accordance with ASTM A153.

Erect extension arms so as to point away from the pavement. Splicing of barbed wire between the arms will not be permitted. Use a method of attaching barbed wire to the arms acceptable to the Engineer.

**Measurement and Payment**

*Chain Link Fence with Barbed Wire, 96" Fabric, Vinyl Coated* will be measured and paid in linear feet of fence measured in place from center of each post or gate post to center of end post or gate post exclusive of gate sections that has been completed and accepted. No direct payment will be made for furnishing and installing the barbed wire and extension arms as the cost of such work shall be included in the price bid per linear foot for *Chain Link Fence with Barbed Wire, 96" Fabric, Vinyl Coated.*

*Metal Line Posts, 96" Chain Link Fence, Vinyl Coated* will be measured and paid in units of each for the several sizes and kinds of posts actually installed on the project. For extra length metal posts, the actual length of post in place in excess of the standard pay length for each post shall be measured in linear feet, and half of such length shall be converted to an equivalent number of standard length posts of the same size for which a pay item has been established. In converting to equivalent numbers of standard length posts, any fractional portion of a post remaining from the division of a total number of linear feet by a standard post length shall be considered as equal to one post.

*Metal Terminal Posts, 96" Chain Link Fence, Vinyl Coated* will be measured and paid in units of each for all end, corner and brace posts installed on the project.

Payment will be made under:

| **Pay Item** | **Pay Unit** |
|---|---|
| Chain Link Fence with Barbed Wire, 96" Fabric, Vinyl Coated | Linear Foot |
| Metal Line Post, 96" Chain Link Fence, Vinyl Coated | Each |
| Metal Terminal Post, 96" Chain Link Fence, Vinyl Coated | 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*.

## STREET SIGNS AND MARKERS AND ROUTE MARKERS:

(7-1-95) 900 SP9 R02

Move any existing street signs, markers, and route markers out of the construction limits of the project and install the street signs and markers and route markers so that they will be visible to the traveling public if there is sufficient right of way for these signs and markers outside of the construction limits.

Near the completion of the project and when so directed by the Engineer, move the signs and markers and install them in their proper location in regard to the finished pavement of the project.

Stockpile any signs or markers that cannot be relocated due to lack of right of way, or any signs and markers that will no longer be applicable after the construction of the project, at locations directed by the Engineer for removal by others.

The Contractor shall be responsible to the owners for any damage to any street signs and markers or route markers during the above described operations.

No direct payment will be made for relocating, reinstalling, and/or stockpiling the street signs and markers and route markers as such work shall be considered incidental to other work being paid for by the various items in the contract.

## FOUNDATIONS AND ANCHOR ROD ASSEMBLIES FOR METAL POLES:

(1-17-12) (Rev. 5-19-15) 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, Type 2 | 1003 |

| Item | Section |
|---|---|
| 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 |
|---|---|
| ≤ 1 1/2 | 1/3 turn (2 flats) |
| > 1 1/2 | 1/6 turn (1 flat) |

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

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

(12) Between 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 |
| ≥ 1 1/2 | 600 |

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

(13) Do not grout under base plate.

**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. 3-15-16) 1000, 1002, 1005, 1016, 1018, 1024, 1050, 1074, 1078, 1080, 1081, 1086, 1084, 1087, 1092 SP10 R01

Revise the *2012 Standard Specifications* as follows:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**TABLE 1000-1**
**REQUIREMENTS FOR CONCRETE**

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

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

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

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

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

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

**(H) Handling and Storing Test Panels**

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

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

## TABLE 1005-1
## AGGREGATE GRADATION - COARSE AGGREGATE

### 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 |
| Light-weight[C] | - | - | - | - | 100 | 80-100 | 5-40 | 0-20 | - | 0-10 | - | 0-2.5 | AST |

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

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

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

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

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

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

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

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

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

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

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

**TABLE 1024-1**
**POZZOLANS FOR USE IN PORTLAND CEMENT CONCRETE**

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

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

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

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

All fencing material and accessories shall meet Section 106.

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

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

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

**TABLE 1078-1**
**REQUIREMENTS FOR CONCRETE**

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

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

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

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

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

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

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

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

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

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

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

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

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

**TABLE 1081-1**
**PROPERTIES OF MIXED EPOXY RESIN SYSTEMS**

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

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

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

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

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

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

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

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

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

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

**1081-4 EPOXY RESIN ADHESIVE FOR BONDING TRAFFIC MARKINGS**

**(A) General**

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

**(B) Classification**

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

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

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

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

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

**(C) Requirements**

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

**(D) Prequalification**

Refer to Subarticle 1081-1(E).

**(E) Acceptance**

Refer to Subarticle 1081-1(F).

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

Steel sheet piles detailed for permanent applications shall be hot rolled and meet ASTM A572 or ASTM A690 unless otherwise required by the plans. Steel sheet piles shall be coated as required

by the plans. Galvanized sheet piles shall be coated in accordance with Section 1076. Metallized sheet piles shall be metallized in accordance to the Project Special Provision "Thermal Sprayed Coatings (Metallization)" with an 8 mil, 99.9% aluminum alloy coating and a 0.5 mil seal coating. Any portion of the metallized sheet piling encased in concrete shall receive a barrier coat. The barrier coat shall be an approved waterborne coating with a low-viscosity which readily absorbs into the pores of the aluminum thermal sprayed coating. The waterborne coating shall be applied at a spreading rate that results in a theoretical 1.5 mil dry film thickness. The manufacturer shall issue a letter of certification that the resin chemistry of the waterborne coating is compatible with the 99.9% aluminum thermal sprayed alloy and suitable for tidal water applications.

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

The epoxy shall meet Article 1081-4.

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

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

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

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

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

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

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

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

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

**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.

| 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.

**GROUT PRODUCTION AND DELIVERY:**

(3-17-15) 1003 SP10 R20

Revise the *2012 Standard Specifications* as follows:

Replace Section 1003 with the following:

## SECTION 1003
## GROUT PRODUCTION AND DELIVERY

### 1003-1 DESCRIPTION

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

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

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

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

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

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

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

**1003-2 MATERIALS**

Refer to Division 10.

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

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

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

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

**TABLE 1003-1**
**AGGREGATE REQUIREMENTS FOR TYPE 5 GROUT**

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

## 1003-3 COMPOSITION AND DESIGN

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

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

Accompany Materials and Tests Form 312U with a listing of laboratory test results of compressive strength, density and flow or slump and if applicable, aggregate gradation, durability and height change. List the compressive strength of at least three 2" cubes at the age of 3 and 28 days.

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

Perform laboratory tests in accordance with the following test procedures:

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

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

## 1003-4 GROUT REQUIREMENTS

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

**TABLE 1003-2**
**GROUT REQUIREMENTS**

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

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

## 1003-5 TEMPERATURE REQUIREMENTS

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

## 1003-6 ELAPSED TIME FOR PLACING GROUT

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

**TABLE 1003-3**
**ELAPSED TIME FOR PLACING GROUT**
**(with continuous agitation)**

| Air or Grout Temperature, Whichever is Higher | Maximum Elapsed Time: No Retarding Admixture Used | Maximum Elapsed Time: Retarding Admixture Used |
|---|---|---|
| 90°F or above | 30 minutes | 1 hr. 15 minutes |
| 80°F through 89°F | 45 minutes | 1 hr. 30 minutes |
| 79°F or below | 60 minutes | 1 hr. 45 minutes |

**1003-7 MIXING AND DELIVERY**

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

**GEOSYNTHETICS:**

(2-16-16) 1056 SP10 R25

Revise the *2012 Standard Specifications* as follows:

Replace Section 1056 with the following:

**SECTION 1056**
**GEOSYNTHETICS**

**1056-1 DESCRIPTION**

Provide geosynthetics for subsurface drainage, separation, stabilization, reinforcement, erosion control, filtration and other applications in accordance with the contract. Use geotextiles, geocomposite drains and geocells that are on the NCDOT Approved Products List. Prefabricated geocomposite drains include sheet, strip and vertical drains (PVDs), i.e., "wick drains" consisting of a geotextile attached to and/or encapsulating a plastic drainage core. Geocells are comprised of ultrasonically welded polymer strips that when expanded form a 3D honeycomb grid that is typically filled with material to support vegetation.

If necessary or required, hold geotextiles and sheet drains in place with new wire staples, i.e., "sod staples" that meet Subarticle 1060-8(D) or new anchor pins. Use steel anchor pins with a diameter of at least 3/16" and a length of at least 18" and with a point at one end and a head at the other end that will retain a steel washer with an outside diameter of at least 1.5".

**1056-2 HANDLING AND STORING**

Load, transport, unload and store geosynthetics so geosynthetics are kept clean and free of damage. Label, ship and store geosynthetics in accordance with Section 7 of AASHTO M 288. Geosynthetics with defects, flaws, deterioration or damage will be rejected. Do not unwrap geosynthetics until just before installation. Do not leave geosynthetics exposed for more than 7 days before covering except for geosynthetics for temporary wall faces and erosion control.

**1056-3 CERTIFICATIONS**

Provide Type 1, Type 2 or Type 4 material certifications in accordance with Article 106-3 for geosynthetics. Define "minimum average roll value" (MARV) in accordance with ASTM D4439. Provide certifications with MARV for geosynthetic properties as required. Test geosynthetics using laboratories accredited by the Geosynthetic Accreditation Institute (GAI) to perform the required test methods. Sample geosynthetics in accordance with ASTM D4354.

**1056-4 GEOTEXTILES**

When required, sew geotextiles together in accordance with Article X1.1.4 of AASHTO M 288. Provide sewn seams with seam strengths meeting the required strengths for the geotextile type and class specified.

Provide geotextile types and classes in accordance with the contract. Geotextiles will be identified by the product name printed directly on the geotextile. When geotextiles are not marked with a product name or marked with only a manufacturing plant identification code, geotextiles will be identified by product labels attached to the geotextile wrapping. When identification is based on labels instead of markings, unwrap geotextiles just before use in the presence of the Engineer to confirm that the product labels on both ends of the outside of the geotextile outer wrapping match the labels affixed to both ends of the inside of the geotextile roll core. Partial geotextile rolls without the product name printed on the geotextile or product labels affixed to the geotextile roll core may not be used.

Use woven or nonwoven geotextiles with properties that meet Table 1056-1. Define "machine direction" (MD) and "cross-machine direction" (CD) in accordance with ASTM D4439.

**TABLE 1056-1**
**GEOTEXTILE REQUIREMENTS**

| Property<br>*Typical Application* | Requirement<br>**Type 1**<br>*Shoulder Drains* | **Type 2**<br>*Under Rip Rap* | **Type 3**[A]<br>*Silt Fence Fabric* | **Type 4**<br>*Soil Stabilization* | **Type 5**[B]<br>*Temporary Walls* | **Test Method** |
|---|---|---|---|---|---|---|
| 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[C] | 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[C] (unless required otherwise in the contract) | ASTM D4595 |
| Permittivity | Table 2[D], 15% to 50% *in Situ* Soil Passing 0.075 mm | Table 6[D], 15% to 50% *in Situ* Soil Passing 0.075mm | Table 7[D] | Table 5[D] | 0.20 $sec^{-1}$,[C] | ASTM D4491 |
| Apparent Opening Size | | | | | 0.60 mm[E] | ASTM D4751 |
| UV Stability (Retained Strength) | | | | | 70%[C] (after 500 hr of exposure) | ASTM D4355 |

**A.** Minimum roll width of 36" required.
**B.** Minimum roll width of 13 ft required.
**C.** MARV per Article 1056-3.
**D.** AASHTO M 288.
**E.** Maximum average roll value.

## 1056-5 GEOCOMPOSITE DRAINS

Provide geocomposite drain types in accordance with the contract and with properties that meet Table 1056-2.

**TABLE 1056-2**
**GEOCOMPOSITE DRAIN REQUIREMENTS**

| Property | Requirement<br>**Sheet Drain** | **Strip Drain** | **Wick Drain** | **Test Method** |
|---|---|---|---|---|
| Width | ≥ 12" (unless required | 12" ±1/4" | 4" ±1/4" | N/A |

| | | | | |
|---|---|---|---|---|
| | otherwise in the contract) | | | |
| In-Plane Flow Rate[A] (with gradient of 1.0 and 24-hour seating period) | 6 gpm/ft @ applied normal compressive stress of 10 psi | 15 gpm/ft @ applied normal compressive stress of 7.26 psi | 1.5 gpm[B] @ applied normal compressive stress of 40 psi | ASTM D4716 |

**A.** MARV per Article 1056-3.
**B.** Per 4" drain width.

For sheet and strip drains, use accessories (e.g., pipe outlets, connectors, fittings, etc.) recommended by the Drain Manufacturer. Provide sheet and strip drains with Type 1 geotextiles heat bonded or glued to HDPE, polypropylene or high impact polystyrene drainage cores that meet Table 1056-3.

**TABLE 1056-3**
**DRAINAGE CORE REQUIREMENTS**

| Property | Requirement (MARV) | | Test Method |
|---|---|---|---|
| | Sheet Drain | Strip Drain | |
| Thickness | 1/4" | 1" | ASTM D1777 or D5199 |
| Compressive Strength | 40 psi | 30 psi | ASTM D6364 |

For wick drains with a geotextile wrapped around a corrugated drainage core and seamed to itself, use drainage cores with an ultimate tensile strength of at least 225 lb per 4" width in accordance with ASTM D4595 and geotextiles with properties that meet Table 1056-4.

**TABLE 1056-4**
**WICK DRAIN GEOTEXTILE REQUIREMENTS**

| Property | Requirement | Test Method |
|---|---|---|
| Elongation | ≥ 50% | ASTM D4632 |
| Grab Strength | Table 1[A], Class 3 | ASTM D4632 |
| Tear Strength | | ASTM D4533 |
| Puncture Strength | | ASTM D6241 |
| Permittivity | 0.7 $sec^{-1}$,[B] | ASTM D4491 |
| Apparent Opening Size (AOS) | Table 2[A], > 50% *in Situ* Soil Passing 0.075 mm | ASTM D4751 |
| UV Stability (Retained Strength) | | ASTM D4355 |

**A.** AASHTO M 288.
**B.** MARV per Article 1056-3.

For wick drains with a geotextile fused to both faces of a corrugated drainage core along the peaks of the corrugations, use wick drains with an ultimate tensile strength of at least 1,650 lb/ft in accordance with ASTM D4595 and geotextiles with a permittivity, AOS and UV stability that meet Table 1056-4.

**1056-6 GEOCELLS**

Geocells will be identified by product labels attached to the geocell wrapping. Unwrap geocells just before use in the presence of the Engineer. Previously opened geocell products will be rejected.

Manufacture geocells from virgin polyethylene resin with no more than 10% rework, also called "regrind", materials. Use geocells made from textured and perforated HDPE strips with an open area of 10% to 20% and properties that meet Table 1056-5.

**TABLE 1056-5**
**GEOCELL REQUIREMENTS**

| Property | Minimum Requirement | Test Method |
|---|---|---|
| Cell Depth | 4" | N/A |
| Sheet Thickness | 50 mil -5%, +10% | ASTM D5199 |
| Density | 58.4 lb/cf | ASTM D1505 |
| Carbon Black Content | 1.5% | ASTM D1603 or D4218 |
| ESCR[A] | 5000 hr | ASTM D1693 |
| Coefficient of Direct Sliding (with material that meets AASHTO M 145 for soil classification A-2) | 0.85 | ASTM D5321 |
| Short-Term Seam (Peel) Strength (for 4" seam) | 320 lb | USACE[C] Technical Report GL-86-19, Appendix A |
| Long-Term Seam (Hang) Strength[B] (for 4" seam) | 160 lb | |

**A.** Environmental Stress Crack Resistance.
**B.** Minimum test period of 168 hr with a temperature change from 74°F to 130°F in 1-hour cycles.
**C.** US Army Corps of Engineers.

Provide geocell accessories (e.g., stakes, pins, clips, staples, rings, tendons, anchors, deadmen, etc.) recommended by the Geocell Manufacturer.

## SELECT MATERIAL, CLASS IV:

**Description**

Place Select Material, Class IV where designated on the plans and as directed by the Engineer.

**Material**

| Item | Section |
|---|---|
| Select Material, Class IV | 1016-3 |

**Construction Methods**

Place Select Material, Class IV as indicated in the plans and as directed by the Engineer.

**Measurement and Payment**

*Select Material, Class IV* will be measured and paid for per ton of Select Material, Class IV satisfactorily placed and accepted.

Payment will be made under:

| **Pay Item** | **Pay Unit** |
|---|---|
| Select Material, Class IV | Ton |

**TEMPORARY SHORING:**

(2-20-07) (Rev. 3-17-15) 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 |
| Grout | 1003 |
| Portland Cement Concrete | 1000 |

| Item | Section |
|---|---|
| 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 neat cement grout for Type 2 grout for ground anchors. Use Class A concrete that meets Article 450-2 of the *2012 Standard Specifications* or Type 1 grout for drilled-in piles. Provide untreated timber with a thickness of at least 3" and a bending stress of at least 1,000 psi for timber lagging. Provide steel bracing that meets ASTM A36.

(A) Shoring Backfill

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

(B) Anchors

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

(1) Ground Anchors

Use high-strength deformed steel bars that meet AASHTO M 275 or seven-wire strands that meet ASTM A886 or Article 1070-5 of the *2012 Standard Specifications*. 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 ($\gamma$) = 120 lb/cf;

(b)

| **Friction Angle ($\phi$)** | **Shoring Backfill** |
|---|---|
| 30° | A-2-4 Soil |
| 34° | Class II, Type 1 or Class III Select Material |
| 38° | Class V or VI Select Material |

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

(2) Traffic Surcharge

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

(3) Cantilever, Braced and Anchored Shoring Designs

Use shoring backfill for fill sections and voids between cantilever, braced and anchored shoring and the critical failure surface. Use 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 ($P_{H1}$) in accordance with Figure 3.11.6.3-2(a) of the AASHTO LRFD specifications.

Extend cantilever, braced and anchored shoring at least 32" 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 longer. Extend the reinforced zone at least 6" beyond end of reinforcement. Do not locate the reinforced zone outside right-of-way or easement limits.

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

Do not use more than 4 different reinforcement strengths for each temporary geosynthetic wall. Design temporary geotextile walls for a reinforcement coverage ratio ($R_c$) of 1.0 and temporary geogrid walls for an $R_c$ of at least 0.8. For geogrid reinforcement with an $R_c$ of less than 1.0, use a maximum horizontal clearance between geogrids of 3 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 and if this meeting occurs before all shoring submittals have been accepted, additional preconstruction meetings may be required before beginning construction of temporary shoring without accepted submittals. The Resident, District or Bridge Maintenance Engineer, Bridge or Roadway Construction Engineer, Geotechnical Operations Engineer, Contractor and Shoring Contractor Superintendent will attend preconstruction meetings.

**Construction Methods**

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

Install positive protection in accordance with the contract and accepted submittals. Use PCB in accordance with Section 1170 of the *2012 Standard Specifications* 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 over excavation 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.

(d) Measure grout temperature, density and flow during grouting with at least the same frequency grout cubes are made for compressive strength. Perform density and flow field tests in the presence of the Engineer in accordance with American National Standards Institute/American Petroleum Institute Recommended Practice 13B-1 (Section 4, Mud Balance) and ASTM C939 (Flow Cone), respectively.

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

(4) Anchor Testing

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

(a) Anchor Acceptance

Anchor acceptance is based in part on the following criteria.

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

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

(b) Anchor Test Results

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

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

(C) Temporary Wall Installation

Excavate as necessary for temporary walls in accordance with the plans 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** | **Pay Unit** |
|---|---|
| Temporary Shoring | 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.

**GROUT REFERENCES FOR POSITIVE PROTECTION:**
(5-19-15) 1170 SP11 R20

Revise the *2012 Standard Specifications* as follows:

**Page 11-14, Article 1170-2, Materials,** line 30, in the materials table, replace "Freeze-Thaw Durable Grout, Nonshrink" with "Grout, Type 3".

**Page 11-14, Article 1170-2, Materials,** lines 31-32, delete the first paragraph after the materials table.

**GROUT REFERENCES FOR UTILITY MANHOLES:**
(8-18-15) 1525 SP15 R40

Revise the *2012 Standard Specifications* as follows:

**Page 15-13, Article 1525-2, Materials,** line 9, in the materials table, add the following:

| Item | Section |
|---|---|
| Grout, Type 2 | 1003 |

**Page 15-13, Article 1525-2, Materials,** lines 20-21, replace the third paragraph after the materials table with the following:

Use Type 2 grout with properties that meet Table 1003-2 in the *Grout Production and Delivery* provision except provide grout with a plastic consistency in accordance with ASTM C1107.

**Page 15-14, Subarticle 1525-3(B), Installation of Precast Units,** line 22, in the second sentence of the first paragraph, replace "non-shrink grout." with "grout."

**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.

## EXPLORATORY EXCAVATION:

12-15-09 SPI 8-23

### Description

This work consists of performing exploratory excavation to locate existing underground utilities and storm drain systems as directed by the Engineer. This work will allow minor adjustments to be made prior to the installation of proposed storm drain systems and other items of work to alleviate conflicts.

### Construction Methods

*Exploratory Excavation – Standard* shall consist of removing asphalt, concrete, and earth material by use of standard construction equipment, materials, and laborers to locate accurately any existing underground utilities and storm drain systems. All excavations shall be backfilled with suitable material of the same type excavated. Use available unclassified excavation before using borrow excavation.

*Exploratory Excavation – Vacuum* shall consist of removing asphalt, concrete, and earth material by using a vacuum truck and any necessary laborers or contractor representatives to locate accurately any existing underground utilities and storm drain systems. All excavations shall be backfilled with suitable material of the same type excavated. Use available unclassified excavation before using borrow excavation.

### Measurement and Payment

*Exploratory Excavation – Standard* and *Exploratory Excavation – Vacuum* will be measured and paid for at the contract unit price per hour. Such prices and payment shall be full compensation for satisfactorily excavating and removing existing material, backfilling with suitable previously excavated earth material and any necessary traffic control. Compensation for any additional earth material needed for backfill will be provided under the contract line items for unclassified excavation or borrow excavation, with available unclassified excavation being utilized before borrow excavation. Any pavement that is removed shall be paved back with an approved mix type being used on the project and payment will be made at the appropriate line item unit price established in the contract.

The Contractor at no cost to the Department will correct any damage to existing underground or above ground structures, storm drain facilities, or utilities due to the negligence of the Contractor.

Payment will be made under:

| **Pay Item** | **Pay Unit** |
|---|---|
| Exploratory Excavation – Standard | Hour |
| Exploratory Excavation – Vacuum | Hour |

## 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:

| Restricted Noxious **Weed** | Limitations per Lb. Of Seed | Restricted Noxious **Weed** | Limitations per Lb. of Seed |
|---|---|---|---|
| Blessed Thistle | 4 seeds | Cornflower (Ragged Robin) | 27 seeds |
| Cocklebur | 4 seeds | Texas Panicum | 27 seeds |
| Spurred Anoda | 4 seeds | Bracted Plantain | 54 seeds |
| Velvetleaf | 4 seeds | Buckhorn Plantain | 54 seeds |
| Morning-glory | 8 seeds | Broadleaf Dock | 54 seeds |
| Corn Cockle | 10 seeds | Curly Dock | 54 seeds |
| Wild Radish | 12 seeds | Dodder | 54 seeds |
| Purple Nutsedge | 27 seeds | Giant Foxtail | 54 seeds |
| Yellow Nutsedge | 27 seeds | Horsenettle | 54 seeds |
| Canada Thistle | 27 seeds | Quackgrass | 54 seeds |
| Field Bindweed | 27 seeds | Wild Mustard | 54 seeds |
| Hedge Bindweed | 27 seeds | | |

Seed of Pensacola Bahiagrass shall not contain more than 7% inert matter, Kentucky Bluegrass, Centipede and Fine or Hard Fescue shall not contain more than 5% inert matter whereas a maximum of 2% inert matter will be allowed on all other kinds of seed. In addition, all seed shall not contain more than 2% other crop seed nor more than 1% total weed seed. The germination rate as tested by the North Carolina Department of Agriculture shall not fall below 70%, which includes both dormant and hard seed. Seed shall be labeled with not more than 7%, 5% or 2% inert matter (according to above specifications), 2% other crop seed and 1% total weed seed.

Exceptions may be made for minimum pure live seed allowances when cases of seed variety shortages are verified. Pure live seed percentages will be applied in a verified shortage situation. Those purchase orders of deficient seed lots will be credited with the percentage that the seed is deficient.

FURTHER SPECIFICATIONS FOR EACH SEED GROUP ARE GIVEN BELOW:

Minimum 85% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 83% pure live seed will not be approved.

Sericea Lespedeza
Oats (seeds)

Minimum 80% pure live seed; maximum 1% total weed seed; maximum 2% total other crop; maximum 144 restricted noxious weed seed per pound. Seed less than 78% pure live seed will not be approved.

Tall Fescue (all approved varieties)
Kobe Lespedeza
Korean Lespedeza
Weeping Lovegrass
Carpetgrass
Bermudagrass
Browntop Millet
German Millet – Strain R
Clover – Red/White/Crimson

Minimum 78% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 76% pure live seed will not be approved.

Common or Sweet Sundangrass

Minimum 76% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 74% pure live seed will not be approved.

Rye (grain; all varieties)
Kentucky Bluegrass (all approved varieties)
Hard Fescue (all approved varieties)
Shrub (bicolor) Lespedeza

Minimum 70% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 noxious weed seed per pound. Seed less than 70% pure live seed will not be approved.

Centipedegrass
Crownvetch
Pensacola Bahiagrass
Creeping Red Fescue
Japanese Millet
Reed Canary Grass
Zoysia

Minimum 70% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 5% inert matter; maximum 144 restricted noxious weed seed per pound.

Barnyard Grass
Big Bluestem
Little Bluestem
Bristly Locust
Birdsfoot Trefoil
Indiangrass
Orchardgrass
Switchgrass
Yellow Blossom Sweet Clover

## STANDARD SPECIAL PROVISION

## ERRATA

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

Revise the *2012 Standard Specifications* as follows:

### Division 2

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

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

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

### Division 3

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

### Division 4

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

### Division 6

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

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

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

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

### Division 7

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

### Division 8

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

### Division 10

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

**Division 12**

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

**Division 15**

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

**Division 17**

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

Revise the *2012 Roadway Standard Drawings* as follows:

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

## STANDARD SPECIAL PROVISION

## PLANT AND PEST QUARANTINES
**(Imported Fire Ant, Gypsy Moth, Witchweed, 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

## AWARD OF CONTRACT

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

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

## TITLE VI AND NONDISCRIMINATION

### I. Title VI Assurance

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

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

**(2) Nondiscrimination:** The Contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination prohibited by section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.

**(3) Solicitations for Subcontractors, Including Procurements of Materials and Equipment:** In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.

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

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

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

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

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

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

## II. Title VI Nondiscrimination Program

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

*Nondiscrimination Assurance*

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

*Obligation*

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

also responsible for making its subcontractors aware of NCDOT's Discrimination Complaints Process, as follows:

**FILING OF COMPLAINTS**

1. **Applicability** – These complaint procedures apply to the beneficiaries of the NCDOT's programs, activities, and services, including, but not limited to, members of the public, contractors, subcontractors, consultants, and other sub-recipients of federal and state funds.
2. **Eligibility** – Any person or class of persons who believes he/she has been subjected to discrimination or retaliation prohibited by any of the Civil Rights authorities, based upon race, color, sex, age, national origin, or disability, may file a written complaint with NCDOT's Civil Rights office. The law prohibits intimidation or retaliation of any sort. The complaint may be filed by the affected individual or a representative, and must be in writing.
3. **Time Limits and Filing Options** – A complaint must be filed no later than 180 calendar days after the following:
   - The date of the alleged act of discrimination; or
   - The date when the person(s) became aware of the alleged discrimination; or
   - Where there has been a continuing course of conduct, the date on which that conduct was discontinued or the latest instance of the conduct.

   Title VI and other discrimination complaints may be submitted to the following entities:
   - **North Carolina Department of Transportation**, Office of Equal Opportunity & Workforce Services (EOWS), External Civil Rights Section, 1511 Mail Service Center, Raleigh, NC 27699-1511; 919-508-1808 or toll free 800-522-0453
   - **US Department of Transportation**, Departmental Office of Civil Rights, External Civil Rights Programs Division, 1200 New Jersey Avenue, SE, Washington, DC 20590; 202-366-4070

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

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

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

     **Federal Aviation Administration**, Office of Civil Rights, 800 Independence Avenue, SW, Washington, DC 20591, 202-267-3258
   - **US Department of Justice**, Special Litigation Section, Civil Rights Division, 950 Pennsylvania Avenue, NW, Washington, DC 20530, 202-514-6255 or toll free 877-218-5228
4. **Format for Complaints –** Complaints must be in **writing** and **signed** by the complainant(s) or a representative and include the complainant's name, address, and telephone number. Complaints received by fax or e-mail will be acknowledged and processed. Allegations received by telephone will be reduced to writing and provided to the complainant for confirmation or revision before processing. Complaints will be accepted in other languages including Braille.

5. **Discrimination Complaint Form** – Contact NCDOT EOWS at the phone number above to receive a full copy of the Discrimination Complaint Form and procedures.
6. **Complaint Basis** – Allegations must be based on issues involving race, color, national origin, sex, age, or disability. The term "basis" refers to the complainant's membership in a protected group category. Contact this office to receive a Discrimination Complaint Form.

| Protected Categories | Definition | Examples | Applicable Statutes and Regulations | |
|---|---|---|---|---|
| | | | FHWA | FTA |
| Race | An individual belonging to one of the accepted racial groups; or the perception, based usually on physical characteristics that a person is a member of a racial group | Black/African American, Hispanic/Latino, Asian, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, White | Title VI of the Civil Rights Act of 1964; 49 CFR Part 21; 23 CFR 200 | Title VI of the Civil Rights Act of 1964; 49 CFR Part 21; Circular 4702.1B |
| Color | Color of skin, including shade of skin within a racial group | Black, White, brown, yellow, etc. | | |
| National Origin | Place of birth. Citizenship is not a factor. Discrimination based on language or a person's accent is also covered. | Mexican, Cuban, Japanese, Vietnamese, Chinese | | |
| Sex | Gender | Women and Men | 1973 Federal-Aid Highway Act | Title IX of the Education Amendments of 1972 |
| Age | Persons of any age | 21 year old person | Age Discrimination Act of 1975 | |
| Disability | Physical or mental impairment, permanent or temporary, or perceived. | Blind, alcoholic, para-amputee, epileptic, diabetic, arthritic | Section 504 of the Rehabilitation Act of 1973; Americans with Disabilities Act of 1990 | |

## III. Pertinent Nondiscrimination Authorities

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

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq*., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21.
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 *et seq*.), (prohibits discrimination on the basis of sex);

- Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 *et seq.*), as amended, (prohibits discrimination on the basis of disability); and 49 CFR Part 27;
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 *et seq.*), (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
- The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131 – 12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;
- The Federal Aviation Administration's Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;
- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).
- Title VII of the Civil Rights Act of 1964 (42 U.S.C. § 2000e *et seq.,* Pub. L. 88-352), (prohibits employment discrimination on the basis of race, color, religion, sex, or national origin);
- 49 CFR Part 26, regulation to ensure nondiscrimination in the award and administration of DOT-assisted contracts in the Department's highway, transit, and airport financial assistance programs, as regards the use of Disadvantaged Business Enterprises (DBEs);
- Form FHWA-1273, "Required Contract Provisions," a collection of contract provisions and proposal notices that are generally applicable to *all Federal-aid construction projects* and must be made a part of, and physically incorporated into, *all federally-assisted contracts*, as well as appropriate subcontracts and purchase orders, particularly Sections II (Nondiscrimination) and III (Nonsegregated Facilities).

## STANDARD SPECIAL PROVISION

## MINORITY AND FEMALE EMPLOYMENT REQUIREMENTS

Z-7

NOTICE OF REQUIREMENTS FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (*EXECUTIVE NUMBER 11246*)

1. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, see as shown on the attached sheet entitled "Employment Goals for Minority and Female participation".

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and nonfederally involved construction.

The Contractor's compliance with the Executive Order and the regulations in *41 CFR Part 60-4* shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in *41 CFR 60-4.3(a)*, and its effort to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project or the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the executive Order and the regulations *in 41 CFR Part 60-4*. Compliance with the goals will be measured against the total work hours performed.

2. As used in this Notice and in the contract resulting from this solicitation, the "covered area" is the county or counties shown on the cover sheet of the proposal form and contract.

## EMPLOYMENT GOALS FOR MINORITY AND FEMALE PARTICIPATION

Economic Areas

***Area 023 29.7%***
Bertie County
Camden County
Chowan County
Gates County
Hertford County
Pasquotank County
Perquimans County

***Area 024 31.7%***
Beaufort County
Carteret County
Craven County
Dare County
Edgecombe County
Green County
Halifax County
Hyde County
Jones County
Lenoir County
Martin County
Nash County
Northampton County
Pamlico County
Pitt County
Tyrrell County
Washington County
Wayne County
Wilson County

***Area 025 23.5%***
Columbus County
Duplin County
Onslow County
Pender County

***Area 026 33.5%***
Bladen County
Hoke County
Richmond County
Robeson County
Sampson County
Scotland County

***Area 027 24.7%***
Chatham County
Franklin County
Granville County
Harnett County
Johnston County
Lee County
Person County
Vance County
Warren County

***Area 028 15.5%***
Alleghany County
Ashe County
Caswell County
Davie County
Montgomery County
Moore County
Rockingham County
Surry County
Watauga County
Wilkes County

***Area 029 15.7%***
Alexander County
Anson County
Burke County
Cabarrus County
Caldwell County
Catawba County
Cleveland County
Iredell County
Lincoln County
Polk County
Rowan County
Rutherford County
Stanly County

***Area 0480 8.5%***
Buncombe County
Madison County

***Area 030 6.3%***
Avery County
Cherokee County
Clay County
Graham County
Haywood County
Henderson County
Jackson County
McDowell County
Macon County
Mitchell County
Swain County
Transylvania County
Yancey County

**SMSA Areas**

***Area 5720 26.6%***
Currituck County

***Area 9200 20.7%***
Brunswick County
New Hanover County

***Area 2560 24.2%***
Cumberland County

***Area 6640 22.8%***
Durham County
Orange County
Wake County

***Area 1300 16.2%***
Alamance County

***Area 3120 16.4%***
Davidson County
Forsyth County
Guilford County
Randolph County
Stokes County
Yadkin County

***Area 1520 18.3%***
Gaston County
Mecklenburg County
Union County

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Goals for Female

Participation in Each Trade

(Statewide) 6.9%

# STANDARD SPECIAL PROVISION

## REQUIRED CONTRACT PROVISIONS FEDERAL - AID CONSTRUCTION CONTRACTS

FHWA - 1273 Electronic Version - May 1, 2012 Z-8

I. General
II. Nondiscrimination
III. Nonsegregated Facilities
IV. Davis-Bacon and Related Act Provisions
V. Contract Work Hours and Safety Standards Act Provisions
VI. Subletting or Assigning the Contract
VII. Safety: Accident Prevention
VIII. False Statements Concerning Highway Projects
IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
X. Compliance with Governmentwide Suspension and Debarment Requirements
XI. Certification Regarding Use of Contract Funds for Lobbying

**ATTACHMENTS**

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

### I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

   The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

   Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

   Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).
2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.
3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.
4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

### II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding $10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. **Equal Employment Opportunity:** Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are

incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.
b. The contractor will accept as its operating policy the following statement:
"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. **EEO Officer:** The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.
3. **Dissemination of Policy:** All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:
   a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.
   b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.
   c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.
   d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.
   e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.
4. **Recruitment:** When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.
   a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.
   b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.
   c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.
5. **Personnel Actions:** Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:
   a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.
   b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.
   c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.
   d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.
6. **Training and Promotion:**
   a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.
   b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).
   c The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.
   d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. **Unions:** If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:
   a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.
   b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.
   c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.
   d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.
8. **Reasonable Accommodation for Applicants / Employees with Disabilities:** The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.
9. **Selection of Subcontractors, Procurement of Materials and Leasing of Equipment:** The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.
   a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.
   b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.
10. **Assurance Required by 49 CFR 26.13(b):**
   a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.
   b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.
11. **Records and Reports:** The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.
   a. The records kept by the contractor shall document the following:
      (1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;
      (2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and
      (3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;
   b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

## III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

## IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding $2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. **Minimum wages**
   a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the

Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH–1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. (1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. **Withholding.** The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. **Payrolls and basic records**

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the

payrolls shall only need to include an individually identifying number for each employee ( e.g. , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH–347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/esa/whd/forms/ wh347instr.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency.

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH–347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. **Apprentices and trainees**

a. Apprentices (programs of the USDOL). Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL). Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT). Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. **Compliance with Copeland Act requirements.** The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.
6. **Subcontracts.** The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.
7. **Contract termination:** debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.
8. **Compliance with Davis-Bacon and Related Act requirements.** All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.
9. **Disputes concerning labor standards.** Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.
10. **Certification of eligibility.**
    a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
    b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
    c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

## V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. **Overtime requirements.** No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.
2. **Violation; liability for unpaid wages; liquidated damages.** In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.
3. **Withholding for unpaid wages and liquidated damages.** The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.
4. **Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

## VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).
    a. The term "perform work with its own organization" refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:
    (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;

(2) the prime contractor remains responsible for the quality of the work of the leased employees;
(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.
3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.
4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.
5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

## VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.
2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).
3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

## VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

## IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.
2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

**X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION**

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost $25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1. **Instructions for Certification – First Tier Participants:**
   a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.
   b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.
   c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.
   d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
   e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).
   f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.
   g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold.
   h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (https://www.epls.gov/), which is compiled by the General Services Administration.
   i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
   j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

* * * * *

2. **Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:**
   a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:
      (1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;
      (2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
      (3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and
      (4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
   b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.
2. **Instructions for Certification - Lower Tier Participants:**
   (Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost $25,000 or more - 2 CFR Parts 180 and 1200)
   a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.
   b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.
d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).
e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.
f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold.
g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (https://www.epls.gov/), which is compiled by the General Services Administration.
h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

**Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:**

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.
2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

**XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING**

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed $100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:
   a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
   b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.
3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such recipients shall certify and disclose accordingly.

## STANDARD SPECIAL PROVISION

## ON-THE-JOB TRAINING

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

### Description

The North Carolina Department of Transportation will administer a custom version of the Federal On-the-Job Training (OJT) Program, commonly referred to as the Alternate OJT Program. All contractors (existing and newcomers) will be automatically placed in the Alternate Program. Standard OJT requirements typically associated with individual projects will no longer be applied at the project level. Instead, these requirements will be applicable on an annual basis for each contractor administered by the OJT Program Manager.

On the Job Training shall meet the requirements of 23 CFR 230.107 (b), 23 USC – Section 140, this provision and the On-the-Job Training Program Manual.

The Alternate OJT Program will allow a contractor to train employees on Federal, State and privately funded projects located in North Carolina. However, priority shall be given to training employees on NCDOT Federal-Aid funded projects.

### Minorities and Women

Developing, training and upgrading of minorities and women toward journeyman level status is a primary objective of this special training provision. Accordingly, the Contractor shall make every effort to enroll minority and women as trainees to the extent that such persons are available within a reasonable area of recruitment. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

### Assigning Training Goals

The Department, through the OJT Program Manager, will assign training goals for a calendar year based on the contractors' past three years' activity and the contractors' anticipated upcoming year's activity with the Department. At the beginning of each year, all contractors eligible will be contacted by the Department to determine the number of trainees that will be assigned for the upcoming calendar year. At that time the Contractor shall enter into an agreement with the Department to provide a self-imposed on-the-job training program for the calendar year. This agreement will include a specific number of annual training goals agreed to by both parties. The number of training assignments may range from 1 to 15 per contractor per calendar year. The Contractor shall sign an agreement to fulfill their annual goal for the year.\

**Training Classifications**

The Contractor shall provide on-the-job training aimed at developing full journeyman level workers in the construction craft/operator positions. Preference shall be given to providing training in the following skilled work classifications:

| | |
|---|---|
| Equipment Operators | Office Engineers |
| Truck Drivers | Estimators |
| Carpenters | Iron / Reinforcing Steel Workers |
| Concrete Finishers | Mechanics |
| Pipe Layers | Welders |

The Department has established common training classifications and their respective training requirements that may be used by the contractors. However, the classifications established are not all-inclusive. Where the training is oriented toward construction applications, training will be allowed in lower-level management positions such as office engineers and estimators. Contractors shall submit new classifications for specific job functions that their employees are performing. The Department will review and recommend for acceptance to FHWA the new classifications proposed by contractors, if applicable. New classifications shall meet the following requirements:

Proposed training classifications are reasonable and realistic based on the job skill classification needs, and

The number of training hours specified in the training classification is consistent with common practices and provides enough time for the trainee to obtain journeyman level status.

The Contractor may allow trainees to be trained by a subcontractor provided that the Contractor retains primary responsibility for meeting the training and this provision is made applicable to the subcontract. However, only the Contractor will receive credit towards the annual goal for the trainee.

Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. The number of trainees shall be distributed among the work classifications on the basis of the contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment.

No employee shall be employed as a trainee in any classification in which they have successfully completed a training course leading to journeyman level status or in which they have been employed as a journeyman.

**Records and Reports**

The Contractor shall maintain enrollment, monthly and completion reports documenting company compliance under these contract documents. These documents and any other information as requested shall be submitted to the OJT Program Manager.

Upon completion and graduation of the program, the Contractor shall provide each trainee with a certification Certificate showing the type and length of training satisfactorily completed.

**Trainee Interviews**

All trainees enrolled in the program will receive an initial and Trainee/Post graduate interview conducted by the OJT program staff.

**Trainee Wages**

Contractors shall compensate trainees on a graduating pay scale based upon a percentage of the prevailing minimum journeyman wages (Davis-Bacon Act). Minimum pay shall be as follows:

| | |
|---|---|
| 60 percent | of the journeyman wage for the first half of the training period |
| 75 percent | of the journeyman wage for the third quarter of the training period |
| 90 percent | of the journeyman wage for the last quarter of the training period |

In no instance shall a trainee be paid less than the local minimum wage. The Contractor shall adhere to the minimum hourly wage rate that will satisfy both the NC Department of Labor (NCDOL) and the Department.

**Achieving or Failing to Meet Training Goals**

The Contractor will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and who receives training for at least 50 percent of the specific program requirement. Trainees will be allowed to be transferred between projects if required by the Contractor's scheduled workload to meet training goals.

If a contractor fails to attain their training assignments for the calendar year, they may be taken off the NCDOT's Bidders List.

**Measurement and Payment**

No compensation will be made for providing required training in accordance with these contract documents.

## STANDARD SPECIAL PROVISION

## NAME CHANGE FOR NCDENR

(1-19-16) Z-11

### Description

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

**STANDARD SPECIAL PROVISION**
**MINIMUM WAGES**
**GENERAL DECISION NC160103 01/08/2016 NC103**

Z-103

Date: January 8, 2016

General Decision Number: NC160103 01/08/2016 NC103

Superseded General Decision Numbers: NC20150103

State: North Carolina

Construction Type: HIGHWAY

**COUNTIES:**

| | | |
|---|---|---|
| Brunswick | Greene | Onslow |
| Cumberland | Hoke | Pender |
| Currituck | Johnston | Pitt |
| Edgecombe | Nash | Wake |
| Franklin | New Hanover | Wayne |

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).

Note: Executive Order (EO) 13658 establishes an hourly minimum wage of $10.15 for calendar year 2016 that applies to all contracts subject to the Davis-Bacon Act for which the solicitation is issued on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.15 (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract for calendar year 2016. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

| Modification Number | Publication Date |
|---|---|
| 0 | 01/08/2016 |

SUNC2014-005 11/17/2014

| | Rates | Fringes |
|---|---|---|
| BLASTER | 21.04 | |
| CARPENTER | 13.72 | |
| CEMENT MASON/CONCRETE FINISHER | 14.48 | |
| ELECTRICIAN | | |
| Electrician | 17.97 | |
| Telecommunications Technician | 16.79 | .63 |
| IRONWORKER | 16.02 | |
| LABORER | | |
| Asphalt Raker and Spreader | 12.46 | |
| Asphalt Screed/Jackman | 14.33 | |
| Carpenter Tender | 12.88 | |

| | Rates | Fringes |
|---|---|---|
| Cement Mason/Concrete Finisher Tender | 12.54 | |
| Common or General | 10.20 | |
| Guardrail/Fence Installer | 12.87 | |
| Pipelayer | 12.17 | |
| Traffic Signal/Lighting Installer | 14.89 | |
| PAINTER | | |
| Bridge | 24.57 | |
| POWER EQUIPMENT OPERATORS | | |
| Asphalt Broom Tractor | 11.85 | |
| Bulldozer Fine | 17.04 | |
| Bulldozer Rough | 14.34 | |
| Concrete Grinder/Groover | 20.34 | 2.30 |
| Crane Boom Trucks | 20.54 | |
| Crane Other | 20.08 | |
| Crane Rough/All-Terrain | 20.67 | |
| Drill Operator Rock | 14.38 | |
| Drill Operator Structure | 21.14 | |
| Excavator Fine | 16.60 | |
| Excavator Rough | 14.00 | |
| Grader/Blade Fine | 18.47 | |
| Grader/Blade Rough | 14.62 | |
| Loader 2 Cubic Yards or Less | 13.76 | |
| Loader Greater Than 2 Cubic Yards | 14.14 | |
| Material Transfer Vehicle (Shuttle Buggy) | 15.18 | |
| Mechanic | 17.55 | |
| Milling Machine | 15.36 | |
| Off-Road Hauler/Water Tanker | 11.36 | |
| Oiler/Greaser | 13.55 | |
| Pavement Marking Equipment | 12.11 | |
| Paver Asphalt | 15.59 | |
| Paver Concrete | 18.20 | |
| Roller Asphalt Breakdown | 12.45 | |
| Roller Asphalt Finish | 13.85 | |
| Roller Other | 11.36 | |
| Scraper Finish | 12.71 | |
| Scraper Rough | 11.35 | |
| Slip Form Machine | 16.50 | |
| Tack Truck/Distributor Operator | 14.52 | |
| TRUCK DRIVER | | |
| GVWR of 26,000 Lbs or Less | 11.12 | |
| GVWR of 26,000 Lbs or Greater | 12.37 | |

Welders – Receive rate prescribed for craft performing operation to which welding is incidental.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage

determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U. S. Department of Labor
200 Constitution Avenue, N.W.
Washington, D.C. 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, D.C. 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, D.C. 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

## PROJECT SPECIAL PROVISIONS

## GEOTECHNICAL


| | | |
|---|---|---|
| GEOTEXTILE FOR PAVEMENT STABILIZATION - (1/21/2014) | GT-1.1 | - GT-1.2 |
| STANDARD SHORING - (3/17/2015) | GT-2.1 | - GT-2.4 |
| TEMPORARY SOIL NAIL WALLS - (3/17/2015) | GT-3.1 | - GT-3.9 |
| MSE RETAINING WALLS (SPECIAL) | GT-4.1 | - GT-4.10 |
| DRILLED PIERS (LRFD) - (10/20/2015) | GT-5.1 | - GT-5.2 |
| PILES (LRFD) - (10/20/2015) | GT-6.1 | - GT-6.2 |
| SCARIFY/MIX EXISTING DRAINAGE LAYERS (SPECIAL) | GT-7.1 | - GT-7.1 |
| SOLDIER PILE RETAINING WALLS (LRFD) - (3/17/2015) | GT-8.1 | - GT-8.8 |


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4/7/2016

**GEOTEXTILE FOR PAVEMENT STABILIZATION:** **(1-21-14)**

**Description**

Furnish and place geotextile for pavement stabilization in accordance with the contract. Geotextile for pavement stabilization may be required to prevent pavement cracking and provide separation between the subgrade and pavement section at locations shown in the plans and as directed.

**Materials**

Refer to Division 10 of the *Standard Specifications*.

| **Item** | **Section** |
|---|---|
| Geotextiles | 1056 |

Provide Type 5 geotextile for geotextile for pavement stabilization that meets the following requirements:

| **GEOTEXTILE FOR PAVEMENT STABILIZATION REQUIREMENTS** | | |
|---|---|---|
| **Property** | **Requirement (MARV[A])** | **Test Method** |
| Tensile Strength @ 5% Strain (MD & CD[A]) | 1,900 lb/ft | ASTM D4595 |
| Ultimate Tensile Strength (MD & CD[A]) | 4,800 lb/ft | ASTM D4595 |
| Melting Point | 300° F | ASTM D276 |

A. Define "minimum average roll value" (MARV), "machine direction" (MD) and "cross-machine direction" (CD) in accordance with ASTM D4439.

**Construction Methods**

Notify the Engineer when the roadbed is completed within 2" of subgrade elevation. The Engineer will sample and test subgrade soils for quality to determine if geotextile for pavement stabilization is required at locations shown in the plans and other locations as directed. For subgrades without stabilization, allow 24 days to determine if geotextile for pavement stabilization is required. For stabilized subgrades with geotextile for pavement stabilization, stabilize subgrade soils to 12" beyond the base course as shown in the plans.

Place geotextile for pavement stabilization on subgrades immediately below pavement sections as shown in the plans and in slight tension free of kinks, folds, wrinkles or creases. Install geotextiles with the MD perpendicular to the roadway centerline. The MD is the direction of the length or long dimension of the geotextile roll. Do not splice or overlap geotextiles in the MD so splices or overlaps are parallel to the roadway centerline. Extend geotextile for pavement stabilization 12" beyond the base course as shown in the plans.

Completely cover subgrades with geotextile for pavement stabilization so geotextiles are adjacent to each other in the CD, i.e., perpendicular to the MD. The CD is the direction of the width or short dimension of the geotextile roll. Overlapping geotextiles in the CD is permitted but not required. Overlap geotextiles in the direction that base course will be placed to prevent lifting the edge of the top geotextile.

For asphalt base courses, asphalt mixture temperatures in the truck may not exceed 315° F at the time of placement. Do not damage geotextile for pavement stabilization when constructing base

courses. Place and compact base courses in accordance with the *Standard Specifications*. Do not operate heavy equipment on geotextiles any more than necessary to construct pavement sections. Replace any damaged geotextiles to the satisfaction of the Engineer.

**Measurement and Payment**

*Geotextile for Pavement Stabilization* will be measured and paid in square yards. Geotextiles will be measured along subgrades as the square yards of exposed geotextiles before placing base courses. No measurement will be made for overlapping geotextiles. The contract unit price for *Geotextile for Pavement Stabilization* will be full compensation for providing, transporting and placing geotextiles.

Payment will be made under:

| **Pay Item** | **Pay Unit** |
|---|---|
| Geotextile for Pavement Stabilization | Square Yard |

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**STANDARD SHORING:** **(3-17-15)**

**Description**

Standard shoring includes standard temporary shoring and standard temporary mechanically stabilized earth (MSE) walls. At the Contractor's option, use standard shoring as noted in the plans or as directed. When using standard shoring, a temporary shoring design submittal is not required. Construct standard shoring based on actual elevations and shoring dimensions in accordance with the contract and Standard Detail No. 1801.01 or 1801.02.

Define "standard temporary shoring" as cantilever shoring that meets the standard temporary shoring detail (Standard Detail No. 1801.01). Define "standard temporary wall" as a temporary MSE wall with geotextile or geogrid reinforcement that meets the standard temporary wall detail (Standard Detail No. 1801.02). Define "standard temporary geotextile wall" as a standard temporary wall with geotextile reinforcement and "standard temporary geogrid wall" as a standard temporary wall with geogrid reinforcement. Define "geosynthetics" as geotextiles or geogrids.

Provide positive protection for standard shoring at locations shown in the plans and as directed. See *Temporary Shoring* provision for positive protection types and definitions.

**Materials**

Refer to the *Standard Specifications*.

| Item | Section |
|---|---|
| Anchor Pins | 1056-2 |
| Concrete Barrier Materials | 1170-2 |
| Flowable Fill, Excavatable | 1000-6 |
| Geotextiles | 1056 |
| Grout, Type 1 | 1003 |
| Portland Cement Concrete | 1000 |
| Select Material | 1016 |
| Steel Beam Guardrail Materials | 862-2 |
| Steel Sheet Piles and H-Piles | 1084 |
| Untreated Timber | 1082-2 |
| Welded Wire Reinforcement | 1070-3 |
| Wire Staples | 1060-8(D) |

Provide Type 6 material certifications for shoring materials. Use Class IV select material (standard size No. ABC) for temporary guardrail. Use Class A concrete that meets Article 450-2 of the *Standard Specifications* or grout for drilled-in piles.

Based on actual shoring height, positive protection, groundwater elevation, slope or surcharge case and traffic impact at each standard temporary shoring location, use sheet piles with the minimum required section modulus or H-piles with the sizes shown in Standard Detail No. 1801.01. Use untreated timber with a thickness of at least 3" and a bending stress of at least 1,000 psi for timber lagging.

**(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 the following:

(1) A-2-4 soil for backfill around culverts,

(2) A-2-4 soil in the reinforced zone of standard temporary walls with a back slope and

(3) Class VI select material in the reinforced zone of standard temporary geotextile walls.

**(B) Standard Temporary Walls**

Use welded wire reinforcement for welded wire facing, struts and wires with the dimensions and minimum wire sizes shown in Standard Detail No. 1801.02. Provide Type 2 geotextile for separation and retention geotextiles. Define "machine direction" (MD) and "cross-machine direction" (CD) for geosynthetics in accordance with ASTM D4439. Do not use more than 4 different reinforcement strengths for each standard temporary wall.

(1) Geotextile Reinforcement

Provide Type 5 geotextile for geotextile reinforcement with a mass per unit area of at least 8 oz/sy in accordance with ASTM D5261. Based on actual wall height, groundwater elevation, slope or surcharge case and shoring backfill to be used in the reinforced zone at each standard temporary geotextile wall location, provide geotextiles with ultimate tensile strengths as shown in Standard Detail No. 1801.02.

(2) Geogrid Reinforcement

Handle and store geogrids in accordance with Article 1056-2 of the *Standard Specifications*. 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

Based on actual wall height, groundwater elevation, slope or surcharge case and shoring backfill to be used in the reinforced zone at each standard temporary geogrid wall location, provide geogrids for geogrid reinforcement with short-term design strengths as shown in Standard Detail No. 1801.02. 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 |

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.

**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 standard shoring except for barrier above standard temporary walls. Concrete barrier with the minimum required clear distance is required above standard temporary walls.

**(B) Temporary Guardrail**

Define "clear distance" behind temporary guardrail as the horizontal distance between guardrail posts and standard shoring. At the Contractor's option or if clear distance for standard temporary 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 standard temporary walls.

**(C) Standard Shoring Selection Forms**

Before beginning standard shoring construction, survey existing ground elevations in the vicinity of standard shoring locations to determine actual shoring or wall heights (H). Submit a standard shoring selection form for each location at least 7 days before starting standard shoring construction. Standard shoring selection forms are available from: connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx

**(D) Preconstruction Meeting**

The Engineer may require a shoring preconstruction meeting to discuss the construction and inspection of the standard shoring. If required, schedule this meeting after all standard shoring selection forms have been submitted. 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**

Construct standard shoring in accordance with the *Temporary Shoring* provision.

**(A) Standard Temporary Shoring Installation**

Based on actual shoring height, positive protection, groundwater elevation, slope or surcharge case and traffic impact at each standard temporary shoring location, install piles with the minimum required embedment and extension for each shoring section in accordance with Standard Detail No. 1801.01. For concrete barrier above and next to standard temporary shoring and temporary guardrail above and attached to standard temporary shoring, use "surcharge case with traffic impact" in accordance with Standard Detail No. 1801.01. Otherwise, use "slope or surcharge case with no traffic impact" in accordance with Standard Detail No. 1801.01. If refusal is reached before driven piles attain the minimum required embedment, use drilled-in H-piles with timber lagging for standard temporary shoring.

**(B) Standard Temporary Walls Installation**

Based on actual wall height, groundwater elevation, slope or surcharge case, geotextile or geogrid reinforcement and shoring backfill in the reinforced zone at each standard temporary wall location, construct walls with the minimum required reinforcement length and number of reinforcement layers for each wall section in accordance with Standard Detail No. 1801.02. For standard temporary walls with pile foundations in the reinforced zone, drive piles through reinforcement after constructing temporary walls.

For standard temporary walls with interior angles less than 90°, wrap geosynthetics at acute corners as directed by the Engineer. Place geosynthetics as shown in Standard Detail No. 1801.02. Place separation geotextiles 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, place separation geotextiles between shoring backfill and backfill or natural ground on top of and at the back of the reinforced zone.

**Measurement and Payment**

Standard shoring will be measured and paid in accordance with the *Temporary Shoring* provision.

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**TEMPORARY SOIL NAIL WALLS:** **(3-17-15)**

**Description**

Construct temporary soil nail walls consisting of soil nails spaced at a regular pattern and connected to a reinforced shotcrete face. A soil nail consists of a steel bar grouted in a drilled hole inclined at an angle below horizontal. At the Contractor's option, use temporary soil nail walls instead of temporary shoring for full cut sections. Design and construct temporary soil nail walls based on actual elevations and wall dimensions in accordance with the contract and accepted submittals. Use a prequalified Anchored Wall Contractor to construct temporary soil nail walls. Define "soil nail wall" as a temporary soil nail wall and "Soil Nail Wall Contractor" as the Anchored Wall Contractor installing soil nails and applying shotcrete. Define "nail" as a soil nail.

Provide positive protection for soil nail walls at locations shown in the plans and as directed. See *Temporary Shoring* provision for positive protection types and definitions.

**Materials**

Refer to Division 10 of the *Standard Specifications*.

| Item | Section |
|---|---|
| Anchor Pins | 1056-2 |
| Geocomposites | 1056 |
| Grout, Type 2 | 1003 |
| Reinforcing Steel | 1070 |
| Shotcrete | 1002 |
| Select Material, Class IV | 1016 |
| Steel Plates | 1072-2 |

Use Class IV select material (standard size No. ABC) for temporary guardrail and neat cement grout for Type 2 grout.

Provide soil nails consisting of grouted steel bars and nail head assemblies. Use deformed steel bars that meet AASHTO M 275 or M 31, Grade 60 or 75. Splice bars in accordance with Article 1070-9 of the *Standard Specifications*.

Fabricate centralizers from schedule 40 PVC plastic pipe or tube, steel or other material not detrimental to steel bars (no wood). Size centralizers to position bars within 1" of drill hole centers and allow tremies to be inserted to ends of holes. Use centralizers that do not interfere with grout placement or flow around bars.

Provide nail head assemblies consisting of nuts, washers and bearing plates. Use steel plates for bearing plates and steel washers and hex nuts recommended by the Soil Nail Manufacturer.

Provide Type 6 material certifications for soil nail materials in accordance with Article 106-3 of the *Standard Specifications*. 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 soil nail wall materials so materials are kept clean and free of damage. Bent, damaged or defective materials will be rejected.

**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 soil nail walls except for barrier above walls. Concrete barrier with the minimum required clear distance is required above soil nail walls.

**(B) Temporary Guardrail**

Define "clear distance" behind temporary guardrail as the horizontal distance between guardrail posts and soil nail walls. At the Contractor's option or if clear distance for soil nail walls is less than 4 ft, use temporary guardrail with 8 ft posts and a clear distance of at least 2.5 ft. Place ABC in clear distance and around guardrail posts instead of pavement.

**(C) Soil Nail Wall Designs**

Before beginning soil nail wall design, survey existing ground elevations in the vicinity of wall locations to determine actual design heights (H). Use a prequalified Anchored Wall Design Consultant to design soil nail walls. Provide designs sealed by a Design Engineer approved as a Geotechnical Engineer (key person) for the Anchored Wall Design Consultant.

Submit 8 copies of working drawings and 3 copies of design calculations and a PDF copy of each for soil nail wall designs in accordance with Article 105-2 of the *Standard Specifications*. Submit working drawings showing plan views, wall profiles, typical sections and details of soil nail wall design and construction sequence. Include details in working drawings of soil nail locations, unit grout/ground bond strengths, shotcrete reinforcement and if necessary, obstructions extending through walls or interfering with nails. Include details in construction sequence of excavation, grouting, installing reinforcement, nail testing and shotcreting with mix designs and shotcrete nozzleman certifications. Do not begin soil nail wall construction until a design submittal is accepted.

Design soil nail walls in accordance with the plans and allowable stress design method in the *FHWA Geotechnical Engineering Circular No. 7 "Soil Nail Walls"* (Publication No. FHWA-IF-03-017) unless otherwise required.

Design soil nails that meet the following unless otherwise approved:

(1) Horizontal and vertical spacing of at least 3 ft,

(2) Inclination of at least 12° below horizontal and

(3) Diameter of 4" to 10".

Do not extend nails beyond right-of-way or easement limits. If existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with nails, maintain a clearance of at least 6" between obstructions and nails.

Design soil nail walls for a traffic surcharge of 250 lb/sf if traffic will be above and within H of walls. This traffic surcharge does not apply to construction traffic. Design

soil nail walls for any construction surcharge if construction traffic will be above and within H of walls. For temporary guardrail with 8 ft posts above soil nail walls, analyze walls for a horizontal load of 300 lb/ft of wall.

Place geocomposite drain strips with a horizontal spacing of no more than 10 ft and center strips between adjacent nails. Attach drain strips to excavation faces. Use shotcrete at least 4" thick and reinforce shotcrete with #4 waler bars around nail heads. Two waler bars (one on each side of nail head) in the horizontal and vertical directions are required for a total of 4 bars per nail.

**(D) Preconstruction Meeting**

Before starting soil nail wall construction, hold a preconstruction meeting to discuss the construction, inspection and testing of the soil nail walls. If this meeting occurs before all soil nail wall submittals have been accepted, additional preconstruction meetings may be required before beginning construction of soil nail walls without accepted submittals. The Resident, District or Bridge Maintenance Engineer, Bridge or Roadway Construction Engineer, Geotechnical Operations Engineer, Contractor and Soil Nail Wall Contractor Superintendent will attend preconstruction meetings.

**Construction Methods**

Control drainage during construction in the vicinity of soil nail walls. Direct run off away from soil nail walls and areas above and behind walls.

Install foundations located behind soil nail walls before beginning wall construction. Do not excavate behind soil nail walls. If overexcavation occurs, repair walls with an approved method and a revised soil nail wall design may be required.

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

**(A) Excavation**

Excavate for soil nail walls from the top down in accordance with the accepted submittals. Excavate in staged horizontal lifts with no negative batter (excavation face leaning forward). Excavate lifts in accordance with the following:

(1) Heights not to exceed vertical nail spacing,

(2) Bottom of lifts no more than 3 ft below nail locations for current lift and

(3) Horizontal and vertical alignment within 6" of location shown in the accepted submittals.

Remove any cobbles, boulders, rubble or debris that will protrude more than 2" into the required shotcrete thickness. Rocky ground such as colluvium, boulder fills and weathered rock may be difficult to excavate without leaving voids.

Apply shotcrete to excavation faces within 24 hours of excavating each lift unless otherwise approved. Shotcreting 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 soil nail 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 soil nail wall design may be required.

Do not excavate the next lift until nail installations and testing and shotcrete application for the current lift are accepted and grout and shotcrete for the current lift have cured at least 3 days and 1 day, respectively.

**(B) Soil Nails**

Drill and grout nails the same day and do not leave drill holes open overnight. Control drilling and grouting to prevent excessive ground movements, damaging structures and pavements or fracturing rock and soil formations. If ground heave or subsidence occurs, suspend soil nail wall construction and take corrective action to minimize movement. If property damage occurs, make repairs with an approved method and a revised soil nail wall design may be required.

(1) Drilling

Use drill rigs of the sizes necessary to install soil nails and with sufficient capacity to drill through whatever materials are encountered. Drill straight and clean holes with the dimensions and inclination shown in the accepted submittals. Drill holes within 6" of locations and 2° of inclination shown in the accepted submittals unless otherwise approved.

Stabilize drill holes with temporary casings if unstable, caving or sloughing material is anticipated or encountered. Do not use drilling fluids to stabilize drill holes or remove cuttings.

(2) Steel Bars

Center steel bars in drill holes with centralizers. Securely attach centralizers along bars at no more than 8 ft centers. Attach uppermost and lowermost centralizers 18" from excavation faces and ends of holes.

Do not insert steel bars into drill holes until hole locations, dimensions, inclination and cleanliness are approved. Do not vibrate, drive or otherwise force bars into holes. If a steel bar cannot be completely and easily inserted into a drill hole, remove the bar and clean or redrill the hole.

(3) Grouting

Remove oil, rust inhibitors, residual drilling fluids and similar foreign materials from holding tanks/hoppers, stirring devices, pumps, lines, tremie pipes and any other equipment in contact with grout before use. Measure grout temperature, density and flow during grouting with at least the same frequency grout cubes are made for compressive strength. Perform density and flow field tests in the presence of the Engineer in accordance with American National Standards

Institute/American Petroleum Institute Recommended Practice 13B-1 (Section 4, Mud Balance) and ASTM C939 (Flow Cone), respectively.

Inject grout at the lowest point of drill holes through tremies, e.g., grout tubes, casings, hollow-stem augers or drill rods, in one continuous operation. Fill drill holes progressively from ends of holes to excavation faces and withdraw tremies at a slow even rate as holes are filled to prevent voids in grout. Extend tremies into grout at least 5 ft at all times except when grout is initially placed in holes.

Provide grout free of segregation, intrusions, contamination, structural damage or inadequate consolidation (honeycombing). Cold joints in grout are not allowed except for test nails. Remove any temporary casings as grout is placed and record grout volume for each drill hole.

(4) Nail Heads

Install nail head assemblies after shotcreting. Before shotcrete reaches initial set, seat bearing plates and tighten nuts so plates contact shotcrete uniformly. If uniform contact is not possible, install nail head assemblies on mortar pads so nail heads are evenly loaded.

**(C) Drain Strips**

Install geocomposite drain strips as shown in the accepted submittals. Before installing shotcrete reinforcement, place drain strips with the geotextile side against excavation faces. For highly irregular faces and at the discretion of the Engineer, drain strips may be placed after shotcreting over weep holes through the shotcrete. Hold drain strips in place with anchor pins so strips are in continuous contact with surfaces to which they are attached and allow for full flow the entire height of soil nail walls. Discontinuous drain strips are not allowed. If splices are needed, overlap drain strips at least 12" so flow is not impeded. Cut off excess drain strip length and expose strip ends below shotcrete when soil nail wall construction is complete.

**(D) Shotcrete**

Clean ungrouted zones of drill holes and excavation faces of loose materials, mud, rebound and other foreign material. Moisten surfaces to receive shotcrete. Install shotcrete reinforcement in accordance with the contract and accepted submittals. Secure reinforcing steel so shooting does not displace or vibrate reinforcement. Install approved thickness gauges on 5 ft centers in the horizontal and vertical directions to measure shotcrete thickness.

Apply shotcrete in accordance with the contract, accepted submittals and Subarticle 1002-3(F) of the *Standard Specifications*. Use approved shotcrete nozzlemen who made satisfactory preconstruction test panels to apply shotcrete. Direct shotcrete at right angles to excavation faces except when shooting around reinforcing steel. Rotate nozzle steadily in small circular patterns and apply shotcrete from bottom of lifts up.

Make shotcrete surfaces uniform and free of sloughing or sagging. Completely fill ungrouted zones of drill holes and any other voids with shotcrete. Taper construction joints to a thin edge over a horizontal distance of at least the shotcrete thickness. Wet joint surfaces before shooting adjacent sections.

Repair surface defects as soon as possible after shooting. Remove any shotcrete which lacks uniformity, exhibits segregation, honeycombing or lamination or contains any voids or sand pockets and replace with fresh shotcrete to the satisfaction of the Engineer. Protect shotcrete from freezing and rain until shotcrete reaches initial set.

**(E) Construction Records**

Provide 2 copies of soil nail wall construction records within 24 hours of completing each lift. Include the following in construction records:

(1) Names of Soil Nail Wall Contractor, Superintendent, Nozzleman, Drill Rig Operator, Project Manager and Design Engineer;

(2) Wall description, county, Department's contract, TIP and WBS element number;

(3) Wall station and number and lift location, dimensions, elevations and description;

(4) Nail locations, dimensions and inclinations, bar types, sizes and grades and temporary casing information;

(5) Date and time drilling begins and ends, steel bars are inserted into drill holes, grout and shotcrete are mixed and arrives on-site and grout placement and shotcrete application begins and ends;

(6) Grout volume, temperature, flow and density records;

(7) Ground and surface water conditions and elevations if applicable;

(8) Weather conditions including air temperature at time of grout placement and shotcrete application; and

(9) All other pertinent details related to soil nail wall construction.

After completing each soil nail wall or stage of a wall, provide a PDF copy of all corresponding construction records.

**Nail Testing**

"Proof tests" are performed on nails incorporated into walls, i.e., production nails. Define "test nail" as a nail tested with a proof test. Proof tests are typically required for at least one nail per nail row per soil nail wall or at least 5% of production nails, whichever is greater. More or less test nails may be required depending on subsurface conditions encountered. The Engineer will determine the number and locations of proof tests required. Do not test nails until grout and shotcrete attain the required 3 day compressive strength.

**(A) Test Equipment**

Use the following equipment to test nails:

(1) Two dial gauges with rigid supports,

(2) Hydraulic jack and pressure gauge and

(3) Jacking block or reaction frame.

Provide dial gauges with enough range and precision to measure the maximum test nail movement to 0.001". Use pressure gauges graduated in 100 psi increments or less. Submit identification numbers and calibration records for load cells, jacks and pressure

gauges with the soil nail wall design. Calibrate each jack and pressure gauge as a unit.

Align test equipment to uniformly and evenly load test nails. Use a jacking block or reaction frame that does not damage or contact shotcrete within 3 ft of nail heads. Place dial gauges opposite each other on either side of test nails and align gauges within 5° of bar inclinations. Set up test equipment so resetting or repositioning equipment during nail testing is not needed.

**(B) Test Nails**

Test nails include both unbonded and bond lengths. Grout only bond lengths before nail testing. Provide unbonded and bond lengths of at least 3 ft and 10 ft, respectively.

Steel bars for production nails may be overstressed under higher test nail loads. If necessary, use larger size or higher grade bars with more capacity for test nails instead of shortening bond lengths to less than the minimum required.

**(C) Proof Tests**

Determine maximum bond length ($L_B$) using the following:

$$L_B \leq (C_{RT} \times A_t \times f_y) / (Q_{ALL} \times 1.5)$$

Where,

$L_B$ = bond length (ft),
$C_{RT}$ = reduction coefficient, 0.9 for Grade 60 and 75 bars or 0.8 for Grade 150 bars,
$A_t$ = bar area ($in^2$),
$f_y$ = bar yield stress (ksi) and
$Q_{ALL}$ = allowable unit grout/ground bond strength (kips/ft).

Determine design test load (DTL) based on as-built bond length and allowable unit grout/ground bond strength using the following:

$$DTL = L_B \times Q_{ALL}$$

Where,

DTL = design test load (kips).

Perform proof tests by incrementally loading nails to failure or a load of 150% of DTL based on the following schedule:

| Load | Hold Time |
|---|---|
| AL* | Until movement stabilizes |
| 0.25 DTL | Until movement stabilizes |
| 0.50 DTL | Until movement stabilizes |
| 0.75 DTL | Until movement stabilizes |
| 1.00 DTL | Until movement stabilizes |
| 1.25 DTL | Until movement stabilizes |
| 1.50 DTL | 10 or 60 minutes (creep test) |
| AL* | 1 minute |

* Alignment load (AL) is the minimum load needed to align test equipment and should not exceed 0.05 DTL.

Reset dial gauges to zero after applying alignment load. Record test nail movement at each load increment and monitor test nails for creep at the 1.5 DTL load increment. Measure and record movement during creep test at 1, 2, 3, 5, 6 and 10 minutes. If test nail movement between 1 and 10 minutes is greater than 0.04", maintain the 1.5 DTL load increment for an additional 50 minutes and record movement at 20, 30, 50 and 60 minutes. Repump jack as needed to maintain load during hold times.

**(D) Test Nail Acceptance**

Submit 2 copies of test nail records including load versus movement and time versus creep movement plots within 24 hours of completing each proof test. The Engineer will review the test nail records to determine if test nails are acceptable. Test nail acceptance is based in part on the following criteria.

(1) Total movement during creep test is less than 0.04" between the 1 and 10 minute readings or less than 0.08" between the 6 and 60 minute readings and creep rate is linear or decreasing throughout hold time.

(2) Total movement at maximum load exceeds 80% of the theoretical elastic elongation of the unbonded length.

(3) Pullout failure does not occur at or before the 1.5 DTL load increment. Define "pullout failure" as the inability to increase load while movement continues. Record pullout failure load as part of test nail data.

Maintain stability of unbonded lengths for subsequent grouting. If a test nail is accepted but the unbonded length cannot be satisfactorily grouted, do not incorporate the test nail into the soil nail wall and add another production nail to replace the test nail.

If the Engineer determines a test nail is unacceptable, either perform additional proof tests on adjacent production nails or revise the soil nail design or installation methods for the production nails represented by the unacceptable test nail as determined by the Engineer. Submit a revised soil nail wall design for acceptance, provide an acceptable test nail with the revised design or installation methods and install additional production nails for the nails represented by the unacceptable test nail.

After completing nail testing for each soil nail wall or stage of a wall, provide a PDF copy of all corresponding test nail records.

**Measurement and Payment**

Temporary soil nail walls will be measured and paid in square feet. Temporary soil nail walls will be paid for at the contract unit price for *Temporary Shoring*. Temporary soil nail walls will be measured as the square feet of exposed wall face area. No measurement will be made for any embedment or pavement thickness above soil nail walls.

The contract unit price for *Temporary Shoring* will be full compensation for providing soil nail wall designs, submittals, labor, tools, equipment and soil nail wall materials, excavating, hauling and removing excavated materials, installing and testing soil nails, grouting, shotcreting and supplying drain strips and any incidentals necessary to construct soil nail walls. No additional payment will be made and no extension of completion date or time will be allowed for repairing property damage, overexcavations or unstable excavations, unacceptable test nails or thicker shotcrete.

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 *Standard Specifications*. No additional payment will be made for anchoring PCB for soil nail walls. Costs for anchoring PCB will be incidental to soil nail walls.

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

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## MECHANICALLY STABILIZED EARTH RETAINING WALLS (SPECIAL)

### 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. Use precast concrete panels for vertical facing elements and aggregate in the reinforced zone. 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 "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.

Define "MSE wall" as a mechanically stabilized earth retaining wall and "MSE Wall Vendor" as the vendor supplying the chosen MSE wall system. Define "MSE panel wall" as an MSE wall with panels. Define "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.

Use an approved MSE wall system in accordance with the plans and any NCDOT restrictions or exceptions for the chosen system. Value engineering proposals for other MSE wall systems will not be considered. Do not use MSE wall systems with an "approved for provisional use" status. The list of approved MSE wall systems with approval status is available from:
connect.ncdot.gov/resources/Geological/Pages/Products.aspx

### 2.0 MATERIALS

Refer to the *Standard Specifications*.

| Item | Section |
|---|---|
| Aggregate | 1014 |
| Anchor Pins | 1056-2 |
| Curing Agents | 1026 |
| Epoxy, Type 3A | 1081 |
| Geotextiles, Type 2 | 1056 |
| Grout, Type 3 | 1003 |
| Joint Materials | 1028 |
| Portland Cement Concrete, Class A | 1000 |
| Precast Retaining Wall Coping | 1077 |
| Reinforcing Steel | 1070 |
| Retaining Wall Panels | 1077 |
| Shoulder Drain Materials | 816-2 |

| | |
|---|---|
| Wire Staples | 1060-8(D) |
| Corrugated Steel Pipe | 1032-3(A7) |

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

Use panels 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 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.

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 or connectors. 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*. Use fine aggregate with a maximum organic content of 1.0%. Provide aggregate with electrochemical properties that meet the following requirements:

**AGGREGATE ELECTROCHEMICAL REQUIREMENTS**

| Aggregate Type | Reinforcement or Connector Material | pH | Resistivity | Chlorides | Sulfates |
|---|---|---|---|---|---|
| Coarse | Steel | Not Required | | | |
| Fine | Steel | 5 – 10 | $\geq 3{,}000\ \Omega \cdot cm$ | $\leq 100$ ppm | $\leq 200$ ppm |
| Coarse or Fine | Polyester Type (PET) Geogrid | 5 – 8 | N/A* | N/A* | N/A* |

| | | | | | |
|---|---|---|---|---|---|
| Coarse or Fine | Geostrip or Polyolefin Geogrid | 4.5 – 9 | N/A* | N/A* | N/A* |

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

Use aggregate from a source that meets the *Mechanically Stabilized Earth Wall Aggregate Sampling and Testing Procedures*. Perform pH tests for coarse aggregate in accordance with Materials and Tests (M&T) Unit Chemical Procedure C-Elec. Perform organic content tests for fine aggregate in accordance with AASHTO T 267 instead of Subarticle 1014-1(D) of the *Standard Specifications*. Perform electrochemical tests for fine aggregate 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 reinforcement approved 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 panel walls, 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 with thicknesses that meet the following:

| BEARING PAD THICKNESS | |
|---|---|
| **Facing Area per Panel (A)** | **Minimum Pad Thickness After Compression (based on 2 times panel weight above pads)** |
| $A \leq 30$ sf | 1/2" |
| 30 sf $< A \leq 75$ 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 miscellaneous components approved 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. For proposed slopes above or below MSE walls, survey existing ground elevations to at least 10 ft beyond slope stake points. 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

For MSE wall designs, submit 11 copies of working drawings and 3 copies of design calculations and a PDF copy of each at least 30 days before the preconstruction meeting. Note name and NCDOT ID number of the panel 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 shown in the plans or 6 ft,

whichever is longer, unless noted 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 design parameters approved 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 reinforced zone)** | **Corrosion Loss Rate (after zinc depletion)** |
|---|---|
| Coarse | 0.47 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 parapet 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,

$\phi$ = 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 that are continuous at steps and extend at least 6" in front of and behind bottom row of panels. Unless required otherwise in the plans, embed top of leveling pads in accordance with the following requirements:

**EMBEDMENT REQUIREMENTS**

| **Front Slope[1] (H:V)** | **Minimum Embedment Depth[2] (whichever is greater)** | |
|---|---|---|
| 6:1 or flatter (except abutment walls) | H/20 | 1 ft for H ≤ 10 ft<br>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.

Locate a continuous aggregate shoulder drain along the base of the reinforced zone behind the 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 panel walls, cover joints at back of panels with filtration geotextiles at least 12" wide. If the approval of the chosen MSE wall system does not require a minimum number of bearing pads, provide the number of pads in accordance with the following:

**NUMBER OF BEARING PADS**

| **Facing Area per Panel (A)** | **Maximum Wall Height Above Horizontal Panel Joint** | **Minimum Number of Pads per Horizontal Panel Joint** |
|---|---|---|
| A ≤ 30 sf | 25 ft | 2 |
| | 35 ft[1] | 3 |
| 30 sf < A ≤ 75 sf | 25 ft | 3 |
| | 35 ft[1] | 4 |

1. Additional bearing pads per horizontal panel joint may be required for wall heights above joints greater than 35 ft.

Separation geotextiles are required between the 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 are also required at the back of the reinforced zone between the aggregate and backfill or natural ground. Use reinforced concrete coping at top of walls that meets the following requirements:

1. Coping dimensions as shown in the plans,
2. At the Contractor's option, coping that is precast or cast-in-place concrete for MSE

panel walls unless cast-in-place coping is required as shown in the plans,

3. Cast-in-place concrete coping for MSE segmental walls and
4. At the Contractor's option and when shown in the plans, cast-in-place concrete coping that extends down back of panels or connects to panels or with dowels.

For MSE panel walls with coping, connect cast-in-place concrete coping or leveling concrete for precast concrete coping to top row of panels with dowels cast into panels. When concrete parapet is required above MSE walls, use concrete parapet 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 foundation pressures, typical sections with reinforcement and connection details, aggregate locations and types, geotextile locations and details of leveling pads, panels, coping, bin walls, slip joints, etc. If necessary, include details on working drawings for concrete parapet 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 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 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. If this meeting occurs before all MSE wall submittals have been accepted, additional preconstruction meetings may be required before beginning construction of MSE walls without accepted submittals. The Resident or Bridge Maintenance Engineer, Bridge Construction Engineer, Geotechnical Operations Engineer, Contractor and MSE Wall Installer Superintendent will attend preconstruction meetings.

## 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 M&T 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 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. When temporary slopes are not applicable to construct MSE walls, use temporary shoring for wall construction. 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.

When noted in the plans, install corrugated steel pipes for end bent pile location located in the reinforced zone before placing aggregate or reinforcement. Top of pipes should be 3" below the bottom of cap elevation. Brace pipes or piles in the reinforced zone to maintain alignment when placing and compacting aggregate. Secure piles together with steel members near top of piles. Clamp members to piles instead of welding if bracing is at or below pile cut-off elevations.

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.

Erect and support panels so the final wall position is as shown in the accepted submittals. Space bearing pads in horizontal panel joints as shown in the accepted submittals 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.

Construct MSE walls with the following tolerances:

A. Vertical joint widths are 3/4", ±1/4" for panels,

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 (wall face leaning forward) 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. 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*.

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 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 wall face area with the pay height equal to the difference between top of wall and top of leveling pad elevations. Define "top of wall" as top of coping or top of panels for MSE walls without coping.

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, reinforcement, aggregate, wall drainage systems, geotextiles, bearing pads, coping, 16 gage 24 inch diameter corrugated steel pipe, 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 and extending to minimum 4 ft beyond bridge approach slab.

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** | **Pay Unit** |
|---|---|
| MSE Retaining Wall No. __ | Square Foot |

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**DRILLED PIERS** **(10-20-15)**

Revise the *2012 Standard Specifications* as follows:

**Page 4-9, Article 411-1, Description,** line 12, replace second sentence in the second paragraph with the following:

Define "permanent casing" as a casing that remains in the excavation and acts as a form for Drilled Pier concrete and "temporary casing" as any casing that is not permanent. Define "rock" as a continuous intact natural material with a standard penetration resistance of 0.1 ft or less per 60 blows or a rock auger penetration rate of less than 2" per 5 minutes of drilling at full crowd force or as determined by the Engineer when rock is not encountered as expected based on these criteria.

**Page 4-9, Article 411-2, Materials,** line 18, in materials table, replace "Grout, Nonshrink" with "Grout, Type 2".

**Page 4-9, Subarticle 411-2(A), Steel Casing,** line 26, add the following after first sentence in the first paragraph:

If permanent casing is required for an excavation, the largest diameter casing in the hole is the permanent casing. This does not apply to working casings around permanent casings as approved by the Engineer.

**Page 4-12, Subarticle 411-3(B), Preconstruction Meeting,** line 22, replace with the following:

**(A) Preconstruction Meeting**

Before starting drilled pier construction, hold a preconstruction meeting to discuss the installation, monitoring and inspection of the drilled piers. Schedule this meeting after the Drilled Pier Contractor mobilizes to the site. If this meeting occurs before all drilled pier submittals have been accepted, additional preconstruction meetings may be required before beginning construction of drilled piers without accepted submittals. The Resident or Bridge Maintenance Engineer, Bridge Construction Engineer, Geotechnical Operations Engineer, Contractor and Drilled Pier Contractor Superintendent will attend preconstruction meetings.

**Page 4-12, Article 411-4, Construction Methods,** lines 37-39, replace with the following:

For drilled piers constructed with slurry or permanent casings, the pier diameter may be 2" less than the design pier diameter shown in the plans. For all other drilled piers, construct piers with the minimum required diameters shown in the plans except for portions of drilled piers in rock which may be 2" less than the design pier diameter.

**Page 4-13, Subarticle 411-4(A), Excavation,** line 11, add the following after second sentence in the third paragraph:

See Articles 107-11 and 107-12 for protection of public and private property and control of siltation, dust and air and water pollution from blasting, drilling and excavating with down-the-hole hammers.

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

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2/16/2016

**PILES** **(10-20-15)**

Revise the *2012 Standard Specifications* as follows:

**Page 4-70, Article 450-2, Materials,** line 2, in the materials table, replace "Neat Cement Grout, Nonshrink" with "Neat Cement Grout, Type 1".

**Page 4-70, Article 450-2, Materials,** line 8, in the last sentence of the second paragraph, replace "approved by the Materials and Tests Unit." with "that are on the NCDOT Approved Products List."

**Page 4-72, Subarticle 450-3(D)(3), Required Driving Resistance,** lines 26-30, replace first paragraph with the following:

The Engineer will determine if the proposed pile driving methods and equipment are acceptable and provide the blows/ft and equivalent set for the required driving resistance noted in the plans, i.e., "pile driving criteria" except for structures with pile driving analyzer (PDA) testing. For structures with PDA testing, provide pile driving criteria for any bents and end bents with piles in accordance with Subarticle 450-3(F)(4).

**Page 4-73, Subarticle 450-3(E)(1), Pile Excavation,** lines 19-20, in the third sentence of the second paragraph, replace "use smooth or corrugated clean watertight steel casings" with "use smooth non-corrugated clean watertight steel casings".

**Page 4-73, Subarticle 450-3(F), Pile Driving Analyzer,** lines 45-48, replace third paragraph with the following:

The Engineer will complete the review of the proposed pile driving methods and equipment within 7 days of receiving PDA reports and pile driving criteria. Do not place concrete for caps or footings on piles until PDA reports and pile driving criteria have been accepted.

**Page 4-75, Subarticle 450-3(F), Pile Driving Analyzer,** line 21, add the following to the end of Article 450-3:

(4) Pile Driving Criteria

Analyze pile driving with the GRL Wave Equation Analysis Program (GRLWEAP) manufactured by Pile Dynamics, Inc. Use the same PDA Consultant that provides PDA reports to perform GRLWEAP analyses and develop pile driving criteria. Provide driving criteria sealed by an engineer approved as a Project Engineer (key person) for the same PDA Consultant.

Analyze pile driving so driving stresses, energy transfer, ram stroke and blows/ft from PDA testing and resistances from CAPWAP analyses correlate to GRLWEAP models. Provide pile driving criteria for each combination of required driving resistance and pile length installed for all pile types and sizes. Submit 2 copies of pile driving criteria with

PDA reports. Include the following for driving criteria:

(a) Project information in accordance with Subarticle 450-3(F)(3)(a)
(b) Table showing blows/ft and equivalent set vs. either stroke for multiple strokes in increments of 6" or bounce chamber pressure for multiple pressures in increments of 1 psi
(c) Maximum stroke or blows/ft or pile cushion requirements to prevent overstressing piles as needed
(d) GRLWEAP software version information
(e) PDF copy of all pile driving criteria and executable GRLWEAP input and output files

**Page 4-76, Article 450-4, Measurement and Payment,** lines 27-29, replace third sentence of the sixth paragraph with the following:

The contract unit price for *PDA Testing* will be full compensation for performing PDA testing the first time a pile is tested, performing CAPWAP analysis on data collected during initial drive, restrikes and redrives, providing PDA reports, performing GRLWEAP analysis and developing and providing pile driving criteria.

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2/16/2016

**SCARIFY/MIX EXISTING DRAINAGE LAYERS** **(SPECIAL)**

## 1.0 GENERAL

Upon removal of the existing concrete pavement, incorporate the existing drainage layers of sand and ABC into the underlying soils to a minimum depth of 12 inches. The existing drainage materials should be scarified into the proposed subgrade to a minimum depth of 12 inches. Scarification will require a minimum of 3 passes over the same area. Some areas may be wet and may require additional time to dry before the blended materials can be compacted.

## 2.0 MEASUREMENT AND PAYMENT

Work is incidental to fine grading and payment will be made in accordance with Article, 500-5 of the Standard Specifications.

NORTH CAROLINA LICENSED SEAL 1961 GEOLOGIST JEFFREY BRIAN BARFIELD

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Jeff Barfield
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3/21/2016

## SOLDIER PILE RETAINING WALLS (3-17-15)

### 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 |
| Grout, Type 1 | 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. For proposed slopes above or below soldier pile walls, survey existing ground elevations to at least 10 ft beyond slope stake points. 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

For soldier pile wall designs, submit 11 copies of working drawings and 3 copies of design calculations and a PDF copy of each 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).

When a rock mass shear strength ($S_m$) is noted in the plans, analyze piles using the equation shown in Figure 3.11.5.6-2 of the AASHTO LRFD specifications to calculate the passive resistance of the rock ($\overline{P_p}$). 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. If this meeting occurs before all soldier pile wall submittals have been accepted, additional preconstruction meetings may be required before beginning construction of soldier pile walls without accepted submittals. The Resident or Bridge Maintenance Engineer, Bridge Construction Engineer, Geotechnical Operations Engineer, Contractor and Cantilever Wall Contractor Superintendent will attend preconstruction meetings.

## 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 to the required elevations 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 required penetration. When this occurs, a revised soldier pile wall design or construction plan submittal may be required. When a minimum pile penetration into rock is noted in the plans, rock is as determined by the Engineer.

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 filler 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 wall face area with the pay height equal to the difference between top of wall and top of leveling pad elevations. Define "top of wall" as

top of coping or top of panels or concrete facing for soldier pile walls without coping.

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** | **Pay Unit** |
|---|---|
| Soldier Pile Retaining Walls | Square Foot |

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4/7/2016

**PROJECT SPECIAL PROVISIONS**
**GEOENVIRONMENTAL**

**CONTAMINATED SOIL and GROUND WATER (6/2/2016)**

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 will be available at the following web address by navigating to the correct letting year and month then selecting, "Plans and Proposals", "Wake B-5121", "GeoEnv Postings":

**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 shall remain in place and undisturbed. Undisturbed soil shall remain in place, whether contaminated or not. The Contractor shall transport all petroleum 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 Containment Detail found in the plans. If the volume of contaminated soil exceeds the available space onsite, the NCDEQ has agreed to a central stockpile location for petroleum contaminated soil. The central stockpile location is located on NCDOT Parcel 20 at –L- Station 40+00, 55' to 145' Right. The address is 902 Capital Boulevard. If this central stockpile location is unacceptable to Contractor, the Contractor shall obtain a permit from the NCDEQ UST Section's Regional Office for an alternative off-site temporary storage location. 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 ground water is encountered and dewatering is required in areas of known contamination then the contractor shall containerize the ground water in vessels provided by the Department. The Department will be responsible for the sampling and disposal of the water.

**Removal of potential hazardous materials in and around parcel 11**
The Contractor's attention is directed to the fact that low levels of chlorinated compounds were detected in the soil and ground water within the project area. The known areas of contamination are indicated on corresponding plans sheets.

The Department's consultant shall screen and direct the Contractor to separate the potential contaminated soil from the other soil removed in the area. The separated soil shall be placed by the Contractor into vessels provided by the Department. The Department's Consultant shall test

the soil to determine the available disposal options. If the results indicate the soil is below regulatory levels, the soil shall be left onsite for use by the Contractor. If the results indicate the soil is above regulatory levels, the soil shall be properly disposed by the Department's Consultant.

**Measurement and Payment:**
The quantity of contaminated soil hauled and disposed 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 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.

Payment shall be made under:

| **Pay Item** | **Pay Unit** |
|---|---|
| Hauling and Disposal of Petroleum Contaminated Soil | Ton |

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6/2/2016

NORTH CAROLINA PROFESSIONAL SEAL 031499 ENGINEER Cyrus F. Parker

NORTH CAROLINA PROFESSIONAL SEAL 032615 ENGINEER JASON D. LAWING

DocuSigned by: Jason Lawing B53ABA2D65E1407... 4/11/2016

**SEALED DRAINAGE SYSTEM**: (3/31/2016):

**Description**

The purpose of this section is to specify the requirements for construction of a sealed drainage system. The sealed drainage system is necessary to prevent infiltration of contaminated materials into the drainage system. The Contaminated Soil Provision (GV-1) identifies the potential contaminants and the procedures required for handling the material.

A sealed drainage system is proposed to be installed through or in the vicinity of the contaminated area. Included in this provision is work required for constructing the sealed pipes and drainage structures, in accordance with this provision and Section 300, 840, and 1000 of the Standard Specifications and as shown on the plans or established by the Engineer.

The Contractor is responsible for regulatory compliance for all phases of work described in this section.

**Drainage System Materials**

Ductile Iron drainage pipe shall conform to ANSI A21.51 (AWWA C151). Pipe shall be push-on joint and installed with gaskets in accordance with the applicable sections of ANSI A21.11 (AWWA C111). Gaskets for ductile iron pipe shall be made of material resistant to the contaminants identified in the Contaminated Soil Provision (GV-1) and shall be approved for use with Ductile Iron Pipe.

Drainage Structures shall be precast concrete conforming to ASTM C478. Joints between sections shall conform to ASTM C443 and shall be sealed with O-Ring gaskets. O-Ring gaskets shall be made of material resistant to the contaminants identified in the Contaminated Soil Provision (GV-1) and shall be approved for use with precast drainage structure sections.

Connection of pipe to drainage structure shall be by a flexible, resilient connector conforming to ASTM C923. The drainage structure to pipe connector shall be made of material resistant to the contaminants identified in the Contaminated Soil Provision (GV-1).

Non shrink cement grout shall be used in precast drainage structures per the requirements of Article 1040-9 of the *Standard Specifications*.

The Contractor shall submit to the Engineer catalog cuts and / or shop drawings for materials to be used on the project. Allow 40 days for the review of each submittal.

Materials which have not been approved shall not be delivered to the project. Eight copies of each catalog cut and/or drawing shall be submitted and each shall show the material description, brand name, manufacturing specification, and the use for which it is intended.

**Drainage System Construction Methods**

Installation of the sealed drainage system pipe and drainage structures shall meet the requirements of Section 300 and Section 1505 of the *Standard Specifications*.

All materials shall be carefully examined for defects before placing, and any defective materials shall be replaced.

As the work progresses, the interior of the pipe shall be cleared of all foreign materials. Trenches shall be kept free from water until backfilled and pipe shall not be laid when the condition of the trench or the weather is unsuitable for such work.

Obtain approval by the Engineer prior to any cleaning or flushing activities. Any pipeline or drainage structure that contains silt, sedimentation, or other foreign material shall be flushed or otherwise cleaned out of the line and drainage structures. If it is determined by the Engineer to be contaminated, the material shall be handled and disposed of in a manner approved of by the Engineer.

Gasket joints for pipe and drainage structures shall be installed in accordance with the recommendations of the manufacturer.

**Sealed Drainage System Testing**

The sealed drainage system shall be tested in accordance with Article 1520-3 of the *Standard Specifications* for Gravity Sanitary Sewer. Both infiltration and exfiltration tests will be required. For the exfiltration test, the system shall be plugged and filled to the rim of the drainage structure as directed by the Engineer.

**Measurement and Payment**

____" *Ductile Iron Pipe, Class ___, Sealed* will be measured and paid at the contract unit price per linear foot. The quantity of sealed drainage system lines of the various sizes, which has been incorporated into the completed and accepted work, will be measured from end to end by the linear foot in place with no deduction for length through drainage structures. Where two different sizes enter or exit a drainage structure, each size will be measured to the center of the drainage structure. Unless otherwise shown on the plans, branch connections, ells, or other fixtures will be included in the length measurement.

*Masonry Drainage Structures (Sealed)* will be measured and paid for in accordance with Article 840-4 of the *Standard Specifications*.

*Boots for Sealed Drainage Structures* will be measured and paid for in units of each.

The above price and payment shall be full compensation for all work covered by this section, including, but not limited to: excavation, stockpile construction, equipment, labor, personal protective equipment, pipe gaskets, flushing or cleaning out material from the sealed system and

the pipes, materials, backfilling, compaction, testing, pumping and incidentals necessary to complete the works as required. Handling of contaminated soil and material is included in Special Provision.

Payment will be made under:

| **Pay Item** | **Pay Unit** |
|---|---|
| ____" Ductile Iron Pipe, Class ___, Sealed | Linear Foot |
| Boots for Sealed Drainage Structures | Each |

NORTH CAROLINA PROFESSIONAL SEAL 022959 ENGINEER RONALD W. KING

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Ronald W. King
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3/22/2016

## 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 ($\gamma$) = 120 lb/cf,

(B) Friction angle ($\phi$) = 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*.

Payment will be made under:

| **Pay Item** | **Pay Unit** |
| --- | --- |
| Overhead Footings | Cubic Yard |

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Ronald W. King
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3/22/2016

## 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:

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

Where fa = 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:

| Construction | Detail | Stress Category | Application | Example |
|---|---|---|---|---|
| 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 @* _____. 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 @ _____ | Lump Sum |

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# TC-1

TIP# B-5121/B-5317 Wake County

## WORK ZONE TRAFFIC CONTROL
## Project Special Provisions

**Law Enforcement:**
(05/14/2013)

### Description

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

### Construction Methods

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

### Measurement and Payment

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

Payment will be made under:

| Pay Item | Pay Unit |
|---|---|
| Law Enforcement | Hour |

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CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

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# TC-2

TIP# B-5121/B-5317 Wake County

**WORK ZONE TRAFFIC CONTROL**
**Project Special Provisions**

**Protective Canopy:**
(06/28/2013)

## Description

The Contractor shall provide a protective canopy to protect pedestrians from falling debris along the existing sidewalk beneath the US 70/US 401/NC 50 (Capital Blvd.) bridge structure at all times during construction.

## Construction Methods

The protective canopy shall be constructed in accordance with local governing building codes, and requirements of the Americans with Disabilities Act (ADA). The protective canopy shall be adequately lit for nighttime use. At no time shall materials or equipment be stored on the canopy roof. All waste or falling debris is to be removed from the canopy roof on a daily basis or as directed by the engineer. The Contractor is to investigate and secure all necessary permits required by the governing bodies aforementioned prior to commencing work.

## Measurement and Payment

The measurement and payment for the Protective Canopy shall be Lump Sum. The Lump Sum price shall include any costs associated with the installation, maintenance and removal.

**Pay Item** **Pay Unit**

Protective Canopy.....Lump Sum

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CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

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# TC-3

TIP# B-5121/B-5317 Wake County

## WORK ZONE TRAFFIC CONTROL
**Project Special Provisions**

## TEMPORARY GLARE SCREEN:
(02/06/2013)

### Description

Furnish, installing, maintain, and remove Temporary Glare Screen in accordance with the plans and specifications.

### Materials

Provide Temporary Glare Screen which are modular units consisting of vertical blades and a horizontal base rail. Provide blades and base rails manufactured from durable high impact resistant, non-warping, and non-metallic material.

Provide blades that have nominal widths between 6 inches and 9 inches. Provide blades which are minimum of 24 inches high and capable of being locked down at an angle and spacing to provide a continuous cut-off angle of not less than 22 degrees. Provide modular units with a maximum length of 10 feet.

Anchor the modular units to the barrier using either a mechanical or adhesive system with a minimum pullout and shear strength of 3000 lbs. Use galvanized mounting hardware in accordance with Section 1076 of the 2012 Standard Specifications. An acceptable alternate may be used if approved by the Engineer. Do not place Modular units over barrier connector between adjoining barrier sections.

Install yellow or crystal encapsulated lens (high performance) retro-reflective sheeting or microprismatic retro-reflective sheeting on the surface of the leading blade of every section of concrete barrier. Provide sheeting that is a minimum of 2 inches x 12 inches and applied with a pressure sensitive adhesive. Have color of the retro-reflective sheeting match the color of the adjacent pavement marking edgeline. Provide reflective sheeting which meets the requirements of Section 1092 of the 2012 Standard Specifications.

### Construction Methods

Section 1105-3 of the 2012 Standard Specifications applies to this special provision.

### Maintenance

Maintain Temporary Glare Screen in accordance with Section 1105-4 of the 2012 Standard Specifications.

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TIP# B-5121/B-5317 Wake County

**Method of Measurement**

The quantity of Temporary Glare Screen to be paid for will be the number of linear feet of Temporary Glare Screen installed during the life of the project in accordance with the plans and accepted.

**Basis of Payment**

The quantity of Temporary Glare Screen measured as provided above, will be paid for at the contract unit price per linear foot for "Temporary Glare Screen".

Payment will be made under:

| Pay Item | Pay Unit |
|---|---|
| Temporary Glare Screen | Linear Foot |

PROJECT SPECIAL PROVISIONS
LIGHTING

## 1.00 DESCRIPTION

The work covered by this Section consists of installing, connecting, and placing into satisfactory condition a street lighting conduit system along the subject project as shown on the plans. Perform all work in accordance with these Special Provisions, the Plans, the National Electrical Code, and North Carolina Department of Transportation "Standard Specifications for Roads and Structures" (*2012 Standard Specifications*). Erection of light standards, and installation of circuit conductors and light standard luminaires will be performed by Duke Energy Progress in coordination with NCDOT prime Contractor.

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

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

Section 1409 Electrical Duct

## 2.00 STREET LIGHTING CONDUIT INSTALLATION

### 2.10 DESCRIPTION

Amend Article 1409-1 as shown below.
Install conduit for street lighting along the subject project as shown in the lighting plans including equipment and labor for trenching/open cut along the road shoulder and directional bore under roadway.

### 2.20 MATERIALS

Amend Article 1409-2 as shown below:
Duke Energy Progress will furnish 2" PVC conduit, elbows and sweeps as required to complete the street lighting conduit system along the subject project. Contractor will coordinate conduit installation work with Rick Whitaker of Duke Energy Progress ((919) 546-5096) or Dustin Brice of the City of Raleigh ((919) 996-4045).

Contractor shall notify Duke Energy Progress no less than six weeks before conduit is required. After conduit is delivered by Duke Energy Progress and accepted by the Contractor, the Contractor becomes the owner and is responsible for loss or damage to material until installation.

### 2.30 CONSTRUCTION METHODS

Same as Article 1409-3.

2.40 MEASUREMENT AND PAYMENT

Same as Article 1409-4.

Payment will be made under:

| **Pay Item** | **Pay Unit** |
|---|---|
| Street Lighting Conduit Installation (2" PVC) _____ | Linear Foot |

NORTH CAROLINA PROFESSIONAL SEAL 022582 ENGINEER PAUL KI-BUN CHAN

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PROJECT SPECIAL PROVISIONS
LIGHTING

## 1.00 DESCRIPTION

The work covered by this Section consists of furnishing, installing, connecting, and placing into satisfactory operating condition aesthetic and underpass lighting at locations shown on the plans.

Also covered by this Section, is work that consists of furnishing, installing, connecting, and placing into satisfactory condition a street lighting conduit system along Capital Blvd as shown on the plans. Erection of light standards, and installation of circuit conductors and light standard luminaires will be performed by Duke Energy Progress in coordination with NCDOT prime Contractor.

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

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

| | |
|---|---|
| Section 1407 | Electric Service Pole and Lateral |
| Section 1408 | Light Control System |
| Section 1409 | Electrical Duct |
| Section 1410 | Feeder Circuits |
| Section 1411 | Electrical Junction Boxes |
| Section 1412 | Underpass Lighting |

## 2.00 CONSTRUCTION METHODS

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

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

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

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

## 3.00 BURN IN TEST

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

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

## 4.00 ELECTRICAL JUNCTION BOXES

### 4.10 DESCRIPTION

Same as Article 1411-1.

### 4.20 MATERIALS

Same as Article 1411-2, except modify referenced Article 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."

### 4.30 CONSTRUCTION METHODS

Same as Article 1411-3.

### 4.40 MEASUREMENT AND PAYMENT

Electrical Junction Boxes ____ will be measured and paid as the actual number of the appropriate type and size junction boxes installed and accepted. Payment for the conduit, duct and wiring will be paid under other contract items. Items used for splicing are incidental to the junction boxes.

Payment will be made under:

Electrical Junction Boxes _____.....……. Each

## 5.00 LIGHT CONTROL SYSTEM

### 5.10 DESCRIPTION

Furnish and install an entire control system, including enclosure, control panel, photocell, switches, contactors, breakers, terminal blocks, wiring, concrete foundation, and lightning arrester. The control system contains standard electrical components in a weatherproof enclosure mounted on a metal pole with a concrete foundation as shown in the plans.

### 5.20 MATERIALS

Use a 60 Amp meter base. Use a combination lighting controller/service entrance equipment (combination panel) equal to Square D Class 8903 Night-Master. Manufacturer's name and model number are given for descriptive purposes, to indicate a quality standard and are not intended to limit products to a particular manufacturer. Products deemed equal and approved by the Engineer will be accepted. The combination panel must be UL listed, include one main circuit breaker, solid neutral bar, contactor, photocontrol, selector switch, fused control circuitry and a lightning arrester (mounted external to cabinet) in a NEMA 3R enclosure, labeled as suitable for use as service entrance equipment. Required sizes and ratings are as shown in the plans. Components should be factory installed and not field assembled.

Use a combination panel enclosure with a flange mounted operator handle that is lockable in the OFF position and is interlocked with the door and main circuit breaker, so that the door cannot be opened when the breaker is in the ON position. The enclosure shall have an internal removable back panel for mounting components and shall have external mounting brackets.

The combination panel must be rated 120/240 VAC, single phase, two pole, three-wire, service entrance. The main circuit breaker must have an interrupting capacity rating of not less than 10,000 amperes RMS symmetrical. The control relay shall be 120 Volts and shall have an amperage rating of 10 A. The electrically operated, mechanically held contactor shall be 4 pole, 240 Volts with a current rating of 60 A. Both the control relay and the electrically operated, mechanically held contactor shall have 120 VAC coils. The feeder circuit breakers for all circuits shall be 2 pole, 240 Volts and have an amperage rating for 15 A. The service circuit breaker shall be 2 pole, 240 Volts and have an amperage rating of 60 A. The control circuit breaker shall be 1 pole, 120 Volts and have an amperage rating of 15 A. The selector switch must be a heavy duty HAND-OFF-ON unit including contacts and handle mounted on the back panel of the enclosure.

The lightning arrester must be the thyrite type, designed to contain and snuff out an arc of 10,000 amps, and have conduit threads for mounting in the combination panel enclosure.

The ground rod must be copper clad steel, with a clamp rated for direct burial.

Use a 4" Rigid Galvanized Steel Conduit with cap, embedded in concrete as shown in the plans for mounting the lighting controller. Use galvanized slotted steel framing channel with straps

and bolts, for the mounting brackets and hardware for attaching the lighting controller to the pole.

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

Use zinc rich paint conforming to Section 1080-9 of the Standard Specifications.

5.30 CONSTRUCTION METHODS

Contact the local utility company and obtain the required electrical service, as stated in section 1400-9 of the Standard Specifications.

Locate the combination panel as shown on the plans. Install all non-factory installed components of the combination panel securely, with all conductors properly terminated and identified. Attach all components to the post with galvanized or stainless steel hardware. Provide and install a padlock for the controller, with eight keys all keyed alike.

Operate the lighting system without interruption or failure attributable to poor workmanship or defective material for 2 consecutive weeks, as stated in section 1400-6 of the Standard Specifications. The Engineer will perform insulation resistance tests, as stated in section 1400-5 of the Standard Specifications.

The Engineer must inspect and approve all work before concealment.

5.40 MEASUREMENT AND PAYMENT

The control system measured as provided above will be paid for at the contract unit price per each "Lighting Control System, Type ____". Such price and payment will be considered full compensation for all materials, equipment and labor for installing a new combination panel as described in the preceding sections, as well as all connecting hardware and conduit, construction of foundation and support structure and all incidentals necessary to complete the work.

The quantity of lighting control systems to be paid for will be the actual number which have been installed and accepted

Payment will be made under:

Lighting Control System, Type _____.....Each

**6.00 AESTHETIC LIGHTING SYSTEM**

6.10 DESCRIPTION

6.11 Aesthetic Lighting Luminaire

Furnish, install and place into satisfactory operation aesthetic lighting luminaires on a bracket arm directly mounted to the girder, complete with all light sources, drivers, jumpers and wiring from circuit conductors to luminaire.

The Contractor shall supply LED aesthetic lighting luminaires as specified below or approved equal. A sample of any proposed luminaire must be submitted to the Department for review during the submittal review process. Manufacturer's name and model number are given for descriptive purposes, to indicate a quality standard and are not intended to limit products to a particular manufacturer. Products deemed equal and approved by the Engineer will be accepted.

| # of Fixtures | Philips Product description | Philips Part Number |
|---|---|---|
| 169 | eW Graze MX Powercore, **, 30° X 60° beam angle | 523-000080-** |

** Note: The Color Temperature will be determined after mock-up as describe in section 6.31. (Different Color Temperature will have different part number.)

6.12 Spotlight Luminaire

Furnish, install and place into satisfactory operation, spotlight LED luminaires on a concrete foundation as detailed in these Special Provisions.

The Contractor shall supply LED spotlight luminaires similar to the one specified below or approved equal. Manufacturer's name and model number are given for descriptive purposes, to indicate a quality standard and are not intended to limit products to a particular manufacturer. Products deemed equal and approved by the Engineer will be accepted.

| # of Fixtures | Philips Product description | Philips Part Number |
|---|---|---|
| 8 | eW Burst Powercore Architectural, **, with 14° spread lens | 523-000036-** |

** Note: Use the same (or as close as possible) Color Temperature as used for the aesthetic lighting luminaire. (Different Color Temperature will have different part number.)

Any alternate luminaire submitted for approval must meet the minimum requirements below.

6.20 MATERIALS

6.21 Aesthetic Lighting Luminaire

A. General Requirements
- Luminaire with driver shall accept power input range of 100 to 277VAC including fluctuations of ± 10%.
- Luminaire shall have the color temperature select at the mock-ups.
- Power consumption shall be no greater than 15W per foot.

- Nominal luminaire input wattage shall account for nominal applied voltage and any reduction in driver efficiency due to sub-optimal driver loading.
- Luminaire electrical components (driver and surge protection) shall meet the dust and moisture requirements of ingress protection (IP) rating of IP66.
- Luminaires shall start and operate in -20°C to +50°C ambient.
- Luminaires shall be rated for continuous service at an ambient temperature of 40°C (104°F)
- Electrically test fully assembled luminaires before shipment from factory.
- The luminaire manufacturer shall have no less than five (5) years of experience in manufacturing LED-based lighting products and the manufacturing facility must be ISO 9001 certified.
- Luminaire shall have a Beam angle of 30° with a 60° fan.
- Luminaire shall have multi-positional, constant torque locking hinge mounting hardware and comply with luminaire attachment details as shown in the Lighting Detail Plan Sheets E6-E9.
- Luminaire shall conform to ANSI C136.31 roadway and area lighting luminaire vibration resistance standards.
- Luminaire shall have integral male/female waterproof connectors. Provide waterproof and dustproof boots for any unused connectors.
- Luminaire shall have a L70 rating of 60,000 hours minimum at 25°C.
- Jumper cables between fixtures and leader cable to connect fixture to power source.

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

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

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

E. Color Quality
- Minimum Color Rendering Index (CRI) of 81 with the Correlated Color Temperature (CCT) determined after the mock-up.

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

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

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

I. Warranty
- Provide a minimum five-year warranty covering maintained integrity and functionality of the luminaire housing, wiring, and connections, LED light source(s) and LED driver. Negligible light output from more than 10 percent of the LED packages constitutes luminaire failure.
- Warranty period shall begin after project acceptance by the Department. Supplier shall furnish documentation of warranty procedures to the Contractor stating that warranty is for NCDOT.

6.22 Spotlight Luminaire

A. General Requirements
- Spotlight luminaire shall have exchangeable optical spread lens available in 14°, 23° and 41° angles to allow field modification if necessary.
- Spotlight luminaire shall have an integrated yoke with a canopy base capable of mounting to a standard junction box or a flat surface.
- The spotlight luminaire and driver shall accept power input range of 100 to 277VAC including fluctuations of ± 10%. .
- Spotlight luminaires shall comply with vibration resistance, per ANSI C136.31.
- Spotlight luminaires maximum total power consumption shall not exceed the values shown in the plans. Nominal luminaire input wattage shall account for nominal applied voltage and any reduction in driver efficiency due to sub-optimal driver loading.
- Spotlight luminaire shall meet dust and moisture rating of IP-66, minimum.
- Electrically test fully assembled luminaires before shipment from factory.
- The luminaire manufacturer shall have no less than five (5) years of experience in manufacturing LED-based lighting products and the manufacturing facility must be ISO 9001 certified.
- Spotlight luminaire shall have a L70 rating of 90,000 hours minimum at 25°C. Provide a summary of reliability testing performed for LED driver.

- Spotlight luminaire shall start and operate in -20°C to +50°C ambient.
- Spotlight luminaire shall have a minimum Power Factor (PF) of 0.90 at full input power and across specified voltage range.

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

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

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

E. Color Quality
- Minimum Color Rendering Index (CRI) of 80. Use same Correlated Color Temperature (CCT) selected for the Aesthetic Lighting Luminaires.

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

G. The following shall be in accordance with corresponding sections of ANSI C136.37
- All internal components shall be assembled and pre-wired using modular electrical connections.

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

I. Warranty
- Provide a minimum five-year warranty covering maintained integrity and functionality of the luminaire housing, wiring, and connections, LED light source(s) and LED driver. Negligible light output from more than 10 percent of the LED packages constitutes luminaire failure.
- Warranty period shall begin after project acceptance by the Department.

6.23 Electrical Conduit System for Aesthetic LED Lights

Non-metallic conduit shall be rigid PVC (Polyvinyl chloride) heavy wall approved for above ground and for underground use by direct burial or encasement in concrete per UL 651 "Rigid Non-Metallic Conduit". Use terminations designed for PVC conduit to seal and stub out each PVC conduit, and to provide watertight protection. Provide UL listed PVC expansion fittings of the appropriate size at all construction joints and bent expansion joints, as noted in the plans. Expansion fittings shall be weatherproof, designed for non-metallic conduit and provide 4" minimum of conduit movement.

Cast iron junction box (CIJB) shall be NEMA Type-4, hot-dipped galvanized sized as shown on the plans. The CIJB shall have a neoprene gasketed cover with brass or stainless steel screws and shall be suitable for a water tight installation. A mounting button with a blind tapped bolt hole shall be provided on the interior for connection of a ground lug. The CIJB shall have a continuous hinge on the lid.

6.24 Bracket Assemblies

See Structure Plan Sheets for bracket types and details.

6.30 CONSTRUCTION METHODS

6.31 Aesthetic Lighting Luminaire

The Contractor shall provide four sets of four Aesthetic Lighting Luminaires for the mock-up of the "Architectural Metal Fascia" mounted on the concrete and steel girders. Each set of four shall have a different correlated color temperature of either 2700K, 3500K, 4000K or 5500K. This mock-up is to determine which correlated color temperature to order all the Aesthetic Lighting Luminaires and spotlights. The correlated color temperature will be selected by the City of Raleigh and the Engineer after the mock-up.

Refer to Structure Plan Sheets for brackets to mount Aesthetic Lighting Luminaires to concrete girder on Capital Boulevard Bridge over Peace Street and for brackets to mount Aesthetic Lighting Luminaires to steel girders on the Wade Avenue Flyover Bridge.

Use "Medallion Luminaire Bracket at Central Pilaster" to mount Aesthetic Lighting Luminaire to illuminate concrete decorative medallions installed on the bridge over Peace Street. Use "Medallion Luminaire Bracket at Bent Pilaster" to mount Aesthetic Lighting Luminaire to illuminate concrete decorative medallions installed on the Wade Avenue Bridge. Refer to Structures Plans for dimensions of these brackets and structural attachment details.

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

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

Install Electrical Conduit System for Aesthetic Lighting Luminaires at Peace Street. Use PVC Conduit from JB1 to CIJB. Install RGS conduit from the CIJB, located behind coping of MSE abutment wall, to 4" round metal junction box at concrete girder. See Lighting Details Plan Sheets E6 & E7 for details.

Install Electrical Conduit System for Aesthetic Lighting Luminaires at Wade Avenue. Use PVC conduit from junction box JB3 & JB4 to the CIJB, located behind coping of MSE abutment wall. Install RGS conduit from CIJB to 4" round metal junction box at steel girder. See Lighting Detail Plan Sheets E8 & E9 for details.

Coordinate conduit installation behind MSE abutment wall at both structure locations with Prime Contractor to ensure conduit is properly placed and secured as MSE abutment wall is constructed.

6.32 Spotlight Luminaire

Spotlight luminaire foundation is type R1S which is equal to type R1 on Standard Drawing 1405.01 and described in Section 1405 of the Standard Specifications except as modified below.

The type R1S foundation shall be 16" diameter by 32" deep. Integral anchor bolts are not required.

Spotlight luminaire shall be mounted on a 4" metal round junction box. Junction box shall be cast into the concrete base, level with top face of foundation. Follow manufacturer's installation instructions for securing fixture and sealing fixture to prevent water infiltration.

Install PVC conduit from ground mounted junction box to and in foundation to 4" round metal junction box cast in the foundation. See Roadway Lighting Plan Sheet E4 for details.

Level and secure each spotlight luminaire in all directions. Securely terminate the wiring for each spotlight luminaire and include an equipment grounding conductor to bond the housing to the supply cord grounding conductor.

Adjust any spotlight luminaires, as directed by the Engineer, to provide optimal illumination distribution.

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

6.40 MEASUREMENT AND PAYMENT

The aesthetic lighting systems measured as provided above will be paid for at the contract unit price per each "Aesthetic Lighting System at _____", "Aesthetic Lighting Luminaire" and "Spotlight Luminaire".

Such price and payment for the "Aesthetic Lighting System at _____" will be considered full compensation for providing and installing RGS conduit, junction boxes and conductor from the cast iron junction box mounted behind the coping of the MSE abutment wall and all incidentals. At Wade Avenue the cast iron junction box mounted behind the coping of the MSE abutment wall, as well as the conduit and conductors from the in ground junction box to the cast iron junction box mounted behind the coping of the MSE abutment wall are also included.

Such price and payment for the "Aesthetic Lighting Luminaire" will be considered full compensation for providing and installing the LED aesthetic lighting luminaires including the jumpers and hinge brackets.

Such price and payment for the "Spotlight Luminaire" will be considered full compensation for providing and installing the LED spotlight luminaires including the R1S foundation as described above.

Aesthetic Lighting Luminaires required for the mock-up shall be consider incidental to the Aesthetic Lighting System.

Payment will be made under:

Aesthetic Lighting System at _____.....LS

Aesthetic Lighting Luminaire .....EA

Spotlight Luminaire .....EA

## 7.00 ELECTRICAL CONDUIT SYSTEM FOR UNDERPASS LIGHTING AT PEACE STREET

7.10 DESCRIPTION

The work covered by this section consists of furnishing and installing one conduit system embedded in the coping on the MSE abutment wall under the bridge over Peace Street for underpass lighting, as shown in the plans.

7.20 MATERIALS

Non-metallic conduit shall be rigid PVC (Polyvinyl chloride) heavy wall approved for above ground and for underground use by direct burial or encasement in concrete per UL 651 "Rigid Non-Metallic Conduit". Use terminations designed for PVC conduit to seal and stub out each PVC conduit, and to provide watertight protection. Provide UL listed PVC expansion fittings of the appropriate size at all parapet construction joints and bent expansion joints, as noted in the plans. Expansion fittings shall be weatherproof, designed for non-metallic conduit and provide 4" minimum of conduit movement.

Use CIJB as describe in Section 6.23 already defined.

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

Provide jute that is a burlap-like material used for filling voids and protecting components from waterproofing and adhesive compounds.

Provide zinc rich paint conforming to Section 1080-9 of the Standard Specifications.

Provide pull lines specifically designed for pulling rope through conduit. Use pull lines made of 2-ply line, with a tensile strength of (240 pounds) minimum. Use rot and mildew resistant pull lines that are resistant to tangling when being dispensed.

## 7.30 CONSTRUCTION METHODS

Securely fasten all conduit and boxes prior to placing any concrete. Each conduit run between termination points should be as straight as possible. The total angular deflection of all bends in a conduit run should not exceed 180 degrees. Total deflection greater than 180 degrees requires advanced approval by the Engineer. After the conduit is encased in concrete, clean each conduit by snaking with a steel band that has an approved tube cleaner, equipped with a mandrel of a diameter not less than ½" of the nominal inside diameter of the conduit.

Stub the conduit out in junction boxes as shown in the plans. Use threaded adapter and PVC bushing at all junction box to conduit connections. Install a pull line in each conduit for future use. Leave sufficient slack for attachment of a rope that will be used to install conductors. Coordinate electrical conduit system work with work by others.

Install circuit conductors sized as shown in the Lighting Plans to serve the wallpack underpass luminaires.

All work must be inspected and approved by the Engineer before concealment.

## 7.40 MEASUREMENT AND PAYMENT

No direct measurement will be made for the conduit system(s), since it will be paid for on a lump sum basis.

Payment for the conduit system will be made at the contract lump sum price for "Electrical Conduit System at Peace Street ".

Such price and payment for the conduit system as provided above will be considered full compensation for all materials, equipment, and labor necessary to complete the work in accordance with the plans and these special provisions.

Payment will be made under:

Electrical Conduit System at Peace Street….....Lump Sum

NORTH CAROLINA PROFESSIONAL SEAL 022582 ENGINEER PAUL KI-BUN CHAN

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Paul Chan
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6/7/2016

**PROJECT SPECIAL PROVISIONS**
**Utility Construction**

Kimley»Horn
300 West Morgan St., Suite 1500, Durham, NC 27701

NORTH CAROLINA PROFESSIONAL SEAL 030001 ENGINEER JEREMY A. RIVENBARK

DocuSigned by:
Jeremy Rivenbark
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6/6/2016

I. GENERAL CONSTRUCTION REQUIREMENTS

The proposed utility construction shall meet the applicable requirements of the NC Department of Transportation's "Standard Specifications for Roads and Structures" dated January 2012, and the following Special Provisions:

**DIVISION 1 – GENERAL REQUIREMENTS**

1. SECTION 106 – CONTROL OF MATERIAL
   - Page 1-50; Sub-article 106-4 Delivery and Handling of Materials, add the following after Line 42:

     The Contractor shall be responsible for the shipping and storing of all utility construction materials. The Contractor shall replace any material that is damaged or defective.

     The loading and unloading of all pipe, valves, hydrants, manholes, and other accessories shall be in accordance with the manufacturer's recommended practices and shall at all times be performed with care to avoid any damage to the material.

   - Page 1-51; Sub-article 106-5 Storage of Materials, add the following after Line 11:

     The Contractor shall locate and provide the necessary storage areas for materials and equipment. If private property is being used for storage areas, then the Contractor must have the written consent from the Owner. Without this written consent, all material and equipment shall be stored within the existing rights-of-way and easements of the project. Pipe may not be prestrung along job site; it must be delivered to and removed from job site each day. In extenuating circumstances when the inspector authorizes pipe to remain on the project from one day to the next, the ends of the pipe must be sealed.

**PROJECT SPECIAL PROVISIONS**
**Utility Construction**

All materials, once on the job site, shall be stored in accordance with the manufacturer's recommendations.

All pipes shall be kept free of dirt and other debris. Any damage relating to the coating of the various materials for water mains shall be repaired in a manner approved by the City.

The Contractor shall be responsible for safeguarding and protecting all material and equipment stored on the job site. The Contractor shall be responsible for the storage of materials in a safe and workmanlike manner to prevent injuries, during and after working hours, until the project is complete.

2. SECTION 107 – LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC

- Page 1-55, Sub-article 107-11, Protection and Restoration of Property , add the following:

Trees, fences, poles and all other property shall be protected unless their removal is authorized, and any property not authorized for removal, but damaged by the Contractor, shall be restored by the Contractor to the Owner's satisfaction.

**DIVISION 10 – MATERIALS**

1. SECTION 1034 - SANITARY SEWER PIPE AND FITTINGS

- Page 10-57; Sub-article 1034-2(A), PVC Gravity Flow Sewer Pipe, replace the entire section with the following:

(1) General

Shall only be used for 15-inch diameter and smaller gravity sewers. Pipe and fitting size shall be as indicated on the Drawings.

PVC materials shall comply with ASTM D1784 with a cell classification of 12454-B.

Pipe shall have an integral elastomeric-gasket bell end. Gaskets shall be in conformance with ASTM F477.

See Detail S-4.

(2) SDR 35: PVC SDR 35 gravity sewer pipe 4-inch to 15-inch and related fittings shall conform to ASTM D-3034 and the following requirements:

Pipe shall have standard dimension ratio of SDR 35.

**PROJECT SPECIAL PROVISIONS**
**Utility Construction**

Nominal pipe length shall be a minimum of 13 feet.

- Page 10-57; Section 1034-4(A), Gravity Flow Sewer Pipe, replace the entire section with the following:

(1) Pipe and fittings shall conform to the following requirements:

Size shall be as indicated on the Drawings.

Minimum pipe pressure class shall be 350 for pipes 6-inch to 12-inch diameter, and a minimum pressure class 250 for pipes 16-inch and larger.

Suitable for a system working pressure of 250 psi minimum for gravity sewer, 150 psi for force mains.

Pipe shall be supplied in nominal lengths of 18 or 20 feet.

~~Cement-mortar lined with seal coat in accordance with AWWA C104 for pipes smaller than 12 inches.~~

Interior of pipes and fittings for pipes ~~12 inches and larger~~ shall be lined with ~~PROTECTO~~ **Protecto** 401 ceramic epoxy as described in paragraph in this section.

Pipe pressure/thickness class shall be suitable for the type laying condition and at the depth indicated on the Drawings. The proper pressure/thickness class shall be at a minimum as shown on the Contract Drawings. Pipe manufacturer to verify pipe selection, and document to Engineer, prior to ordering and manufacture of pipe.

Note: The pipe pressure classes shown on the Contract Drawings were determined with the use of the pipe liner as specified above. If this specified pipe liner is modified or changed for any reason, then the Engineer and Pipe Manufacturer, prior to the Contractor ordering the pipe, shall reevaluate the pressure class.

Provide mechanical joint fittings, unless noted otherwise on the Drawings.

Pipe class shall not transition between manholes and shall be the highest pressure/thickness class required for that reach with exception to sections between manholes including jacking pipe as indicated on the Drawings.

Ductile Iron may be used for gravity sewers and force mains.

**PROJECT SPECIAL PROVISIONS**
**Utility Construction**

(2) Ductile-iron pipe for below ground service shall have push-on or mechanical joints, unless noted otherwise on the Drawings, conforming to AWWA C150 and C151, and to the following requirements:

Provide mechanical joint fittings for push-on or mechanical joint pipe, unless noted otherwise on the Drawings.

(3) Ductile-iron pipe for above ground service shall have flanged joints, unless noted otherwise on the Drawings, and conform to AWWA C115.

Pipes to be painted shall have only a shop primer on the outside by the manufacturer. Verify that proposed manufacturer's primer is compatible with the proposed paint system.

- Page 10-57; Section 1034-4, add the following Sub-article:

(C) Protecto 401 Ductile Iron Pipe Liner

The interior wall of ductile iron sewer pipe ~~12" and larger in diameter~~ shall be protected by the Protecto 401 Ceramic Epoxy liner.

The lining shall meet the manufacturer's recommendations and the following requirements as a minimum.

The liner manufacturer shall have a minimum of ten (10) years of successful experience and be able to demonstrate successful performance on comparable projects.

The material shall be an amine cured novalac epoxy containing at least 20% by volume of ceramic quartz pigment.

Permeability rating of 0.00 when tested according to Method A of ASTM E-96-66, Procedure A with a test duration of 30 days.

The following tests must be run on coupons from factory lined ductile iron pipe:

(a) ASTM B-117 Salt Spray (scribed panel) – Results to equal 0.0 undercutting after two years.

(b) ASTM G-95 Cathodic Disbondment 1.5 volts @ 77°F. Results to equal no more than 0.5mm undercutting after 30 days.

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(c) Immersion testing rated on using ASTM D-714-87.

(i) 20% Sulfuric Acid – No effect after two years.

(ii) 140°F 25% Sodium Hydroxide – No affect after two years.

(iii)160°F Distilled Water – No effect after two years.

(iv)120°F Tap Water (scribed panel) – 0.0 undercutting after two years with no effect.

(d) An abrasion resistance of no more than 3 mils (0.075mm) loss after one million cycles using European Standard EN 598: 1994 section 7.8 Abrasion resistance.

The lining shall be applied by a competent firm with a successful history of applying linings to the interior of ductile iron pipe and fittings. After the surface preparation and within 8 hours of surface preparation, the interior of the pipe shall receive 40 mils nominal DFT. No lining shall take place when the substrate or ambient temperature is below 40ºF. The surface shall also be dry and dust free. The lining shall not be used on the face of flanges.

Due to the tolerances involved, the gasket area and spigot end up to 6-inches back from the end of the spigot end must be coated with 6 mils nominal, 10 mils maximum of the lining compound. The lining compound shall be applied by brush to ensure coverage. Care should be taken that the lining compound is smooth without excess buildup in the gasket seat or on the spigot ends. Coating of the gasket seat and spigot ends shall be done after the application of the lining.

The number of coats of lining material applied and the touch-up and repair of the lining shall be as recommended by the manufacturer. The pipe manufacturer shall provide a certification attesting to the fact that the application meets or exceeds the requirements of these Special Provisions. Lining materials made with calcium aluminate shall not be acceptable."

- Page 10-57; Section 1034, add the following Sub-article:

1034-5 GRAVITY FLOW FIBERGLASS REINFORCED SEWER PIPE

The basic structural wall composition of the pipe shall consist of a thermosetting resin, glass fiber reinforcement, and aggregate filler.

**PROJECT SPECIAL PROVISIONS**
**Utility Construction**

The outside diameter of the pipe shall be in accordance with ASTM D3262 (gravity services).

Minimum wall thickness shall be sufficient for design conditions specified.

Each pipe shall be free from all defects including indentations, delaminations, bubbles, pinholes, cracks, pits, blisters, foreign inclusions, and resin-starved areas that due to their nature, degree, or extent, detrimentally affect the strength and serviceability of the pipe.

The pipe shall be as uniform as commercially practicable in color, opacity, density, and other physical properties.

The inside surface of each pipe shall be free of bulges, dents, ridges, or other defects that result in a variation of inside diameter of more than 1/8 IN from that obtained on adjacent unaffected portions of the surface. No glass fiber reinforcement shall penetrate the interior surface of the pipe wall.

Pipe specimens shall be capable of being deflected, without failure, at the 50 year strain level provided in Table 4 of ASTM when exposed to 1.0 N sulfuric acid.

All pipes shall be capable of withstanding a test pressure of two times the maximum sustained operating pressure of the line without leaking or cracking.

Unless otherwise specified, the pipe joints shall be field connected with fiberglass sleeve couplings that utilize elastomeric sealing gaskets made of EDPM rubber compound as the sole means to maintain joint water tightness. The joints must meet the performance requirements of ASTM D4161 and ASTM F477. Tie-ins, when needed, may utilize gasket-sealed mechanical couplings. Gasket-sealed mechanical couplings shall be stainless steel and approved by the Engineer.

Flanges, bends, reducers, tees, wyes, laterals and other fittings shall be capable of withstanding all operating conditions when installed. They may be contact molded or manufactured from mitered sections of pipe joined by glass-fiber-reinforced overlays. Properly protected standard ductile iron, fusion-bonded epoxy-coated steel and stainless steel fittings may also be used.

Coupling joints shall meet the requirements of ASTM D4161 and ASTM F477.

Mark each length of pipe in accordance with ASTM D3262.

**PROJECT SPECIAL PROVISIONS**
**Utility Construction**

(A) CENTRIFUGALLY CAST FIBERGLASS REINFORCED POLYMER MORTAR (CCFRPM) PIPE

Pipe and fittings shall conform to the following requirements:

Size stiffness class (SN) shall be as indicated on the Drawings.

Pipe shall be supplied in 20-foot nominal lengths. At least 90% of the total footage of each size and class of pipe, excluding special order lengths shall be furnished in minimal length sections.

Each length of pipe, fittings, couplings, specials to be used shall be plainly and permanently marked with the following: pipe class or strength designation, manufacturer's name or trademark, date of manufacture, and the nominal pipe size.

CCFRPM Pipe is allowable only for gravity sewers.

Centrifugally Cast Fiberglass Reinforced Polymer Mortar Pipe shall conform to ASTM D3262, for CCFRPM pipe manufactured of "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) materials, and to the following requirements:

CCFRPM pipe shall be as manufactured per the City of Raleigh Public Utilities Handbook (pg. 97) or approved equal.

The pipe shall be manufactured in accordance with ASTM D3262 with a minimum nominal pipe stiffness of SN 72 as shown on the Drawings. The pipe shall meet the following cell limits: Type 1, Liner 2, Grade 3, as described by Section 4.2 and Table 1 of ASTM D3262. The stiffness is to be measured in accordance with ASTM D2412. The corrosion liner shall not be considered as contributing to the structural strength of the pipe.

The pipe shall be manufactured by the centrifugal casting process resulting in a dense, nonporous, corrosion-resistant, consistent, composite structure to meet the operating conditions as shown on the Drawings.

Pipe shall conform to ASTM D2412 for minimum stiffness and external loading characteristics.

Couplings, fittings and push-on joints shall be manufactured

with flexible, elastomeric seals conforming to the requirements of ASTM D4161 and ASTM F477 and shall meet or exceed the pipe class at the location of its installation.

Pipe joint shall be push-on type couplings unless specified otherwise.

Pipe shall meet the minimum requirements of ASTM D3681 and ASTM D3262. Manufacturer shall provide complete 10,000-hour test results on pipe produced at the proposed location of manufacture. Results shall reflect that the pipe has a minimum allowable strain of no less than 0.9% at fifty years when tested in accordance with ASTM D3681 and D3262.

Normal production pipe for this project shall not incorporate raw materials that are not in compliance with ASTM D3681 and ASTM 3262.

Interior of pipe shall be manufactured using a nonstructural resin with a minimum allowable elongation of 50% when measured in accordance with ASTM D638. The liner nominal thickness shall be 40-mils.

Exterior pipe surfaces shall be comprised of a layer of sand and resin to provide UV protection to the exterior.

(B) FILAMENT-WOUND FIBERGLASS REINFORCED POLYMER MORTAR PIPE

Pipe and fittings shall conform to the following requirements:

The pipe shall be as manufactured as per the City of Raleigh Public Utilities Handbook (pg. 97) or approved equal.

Size and stiffness class SN 72 shall be as indicated on the Drawings.

Pipe shall be supplied in 20-foot or 40-foot nominal lengths. At least 90% of the total footage of each size and class of pipe, excluding special order lengths shall be furnished in minimal length sections.

Each length of pipe, fittings, couplings, specials to be used shall be plainly and permanently marked with the following: pipe class or strength designation, manufacturer's name or trademark, date of manufacture, and the nominal pipe size.

Filament-Wound Fiberglass reinforced Polymer Mortar Pipe is

allowable only for gravity sewers.

Wall Thickness: The average wall thickness of the pipe shall not be less than the nominal wall thickness published in the manufacturer's literature, and the minimum wall thickness at any point shall not be less than 87.5% of the nominal wall thickness.

End Squareness: All points around each end of a pipe unit shall fall within +/-1/4 inch or +/-0.5% of the nominal diameter of the pipe, whichever is greater, to a plane perpendicular to the longitudinal axis of the pipe.

Stiffness: Each pipe shall have sufficient strength to exhibit the minimum pipe stiffness at 5% deflection as required by the Engineer. Stiffness shall be tested in accordance with the test method of ASTM D2412. A minimum of one pipe shall be tested every 100 lengths of each type, grade, and size pipe produced.

Filament-Wound Fiberglass Reinforced Polymer Mortar Pipe shall conform to ASTM D3262, for fiberglass reinforced polymer mortar pipe manufactured of "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) materials, and to the following requirements:

The pipe shall be manufactured in accordance with ASTM D3262 with a minimum nominal pipe stiffness of (SN) as shown on the Drawings. The pipe shall meet the following cell limits: Type 1, Liner 2, Grade 3, as described by Section 4.2 and Table 1 of ASTM D3262. The stiffness is to be measured in accordance with ASTM D2412. The corrosion liner shall not be considered as contributing to the structural strength of the pipe.

The pipe shall be manufactured by the continuous advancing mandrel (filament wound) process resulting in a dense, nonporous, corrosion-resistant, consistent, composite structure to meet the operating conditions as shown on the Drawings.

Pipe shall conform to ASTM D2412 for minimum stiffness and external loading characteristics.

Couplings, fittings and push-on joints shall be manufactured with flexible, elastomeric seals conforming to the requirements of ASTM D4161 and ASTM F477 and shall meet or exceed the pipe class at the location of its installation.

Pipe joint shall be push-on type couplings unless specified otherwise.

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Pipe shall meet the minimum requirements of ASTM D3681 and ASTM D3262. Manufacturer shall provide complete 10,000-hour test results on pipe produced at the proposed locaton of manufacture. Results shall reflect that the pipe has a minimum allowable strain of no less than 0.65% at fifty years when tested in accordance with ASTM D3681 and D3262.

Normal production pipe for this project shall not incorporate raw materials that are not in compliance with ASTM D3681 and ASTM 3262.

Interior of pipe shall be manufactured using a nonstructural resin with a minimum allowable elongation of 50% when measured in accordance with ASTM D638. The liner nominal thickness shall be 40-mils.

Exterior pipe surfaces shall be comprised of a layer of sand and resin to provide UV protection to the exterior.

Resin Systems: The manufacturer shall use only approved polyester resin systems with a proven history of performance in this particular application.

Glass Reinforcements: The reinforcing glass fibers to be used to manufacture the components shall be of the highest quality commercial grade of glass filaments suitably treated with binder and sizing compatible with impregnating resins.

The internal liner shall be suitable for service in a sewer pipe, and shall be highly resistant to exposure to sulfuric acid as produced by biological activity from hydrogen sulfide gases. Pipe shall meet or exceed requirements off ASTM D3681.

Silica Sand: Sand shall be minimum 98% silica with a maximum moisture content of 0.2%. Sand shall conform to ASTM C33, except that requirements for gradation shall not apply.

Additives: Resin additives, such as curing agents, pigments, dyes, fillers, thixotrophic agents, etc., when used, shall not detrimentally effect the performance of the product.

Elastomeric Gaskets: Gaskets shall be supplied by qualified gasket manufacturers and be suitable for the service intended.

2. SECTION 1036 – WATER PIPE AND FITTINGS

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- 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 10-58; Sub-article 1036-5, Ductile Iron Pipe and Fittings, replace the first two paragraphs with the following:

  Ductile iron restrained joint water pipe shall he installed in accordance with the applicable utility provisions herein, as shown on the utility plans and/or as directed by the Engineer.

  Ductile iron restrained joint water pipe shall be, at a minimum pressure class 350, and shall conform to ANSI A2151 (AWWA C151). Push-on joints for such pipe shall be in accordance with ANSI A2l.11 (AWWA C1 I 1). Pipe thickness shall be designed in accordance with ANSI A2l.5O (AWWA C150) and based on laying conditions and internal pressures as stated on the plans.

  Cement mortar lining and seal coating for pipe shall he in accordance with ANSI A2l.4 (AWWA C104). Bituminous outside coating shall be in accordance with ANSI A21.51 (AWWA C151).

  All ductile iron restrained joint water pipe shall be installed in accordance with laying condition Type 2 as stated in ANSI A21.51 (AWWA C151) unless otherwise shown on the plans.

  Ductile iron restrained joint pipe shall be manufactured to the lengths required. Cutting of ductile iron pipe by the Contractor will not be allowed.

- Page 10-59; Sub-article 1036-8, Sleeves, Couplings and Miscellaneous, add the following after Subparagraph (B):

  (C) MJ Solid Sleeve Couplings and MJ Transition Sleeve Couplings

  MJ Solid Sleeve Couplings shall be used to connect ductile iron piping to ductile iron and MJ Transition Sleeve Couplings shall be used to connect ductile iron pipe to cast iron pipe for buried service, where shown on the Plans. Solid sleeves shall be ductile iron and conform to the requirements of ANSI A21.10 (AWWA C110) or ANSI A21.53 (AWWA C153). MJ Solid Sleeve Couplings shall be per the City of Raleigh Public Utilities Handbook.

  (E) Mechanical Joint Restraints

  Mechanical joint restraints shall be specifically selected for the

appropriate application. Restraint devices for nominal pipe sizes 3 inch through 48 inch shall consist of multiple gripping wedges incorporated into a follower gland meeting the applicable requirements of ANSI/AWWA C110/A21.10. The devices shall have a working pressure rating of 350 psi for 3-16 inch and 250 psi for 18-48 inch. Ratings are for water pressure and must include a minimum safety factor of 2 to 1 in all sizes. Restraint devices shall be Listed by Underwriters Laboratories (3" through 24" inch size) and Approved by Factory Mutual (3" through 12" inch size). Gland body, wedges and wedge actuating components shall be cast from grade 65-45-12 ductile iron material in accordance with ASTM A536. Ductile iron gripping wedges shall be heat treated within a range of 370 to 470 BHN. Three (3) test bars shall be incrementally poured per production shift as per Underwriter's Laboratory (U.L.) specifications and ASTM A536. Testing for tensile, yield and elongation shall be done in accordance with ASTM E8. Chemical and nodularity tests shall be performed as recommended by the Ductile Iron Society, on a per ladle basis.

## DIVISION 15 – UTILITY CONSTRUCTION

1. SECTION 1500 – GENERAL UTILITY REQUIREMENTS

- Page 15-1; Sub-article 1500-1, Description, add the following after Paragraph 2:

  The Contractor shall be responsible for furnishing all equipment, labor and materials necessary to install/abandon/relocate the water mains and gravity sewer mains indicated on the plans along the corridor of the above referenced highway project. This work will be performed concurrent and in coordination with the highway coordination project above. Contractor is responsible to coordinate with NCDOT as well as other utility stakeholders along the project corridor to install the utilities as shown on the plans, and described in these Project Special Provisions. All water and sewer replacement and protection work shall be completed in accordance with the Specifications as detailed below. If a discrepancy arises between the plans or specifications outlined below, the prevailing document shall be at the discretion of the Engineer.

- Page 15-1; Sub-article 1500-2, Cooperation with the Utility Owner, replace paragraphs 3 and 4 with the following:

  The utility owner is the City of Raleigh. The contact at the City of Raleigh is Eileen Navarrete, 919-996-3480, eileen.navarrete@raleighnc.gov.

  The proposed utility construction shall meet the applicable requirements of the NC Department of Transportation's "Standard Specifications for Roads and Structures" dated January 2012, and the Design & Material Standards of the City

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of Raleigh Public Utilities Handbook, 2014 edition., as well as the following provisions.

The existing water and sewer utilities belong to the City of Raleigh. The Contractor shall provide access for the owner's representatives to all phases of construction. The owners shall be notified two weeks prior to commencement of any work and one week prior to service interruption. The Contractor must call the Public Utilities Department at 919-996-4540 and give the location, project name, individual's name, company name, start date and indicate if it involves water or sewer relocations.

It shall be the Contractor's responsibility to notify the Public Utilities Department at least twenty-four hours in advance of beginning any construction work on any project. The Contractor must call the Public Utilities Department at 919-996-4540 and give the location, project name, individual's name, company name, start date and indicate if it involves water extensions.

Contractor shall contact the Public Utilities Department at 919-996-4540 by 4:15 PM each day to provide notice of the locations and nature of the work that will be performed the following day. Any work requiring inspector observation outside of the normal workday, Monday-Friday, 7:30 a.m. to 4:15 p.m. will be charged to the Contractor at the current inspector hourly rate.

If the Contractor proceeds with the main installation prior to permit issuance, the City may require the work to be reinstalled and the Contractor shall be fully liable for all actions and costs, including prosecution by the City or the State for proceeding with installation prior to issuance of appropriate permit(s).

Valve Operations

No valve in the existing City of Raleigh system shall be operated without following the procedure outlined below. Failure to comply with these requirements shall be grounds for suspension of pipe-laying operations until written assurances can be obtained from a company official that such noncompliance will not occur again. The Contractor should be aware that the City of Raleigh regards violations of these requirements as justifying punitive measures.

Notification procedures are as follows:

a. The Contractor shall notify the City of Raleigh Public Utilities Department's Maintenance Division at 919-996-5921 in order to request the operation of any valves. At least forty-eight hours' notice should be given to the Public Utilities Department, and at least twenty-four hours' notice must be given to each consumer affected by a water cut-off. The Contractor is responsible for notifying the affected consumers. All valve operations shall be done by a

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Public Utilities Department valve crew or bv the City's representative.

b. The Contractor shall provide the following information when calling for the Water Distribution Division valve operation: (1) Name of person calling (2) Name of company (3) Telephone number of company (4) Location of valve and map number if available (5) Reason for requesting operating and whether to be closed or open (6) Time valve to be opened or closed (7) Approximate time water line to be out of service.

c. Each time a Contractor needs a valve operated, he/she shall again secure permission, following the steps outlined.

d. System valves shall be defined as any valve, which has main pressure against either gate face. Newly installed tapping valves and control valves to networks not yet accepted for service are considered as system valves. Valves within a network still under construction are not considered as system valves.

In case of an emergency, the Contractor shall be allowed to take such steps with the valves and hydrants as are necessary for the protection of life and property. Notification must be made after a break in a 4 inch or larger water main, or where ruptured smaller litres are causing property damage. After an emergency valve operation, the Contractor shall notify the Maintenance Division and give the details for that operation.

Hydrants shall not be operated without following the above procedures relative to requesting operating permission and reporting emergency use of hydrant.

Construction Water

The City of Raleigh Public Utilities Department does not provide free or otherwise unmetered construction water for any construction project. Hydrant meters may only be moved with express written permission of the Public Utilities Department. In residential areas hydrant meters may only be used for the filling of swimming pools unless prior approval of the Public Utilities Department. Contractors are responsible for adequate construction water for their job sites in one of the following approved manners:

a. Apply for permanent water service connection at the Development Services Customer Service Center, 4th floor, One Exchange Plaza, (919-996-2500). Sufficient lead-time (6 weeks) should be provided for all new service taps and all fees must be paid in full prior to the work order being authorized.

b. Apply online (Hydrant.meter@raleighnc.gov) with the Public Utilities Meters Division Office for rental of a hydrant meter. There are a limited number of these meters and they are reserved in advance by contacting the

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Meter Division (919-996-2797). A deposit is required along with a daily/monthly/yearly rental fee per account plus the cost of the water used, at the outside City rate. Hydrant meters are read in 100 cubic feet (cf). There is a minimum rental fee and an administration fee for billing and closing an account. A service charge is charged when accounts are closed. Customers are responsible for notifying the Meters Division if the meter is not registering usage. The following information is required:

(i) Meter location;

(ii) Billing address, telephone number, responsible patty name, and federal tax ID #;

(iii) Location of hydrant;

(iv) Water to be used for;

(v) Duration of use and frequency of meter reading;

(vi) Meters must be brought to the Utilities Operations Center for monthly reading.

c. Upon application approval, the City shall install hydrant meters and approved backflow prevention Devices on the fire hydrant requested by the customer, but acceptable to the City, within three (3) business days of the application and deposit being received;

d. Hydrant meters accounts are billed monthly. Failure to report usage in a timely manner for billing or accounts that are not paid in full will result in the loss of water service and the closing of the account with the City.

e. Hydrant meters will only be set when the temperature is over 35 degrees. Damage to meters from cold weather or abuse will be charged to the customers.

f. Hydrant meters used for long term use shall be returned at the end of every one year block for inspection. Upon completion of hydrant usage, deposits shall be refunded to customers within 30 days provided the following has occurred:

(i) Hydrant meter and backflow device have been returned in good condition, with no excessive wear nor damage.

(ii) All outstanding water usage charges and rental charges for the meter and backflow device have been paid in full by the customer.

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g. The cut off to apply for new accounts is 3:00 PM each business day.

h. It is a violation of the City Code to establish a direct connection to a fire hydrant to fill a tank or tank vehicle. lt is also illegal to use a RP or Double detector check valve on a domestic or fireline service for temporary water service. Violations of the City Code will result in loss of service, fines, and other measures as specified by the code.

i. Continued use of a hydrant meter, when usage readings are not being registered is considered theft of City water and subject to civil penalties of $500.00/day. It is the responsibility of the customer to notify the Meters Division at 919-996-2797 when the meter is not registering/recording the water usage properly.

j. Hydrant meters and backflow assemblies approved for use in this program is the property of the City of Raleigh Utilities Department. Failure to return the hydrant meter and backflow preventer at the end of the rental period will he considered theft of City property and prosecuted to the fullest extent of the law.

Note: Individuals caught using water unmetered and/or unauthorized by the Public Utilities Department will be prosecuted to the fullest extent of the law.

Hydrant Removal

The Contractor shall notify the utility owner's representative prior to performing the proposed "remove fire hydrant" work. Removed hydrants become the property of the Contractor. The Contractor shall remove and dispose of all other ancillary items.

- Page 15-1; Sub-article 1500-3, Utility Locations and Contractor's Responsibility, add the following:

The Contractor shall be responsible for field verifying, location, size, type and elevation of all underground utilities, as well as reconnecting any water and/or sanitary sewer services disturbed during construction, even if they are not shown on the plans. Any costs whatsoever, associated with the Contractor's failure to perform this task shall be borne by the Contractor.

The Contractor is herein forewarned as to the possibility of having to vary the depth of the pipeline installation to achieve minimum clearance of existing or proposed utilities or storm drainage while maintaining minimum cover specified (whether existing or proposed pipelines, conduits, cables, mains, storm drainage are shown on the plans or not).

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- Page 15-1; Sub-article 1500-5, Relation of Water Mains to Sewers, add the following:

  The waterline shall be installed as to provide a minimum of 3 feet of coverage above the top of pipe from finished grade.

- Page 15-2; Sub-article 1500-7, Submittals and Records, add the following:

  When brand names of materials have been determined, the Contractor shall obtain approval, through the Engineer and the Owner prior to their use and/or installation. Then Contractor shall furnish, but is not limited to furnishing' catalog cuts and/or shop drawings of the materials. Thirty days shall be allowed for the Engineer's review of each submittal eight copies of each catalog cut and/or shop drawing (signed and sealed) shall be submitted.

  Certified surveyed "As built" plans and profiles, sealed by a Professional Land Surveyor, shall be furnished to the Public Utilities Department by the Engineer upon completion and acceptance of the public utility improvements by the City and completion of private systems. The surveyed "as built" plans shall have North Carolina Geodetic Survey grid coordinates to all meter boxes, valves, manholes, and mains along with the depth information. The water and sewer permit numbers must also be included. Surveyed "As built" plans of installed utilities shall be furnished to the City prior to issuance of the letter of acceptance. All service stubs shall be shown on the surveyed "as built" plans.

  Certified surveyed "As Builts" should be provided in a digital format. The digital file of utilities needs to show the overall water and sewer system layout along with the property or subdivision boundaries and connecting manhole. The water distribution system drawings should show mains sizes, material, hydrants, valves, blow-off assemblies, and any other relevant information (backflow preventers, air release valves, etc.). The digital file should be delivered in DXF format. If this is not possible, then, DWG, DGN, and SHP are also acceptable formats.

- Page 15-2; Sub-article 1500-9, Placing Pipelines into Service, add the following:

  Obtain written approval from the City of Raleigh and the NCDEQ-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 lines.

  When replacing or extending water and/or sewer mains, the Contractor shall maintain existing water and/or sewer services.

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2. SECTION 1505 – EXCAVATION, TRENCHING, PIPE LAYING AND BACKFILLING FOR UTILITIES

- Page 15-3, Sub-article 1505-3 (C), Bedding, add the following:

  Bedding material for utility lines shall be installed in accordance with the applicable City of Raleigh Public Utilities Handbook, as shown on the utility construction plans, and/or as directed by the Engineer.

  Bedding material shall meet the requirements of Article 1016-3 of the Standard Specifications; bedding material shall be installed in accordance with Articles 300-6 and 300- 7 of the Standard Specifications and the detail sheets which are part of the Utility Construction Plans.

- Page 15-4; Sub-article 1505-3, Construction Methods, add the following after Subparagraph (F):

  (G) Concrete Thrust Collars

  Concrete thrust collars shall be installed where shown on the Plans and as required under Article 1505-3, Subparagraph (E). Concrete thrust collars shall be provided at the locations shown on the Plans or as requested by the Engineer. The excavation at such location(s) shall receive special attention with such undisturbed materials within as short a distance as possible from the pipe. Concrete thrust collars shall be installed in accordance with the Detail 0222119R, as shown on the Plans. The ductile iron pipe manufacturer shall provide a section of pipe with a welded-on thrust collar that is welded 360° around the barrel of the pipe. The welded-on thrust collars shall not be spaced any closer than 5-feet relative to each other on a single joint of pipe. The welded-on thrust collar shall meet the following minimum requirements and dimensions:

| Pipe Size (inches) | Collar O.D. (inches) | Collar Thickness (inches) | Allowable Load per Collar (lbs) |
|---|---|---|---|
| 4 | 8.00 | ½ | 4,500 |
| 6 | 10.00 | ½ | 9,300 |
| 8 | 12.50 | ½ | 16,000 |
| 10 | 14.50 | ½ | 24,000 |
| 12 | 16.50 | ½ | 34,000 |
| 14 | 19.50 | ¾ | 46,000 |
| 16 | 21.75 | ¾ | 59,000 |

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| | | | |
|---|---|---|---|
| 18 | 23.75 | ¾ | 75,000 |
| 20 | 25.75 | ¾ | 92,000 |
| 24 | 30.25 | ¾ | 130,000 |
| 30 | 36.50 | 1 | 200,000 |
| 36 | 43.00 | 1 | 290,000 |
| 42 | 49.50 | 1¼ | 390,000 |
| 48 | 56.50 | 1¼ | 510,000 |
| 54 | 63.00 | 1½ | 650,000 |
| 60 | 70.25 | 1½ | 745,000 |

All reinforcing steel shall be Grade 60 in accordance with Article 1070-2. All concrete shall be Class AA in accordance with Article 1000-4.

Valves on ductile iron lines 16-inches or greater and dead end mains shall be anchored with thrust collars as shown in Detail W-8.

(H) Reaction Blocking

All fittings or components subject to hydrostatic thrust shall be securely anchored by the use of concrete thrust blocks poured in place, unless otherwise directed by the Engineer. Where concrete must be reinforced, the Contractor shall furnish such reinforcing as is required.

Required thrust block sizing shall be per the schedule provided on the plans and installation shall be per the detail notes; see Details 0222114R and 0222108.

Material for reaction blocking shall be transit-mixed concrete. This concrete shall have a twenty-eight day compressive strength of 3000 psi. Any metal used to resist thrust which is not encased in concrete shall be "hot dipped" galvanized.

(I) Nitrile Gaskets **and Polyethylene Encasement**

Gaskets of the Viton nitrile type, or equal, **and polyethylene encasement** shall be installed on both water and sewer pipe if contaminated soil and/or groundwater are detected during excavation, or as directed by the Engineer. The use of nitrile gaskets shall extend at least forty (40) feet beyond the limit of ~~petroleum~~ contamination.

- Page 15-4; Sub-article 1505-6, Measurement and Payment, add the following after Line 43:

Concrete thrust collars required for the Project shall be ~~included and paid for~~ as ~~part of~~ **considered incidental to** the ____" Water Line pay item. No additional

**measurement nor** payment will be made.

Polyethylene encasement shall be ~~included and paid for as part of~~**considered incidental to** the ____" Water Line pay item. No additional **measurement nor** payment will be made.

**Nitrile gaskets shall be considered incidental to the ____" Water Line pay item. No additional measurement nor payment will be made.**

3. SECTION 1510 - WATER LINES

- Page 15-5; Sub-article 1510-3 (A), General, add the following:

Fittings shall be set at locations shown on the plans, with care being taken to properly "bell-up" joints and support the body of the fitting. All dead-end lines shall be plugged with mechanical joint plugs or caps and anchored by using thrust collars and blocking as shown on Details W-8, 0222114R, and 0222108.

Ductile Iron Pipe

Install pipe in conformance with AWWA C600 and the following:

For laying pipe in a vertical or horizontal curve, each full length pipe may be deflected by the following offset distance unless the pipe manufacturer's recommended distances are less:

(i) Push-on joint

- 3 to 12-inch pipe: 14-inch offset
- 14 to 36-inch pipe: 8-inch offset

(ii) Mechanical joint

- 3 to 6-inch pipe: 20-inch offset
- 8 to 12-inch pipe: 15-inch offset
- 14 to 20-inch pipe: 8-inch offset
- 24 to 36-inch pipe: 6-inch offset

For laying restrained joint pipe in a vertical or horizontal curve, except for horizontal directional drills (HDD), each full length pipe may be deflected by the following offset distance:

- 6 to 12-inch pipe: 11-inch offset
- 16 to 20-inch pipe: 7-inch offset
- 24 to 30-inch pipe: 5-inch offset

- 36-inch pipe: 4-inch offset
- 42 to 48-inch pipe: 1 ¼ -inch offset

For laying restrained joint pipe in a vertical or horizontal curve, except for horizontal directional drills (HDD), each full length pipe may be deflected by the following offset distance:

- 6 to 12-inch pipe: 11-inch offset
- 16 to 20-inch pipe: 7-inch offset
- 24 to 30-inch pipe: 5-inch offset
- 36-inch pipe: 4-inch offset
- 42 to 48-inch pipe: 1 ¼ -inch offset

The Contractor shall verify the offset distances specified are acceptable with the pipe manufacturer prior to installation.

Carrier pipe of any joint type may not be deflected.

- Page 15-6, Sub-article 1510-3 (B), Testing and Sterilization, add the following before the first paragraph:

(1) General

The Contractor shall guarantee all material, equipment and workmanship for a period of at least one-year after final acceptance by the City. The Public Works Department Construction Inspection Division is responsible for the issuance of final acceptance letters by the City.

The pressure test, leakage test and sterilization of the main shall be performed as provided for the in the NCDOT Standard Specifications and in accordance with City of Raleigh Public Utilities Department Handbook.

General Water Main Testing Sequence:

Water mains shall be tested in the following general sequence:

a. "Pigging" main (mains with gate valves)

b. Flush the main (all flush water shall be dechlorinated using methods acceptable to the City of Raleigh Public Utilities Department);

c. Perform the hydrostatic tests;

d. Introduce the appropriate amount of chlorine by tapping the main;

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e. Hold the chlorine solution in the main for at least twenty-four hours and no more than seventy-two hours;

f. Flush the main (all flush water shall be dechlorinated using methods acceptable to the City of Raleigh Public Utilities Department);

g. Sample for the bacteriological tests; and

h. Water mains shall be placed into service within 48 hours of meeting bacteriological analysis requirements. If no activity is anticipated on a water main for the first 30 days after it is placed into service, the Contractor shall notify the City of Raleigh Public Utilities Department at 919-996-2870.

- Page 15-6; Sub-article 1510-3 (B), Testing and Sterilization, add the following after the second paragraph:

(2) Hydrostatic Tests

a. All main installations including private distribution and fire lines to the buildings shall be pressure tested between each main line valve in accordance with AWWA C-600-87. The test shall be performed using a suitable pump and an accurate pressure gauge. Immediately upon completion of a section of main, 150 psi (1 5 psi) of pressure shall be applied and held for 7 two hours. The acceptable leakage rate shall not exceed .092 gallons per inch of pipe diameter per l,000 feet of pipe per hour. Failure of the water main to comply with the above acceptable leakage rate, shall require the Contractor to replace any defective materials to insure a watertight installation. If it is deemed that the existing blowoff valve is the cause of failure, the party responsible for the water main extension shall also be responsible for adding a valve at that location and abandoning the existing valve. After any inadequacies have been corrected, the leakage rate will again be tested. This test shall be repeated until that portion of main is brought to compliance with the permissible leakage rate.

b. Prerequisite conditions for inspection prior to testing shall be as follows:

l) Hydrants shall be properly located, operable, plumb and at correct elevation.

2) Valves shall be properly located, operable and at correct elevation. Valve boxes or manholes shall be centered over operating nuts, and the top of the box or manhole shall be at proper elevation.

3) Lines shall be properly vented where entrapped air is a consideration.

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(3) Chlorination

a. All additions or replacements to the water system, including fire lines and backflow prevention devices, shall be chlorinated before being placed in service. Such chlorination must take place under the supervision of an inspector.

b. Pipe subjected to contaminating materials shall be treated as directed by the Engineer. Should such treatment fail to cleanse the pipe, replacement shall be required. The City shall bear no portion of any cost sustained by the Contractor in meeting this specification.

c. Chlorination of a completed line shall be carried out after completing the pressure test and in the following manner.

(i) Taps will be made at the control valve at the upstream end of the line and at all extremities of the line, including valves. These taps shall be located in such a manner as to allow HTI solution to be fed into all parts of the line.

(ii) A solution of water containing high test hypochlorite (70%) available chlorine or chlorine gas solution shall be introduced into the line by regulated pumping at the control valve tap. The solution shall be of such a concentration that the line shall have a uniform concentration 50 ppm total chlorine immediately after chlorination. The chart below shows the required quantity of 70% HTH compound to be contained in solution in each 1000-foot section of line to produce the desired concentration of 50 ppm.

| Pipe Size | Pounds High Test Hypochlorite (70%) per 1000 feet of line |
|---|---|
| 6” | 0.88 |
| 8” | 1.56 |
| 10” | 2.42 |
| 12” | 3.50 |
| 14” | 4.76 |
| 16” | 6.22 |
| 20” | 9.76 |
| 24” | 14.00 |
| 30” | 21.00 |
| 36” | 31.50 |
| 48” | 56.00 |

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(iii) The HTH solution shall be circulated in the main by opening the control valve and systematically manipulating hydrants and taps at the line extremities. The HTH solution must be pumped in at a constant rate for each discharge rate in order that a uniform concentration will be produced in the mains.

(iv) Services shall be sterilized by methods acceptable to the Public Utilities Director or Engineer, and the Contractor shall have the same responsibility for laterals as for mains in regard to bearing full cost of any corrective measures needed to comply with bacteriological or other requirements.

(v) HTH solution shall remain in lines for no less than twenty-four hours, unless otherwise directed by the Public Utilities Director or Engineer.

(vi) Extreme care shall be exercised at all times to prevent the HTH solution from entering existing mains.

(4) Bacteriological Testing:

a. Free residual chlorine after twenty-four hours shall be at least 10 ppm, or the Engineer will require the lines be rechlorinated.

b. Mains will be flushed with a blow-off assembly of sufficient size to effectively clean the main. Flushing of lines may proceed after twenty-four hours, provided the free residual chlorine analysis is satisfactory. Flushing shall be continued until chlorine returns to normal level. In times of water shortages or distribution main problems, the flushing operation may be delayed. The Public Utilities Department shall determine when flushing is allowable. The Contractor shall advise the inspector prior to the chlorination and flushing so that the inspector can advise the Public Utilities Department of the construction location, size and length of mains. All tests shall be done in the presence of an inspector. Flushing will be for short duration. Sufficient precautions must be taken to the satisfaction of the Engineer to ensure that the impact of the water is absorbed and the water is conveyed without erosion or property drainage. All flush water shall be dechlorinated using methods acceptable to the City of Raleigh Public Utilities Department.

c. After flushing is completed, the Public Works Department (or their designee) shall collect samples for turbidity and bacteriological analysis for each section of pipe between main line valves. Sample point locations shall be determined by a representative of the engineer or owner. A custody seal shall be placed on each set of turbidity and bacteriological bottles. A chain of custody form must be completed for sample set(s) collected and must be delivered along with the sample(s). A turbidity lest will he done. If the turbidity exceeds 1 NTU, the sample fails and a bacteriological test will not

be set up. The Public Utilities Department will perform the turbidity and bacteriological analysis.

d. Samples will be accepted between 8:00 AM and I2 NOON and 1PM and 3:30 PM Monday through Thursday, excluding holidays. Special arrangements may be made for samples to be accepted outside of this time frame by calling the laboratory in advance.

e. ln the event that two successive bacteriologic tests fail, that section of the main shall be rechlorinated by the Contractor and new tests performed prior to moving to the next section of main.

- Page 15-6; Sub-article 1510-3 (B), Testing and Sterilization, change the allowable leakage formula to:

$$W = LD\sqrt{P} \div 148{,}000$$

- 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."

4. SECTION 1515 – UTILITY CONTROLS

- Page 15-7; Sub-article 1515-2, Materials, replace paragraph beginning "Double check valves…" with the following:

  Double Check valves (DCV) and Reduced Pressure Zone principal (RPZ) backflow prevention assemblies shall be listed on the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research list of approved backflow devices.

- Page 15-8, Sub-article 1515-3, A, add the following to Subparagraph (A):

**PROJECT SPECIAL PROVISIONS**
**Utility Construction**

Valves shall be set at locations shown on the plans with care being taken to support the valve properly and to accurately position the valve box over the operating nut of the valve. Where pavement is existing, the box shall be adjusted to finished street grade and a concrete pad two-feet square and six inches thick shall be poured around the box two inches from the top of finished grade as shown in Detail W-17. When valves are located in street rights-of-way, but out of pavement, the boxes shall be adjusted to finished grade and a concrete pad two-feet square and six-inches thick shall be poured around the box one-half inch from the top. When valves are located outside of street rights-of-way, the boxes shall be at finish grade, and a concrete block two-feet square and six-inches thick shall be poured around the box at grade line. Valve locations out of street rights-of-way shall be marked with a metal post having a minimum diameter of two inches and a minimum bury of three feet with a minimum of three feet exposed. The exposed portion shall be painted bright orange and shall be placed so that a valve operating tool has free operation.

When a tapping sleeve and valve are being used, the valve, sleeve and machine assembly shall be air tested to hold at 150 psi for a five-minute duration in the presence of the inspector prior to drilling or tapping the main. All tap coupons shall be given to the city inspector. The valve shall be in the closed position during the testing.

- Page 15-8, Sub-article 1515-3, add the following to Subparagraph (D):

  Specific directions are required for the setting of all hydrants. In streets where paving is proposed in the near future, the Contractor will be given line and grade stakes for hydrants. lt is mandatory for the Contractor to preserve these stakes for the inspector to verify that the hydrant was set correctly. ln areas where paving is not anticipated in the near future, hydrants shall be set according to the inspector's directions. When fire hydrants are installed behind guardrails the breakaway flange will be flush with the top of the guardrail. In general, hydrants shall be located in a manner to provide complete accessibility and minimize possibility of damage from vehicles or injury to pedestrians.

  Hydrant installation shall be as shown in Detail W-4 and will be rodded from the main to the hydrant with a maximum one rod coupling. If the distance is greater than 20 feet, the hydrant shall be rodded to a thrust block as shown in Detail W~7. When hydrants are used as blow-off assemblies, the valves shall be rodded to a thrust block. Restraining rods and accessories shall be “hot dipped" galvanized.

  Before a hydrant is set, all dirt and foreign matter shall be removed from the interior of the hydrant.

**PROJECT SPECIAL PROVISIONS**
**Utility Construction**

Hydrants shall be bagged, to indicate "out of service", until all testing is complete and the mains are placed in service. Bags shall be large enough to cover the entire hydrant and shall be black in color. Bags shall be secured with duct tape at the base of the hydrant and shall be removed immediately after the hydrants are placed in service.

- Page 15-9, Article 1515-4, Measurement and Payment , add the following after Line 10:

All *MJ Solid Sleeve Couplings* and *MJ Transition Sleeve Couplings* required for the Project shall be ~~included and paid for as part of~~ **considered incidental to** the ____" Water Line pay item. No additional **measurement nor** payment will be made.

All *Mechanical Joint Restraints* shall be ~~included and paid for as part of~~**considered incidental to** the ____" Water Line pay item.~~ and~~ ~~n~~No additional **measurement nor** payment will be made.

All miscellaneous connections to existing pipe shall be installed in accordance with Article 1036-8 (B) and shall be considered as incidental to the Project and no additional payment will be made.

*12" Insertion Valve Assembly*: The Work shall include the total amount of pipe, fittings, valves, couplings, mechanical joint restraints, adapters, sleeves, transition pieces, plugs, rodding, concrete, excavation and backfill, crushed stone, and appurtenances shown on the Plans and as required for a complete and operable 12" Insertion Valve Assembly. All piping and fittings shall be ductile iron, unless otherwise shown on the Plans.

All other Work required to complete the 12" Insertion Valve Assembly installation shall be considered as incidental to the project and no specific payment will be made. Payment for completing the work specified herein and as shown on the Plans shall be measured and paid for at the contract unit price per each, for each size of associated connection pipe.

*2" Air Release Valve*: The Work shall include the total amount of pipe, fittings, valves, hydrants, couplings, mechanical joint restraints, adapters, sleeves, transition pieces, plugs, rodding, concrete, excavation and backfill, crushed stone, and appurtenances shown on the Plans and as required for a complete and operable 2" Air Release Valve. All piping and fittings shall be ductile iron, unless otherwise shown on the Plans.

All other Work required to complete the 2" Air Release Valve detail shall be considered as incidental to the project and no specific payment will be made. Payment for completing the work specified herein and as

shown on the Plans shall be measured and paid for at the contract unit price per each, for each size of associated connection pipe.

- Page 15-9, Article 1515-4, Measurement and Payment, add the following to the Pay Item table:

| | |
|---|---|
| 12" Insertion Valve Assembly | Each |
| 2" Air Release Valve | Each |

5. SECTION 1520 – SANITARY SEWER

- Page 15-10; Sub-article 1520-3, Construction Methods, add the following to the end of the section:

Pipe installation shall meet the following general guidelines:

1. Lay pipe in the presence of Engineer, unless specifically approved otherwise.
2. Handle pipe and accessories in accordance with manufacturer's recommendations. Take particular care not to damage pipe coatings.
3. Carefully inspect pipe immediately prior to laying. Do not use defective pipe. Replace pipe damaged during construction.
4. Lay pipe to grade and alignment indicated on the Drawings.
5. Provide proper equipment for lowering pipe into trench.
6. Provide tight closure pipe ends when work is not in progress.
7. Keep pipe interior free of foreign materials.
8. Do not lay pipe in water or when the trench or weather conditions are unsuitable for the work.
9. Clean bell and spigots before joining. Make joints and lubricate gasket in accordance with pipe manufacturer recommendation.
10. Block fittings with concrete, or restrained as indicated on the Drawings or as required to prevent movement.
11. Lay gravity pipe upgrade from the lower end and at the grades and alignment indicated on the Drawings.

**PROJECT SPECIAL PROVISIONS**
**Utility Construction**

12. Lay sewer pipe to true lines and grades by using laser beam equipment or other acceptable means.

13. Minimum Separation Distances:

    a. In general, 100-foot horizontal separation from wells or other water supplies. If sewer pipe is installed within 50 foot of a public well or water supply or 25 foot of a private well or water supply, ferrous pipe must be used. Manholes shall not be located within 50-foot of a public well or water supply or 25 foot from a private well or water supply.

    b. 24-inch vertical separation from storm sewers or ferrous pipe shall be used.

14. **Sewer Bypass Pumping Operations**

    a. **In all Sewer Bypass Pumping operations, a bypass plan sealed by a N.C. Professional Engineer must be submitted for approval to the Public Utilities Department prior to pumping operations (Plans may be submitted to administration staff at One Exchange Plaza, Suite 620, Raleigh, NC 27601) Pumps should be sized to handle the peak daily flow (2.5 times the average daily flow) for the line or area of work. The contractor shall secure pumps from a pump supplier according to the provided flow information. Pumping operations must be monitored 24 hours a day for each day of the pumping operation by qualified personnel in order to respond to problems or failures. 100% redundancy is required for pumping operations. In addition, back up pumps are to be connected to the bypass force main to facilitate immediate use upon failure of the primary pumps. Sewer service outages must be scheduled one week in advance and may not last longer than eight hours.**

    b. **While working on any part of an existing sewer main, the Contractor shall maintain the existing sewage flow. No discharge of sewage to the storm waters will be allowed. Water for the flushing of new sanitary sewer mains must be obtained through a fire hydrant meter and must be pumped out and may not be discharged into the sanitary sewer system. Construction requiring existing sewer flow to be pumped from existing manholes shall be the responsibility of the contractor and must be approved prior to proceeding by the Public Utilities Director or the City Inspector.**

- Page 15-10; Sub-article 1520-3(A)(1), Pipe Installation, add the following:

**PROJECT SPECIAL PROVISIONS**
**Utility Construction**

Install Fiberglass Reinforced Pipe in accordance with ASTM D3839 and the manufacturer's instructions. Bedding shall be in accordance with Detail 0222132.

Sewer Construction Plugs

A sewer plug permit must be obtained prior to beginning construction.

Mechanical plugs (non-pneumatic) must be installed throughout the time of construction of any sanitary sewer extension. Plugs are to be installed on the downstream end of the new main at the first manhole from the existing tie-in, until final acceptance.

All plugs must be securely tied off with steel cable within the manhole and must have a secure marking attached to the plug indicating the utility Contractor to whom the plug belongs.

All plugs must be monitored during construction to insure the plug is functioning as required.

Prior to removing the plug, the Contractor must sign a plug removal form verifying that the sewer facilities are sufficient and functionally complete. All plugs must be removed by the Contractor upon acceptance that the sewer facilities are sufficiently functionally complete to accept flow and PRIOR to the mains above the plug location being placed into service and/or accepting any flow of sewage.

**Gaskets of the Viton nitrile type, or equal, and polyethylene encasement shall be installed on sewer pipe if contaminated soil and/or groundwater are detected during excavation, or as directed by the Engineer. The use of nitrile gaskets and polyethylene encasement shall extend at least forty (40) feet beyond the limit of contamination.**

a. Sewer Services

Provide PVC wye sewer saddles for services on PVC mains. Saddles shall be solvent welded and fastened with double stainless steel bands.

Provide a cast or ductile iron wye sewer saddle for services on ductile iron main. Saddles shall be per the City of Raleigh Public Utilities Handbook (pg. 117), consisting of a virgin SBR gasket compounded for sewer service, a ductile iron saddle casting, a 304 stainless steel adjustable strap for fastening the gasket and the saddle casting to the sewer main, and a 304 stainless steel adjustable circle clamp for securing the service line into the SBR gasket.

**PROJECT SPECIAL PROVISIONS**
**Utility Construction**

Make service connections in accordance with the standard detail(s) on the Drawings.

Service connections to the main lines shall be perpendicular to the main line to the edge of the right-of-way or easement line.

Four-inch lines shall have a minimum slope of 1.0 % and have cleanouts every 75 feet at a minimum in addition to a cleanout at the right-of-way line or at the edge of the easement.

Six-inch lines shall have a minimum slope of 0.60 % and have cleanouts every 100 feet at a minimum in addition to a cleanout at the right-of-way line or at the edge of the easement.

6-inch service lines shall tie directly into a manhole.

Wye sewer saddles shall be made only when the sewer main is 8-, 10-, or 12-inch diameter concrete, ductile iron, or PVC sewer pipe. This type connection cannot be used on truss sewer pipe. The opening in the sewer main for the saddle shall be cut with a hydraulically driven or pneumatically driven circular tapping saw of the same nominal diameter as the sewer service line.

b. Sewer Cleanouts

Sewer cleanouts connected to ductile iron pipe shall also be ductile iron sewer pipe conforming to these specifications.

Sewer cleanouts connected to PVC pipe shall also be PVC sewer pipe schedule 40 conforming to ASTM-D-3034 latest revision. Use elastomeric gaskets for pipe joints.

PVC wye sewer saddles shall be used on new PVC pipe. Saddles shall be used on existing PVC, solvent welded to the main and fastened with double stainless steel bands.

Cleanouts shall be a minimum of 4-inch diameter unless noted otherwise on the Drawings. Provide sewer cleanouts with screw-in watertight cap. Installation shall be in accordance with the details as shown on the Drawings.

c. Protecto 401 Ductile Iron Pipe Liner

(i) Application

The entire surface shall be inspected prior to receiving protective compound to ensure that no oil, grease, etc. exists on the surface. If any

surface contains any of these items shall be solvent cleaned to remove said substances.

Once free of any oil, grease, etc., all surfaces shall be abrasive blasted using sand or grit abrasive media. No rust shall be present on surface at the time of application.

After surface preparation, the pipe interior shall receive 40 mils nominal dry film thickness of Protecto 401.

No lining shall take place when the substrate or ambient temperature is below 40°F.

The surface must be dry and dust free during application.

Bell Sockets and Spigot Ends shall be coated with 6 mils nominal, 10 mils maximum with Protecto Joint Compound 6 inches back from the end of the spigot end.

The joint compound shall be applied by brush to ensure full coverage.

No excessive buildup shall be present in the gasket seat or on the spigot ends.

Coating of the gasket seat and spigot ends shall be done after the application of the lining to the interior of the pipe.

The number of coats shall be as recommended by the lining manufacturer.

No material shall be used for lining which is not indefinitely recoatable with itself without roughening of the surface.

Provide touch up, as necessary, using Protecto Joint Compound per manufacturer's recommendations.

(ii) Inspection and Certification

A magnetic film thickness gauge shall be used to confirm the thickness on all ductile iron pipe and fittings. Thickness testing shall be done in accordance with SSPC-PA-2 Film Thickness Rating.

The interior lining shall be tested using a non-destructive 2,500 volt test to check for pinholes. Repair defects prior to shipment.

**PROJECT SPECIAL PROVISIONS**
**Utility Construction**

Each pipe joint and fitting shall be marked with the date of application of the lining system along with its numerical sequence of application on that date and records maintained by the applicator of his work. These records shall be made available to the Engineer upon request.

The pipe/fitting manufacturer shall provide a certificate attesting that the applicator meets the requirements of this specification, and that the material used was as specified and applied as specified.

d. Fiberglass Reinforced Pipe – Centrifugally Cast and Filament Wound

Install pipe in accordance with manufacturer's recommendations and the following requirements:

The bedding and burial of pipe and fittings shall be in accordance with the Drawings and Specifications and the Manufacturer's requirements.

Do not exceed forces recommended by the manufacturer when joining pipe.

Gasket shall be wiped clean prior to joining. Damaged, defective, or bulging gaskets shall be replaced with a new coupling.

Wipe the plain end of pipe clean prior to insertion in the coupling. The coupling components shall also be wiped clean prior to connection.

Apply joint lubricant, as approved by pipe manufacturer, to pipe end and elastomeric gaskets.

For handling pipe, use textile slings or other suitable materials or a forklift. Use of cables or chains is not permitted. Damaged pipe will be rejected.

Pipe shall be free of nicks, scratches and gouges at the time of installation. Visible gouges shall be cause for rejection of pipe.

Join pipe in straight alignment then deflect slightly if required. Do not allow the deflection angle to exceed the deflection permitted by the manufacturer.

No blocking under the pipe will be permitted.

Storage of pipe on the job site shall be done in accordance with the pipe manufacturer's recommendation and with approval of the Engineer.

Under no circumstances shall pipe or fittings be dropped either into the trench or during unloading. The interior of the pipe shall be kept clean of oil, dirt, and foreign matter; and the machined ends and couplings shall be wiped clean immediately prior to jointing.

**PROJECT SPECIAL PROVISIONS**
**Utility Construction**

Use a pipe cutter where necessary to cut and machine all pipe in the field. A "full insertion mark" shall be provided on each field-cut pipe end. Field-cut pipe shall be beveled with a beveling tool in accordance with the manufacturer's recommendations. Bevels shall be in accordance with the manufacturer's requirements.

If not integral to the bell or coupling, rubber gaskets shall be marked with manufacturer's identification sizes and proper insertion direction.

Before use, all pipe and specials shall be thoroughly examined for defects; and no piece shall be installed which is known to be defective. If any defective piece should be discovered after having been installed, it shall be removed and replaced with a sound on in a satisfactory manner at no additional cost to the Owner.

For open-trench construction, the laying of the pipe in finished trenches shall begin at the lowest point with the coupling/bell ends pointing opposite to the direction of flow. The interior of the pipe and the jointing seal shall be free from sand, dirt, and trash before installing in the line. Extreme care must be taken to keep the couplings of the pipe free from dirt and rocks so joints may be properly assembled without overstressing the coupling. The jointing of the pipe shall be done in strict accordance with the pipe manufacturer's instructions and shall be done entirely in the trench.

e. Painting

Equipment shall receive the manufacturer's standard coating for the intended application. Coatings shall be suitable for the intended application.

Repaint damaged paint surfaces.

Above ground piping and piping within vaults shall be painted in accordance with the specification section for each item.

- Page 15-11; Sub-article 1520-3(A)(2) Testing, line 5, replace the entire section with the following:

Test all 24" and smaller gravity sewer lines for leakage using infiltration, exfiltration, or air test. Perform visual inspection on gravity sewer lines larger than 24". Perform line and grade testing and deflection testing on all gravity sewer lines.

a. General

**PROJECT SPECIAL PROVISIONS**
**Utility Construction**

Clean and flush pipe system of foreign matter prior to testing. Notify Owner and Engineer a minimum of 48 hours prior to testing. Perform tests in the presence of Engineer. Length of line to be tested at one time shall be subject to approval of Engineer. Pipe sections shall not be accepted and placed into service until specified test have been performed and approved. Repair defects in the pipe system. Make repairs to the same standard as specified for the pipe system. Retest repaired sections until acceptance. Repair visible leaks regardless of the test results.

b. Gravity Sewer Mains

Test gravity lines between manholes.

Light Testing: Engineer will check for displacement of pipe as follows:

(i) A light will be flashed between the ends of the pipe section being tested.

(ii) If the illuminated interior shows misalignment, or other defects as designated by Engineer, defects shall be repaired.

Infiltration shall not exceed 100 gallons per inch of diameter, per mile of pipe, per 24 hours. Engineer may require flow measurement for verification of infiltration. Verify that maximum infiltration rate shall not be surpassed by air testing as follows.

Low Pressure Air Test - Air testing of sewer mains shall conform to UNI-B-6 and the following requirements:

(i) Perform initial air test when each section of main is complete including services to right of way. Test as construction proceeds.

(ii) Wet interior surfaces of porous pipe material prior to testing.

(iii) Safety

Provide a superintendent who has experience in low pressure air testing of gravity sewer mains. Follow safety recommendations of air testing equipment manufacturer. Properly brace sewer plugs during testing. Test plugs prior to use in air testing. No one shall be allowed in manhole or trench when pipe is under pressure. Pressurizing equipment shall include a regulator and a pressure relief valve, which are set no higher than 9 psig. Monitor gauges continuously to assure that the pressure does not exceed 9 psig.

(iv) Equipment

Sewer plugs shall be specifically designed for low pressure air testing. Use two separate air hoses; one to connect the control panel to the sealed line for introducing the air, and one from the sealed line to the control panel to provide constant monitoring of the air pressure in the line. If Pneumatic plugs are used a separate line shall be used to inflate the plugs.

As a minimum the above ground air testing equipment shall include a shutoff valve, pressure regulating valve, pressure relief valve, input pressure gauge, and a continuous monitoring pressure gauge having a pressure range from 0 to at least 10 psig.

Continuous monitoring pressure gauge shall be at least 4 inches in diameter with minimum divisions of 0.10 psi and an accuracy of +/- 0.04 psi. Monitoring gauges shall be subject to calibration as deemed necessary. Air used for testing shall pass through a single above ground control panel.

(v) Testing

Groundwater Determination: Immediately prior to each air test, determine groundwater level by a method acceptable to the Engineer. Adjust pressure used in air test in accordance with groundwater level.

Apply air slowly to the test section until the pressure reached is 4.0 psi plus an adjustment of 0.433 psi for each foot of ground water above the crown of the pipe. Internal air pressure, including adjustment for ground water, should never exceed 9.0 psi for ductile iron and concrete pipe and 5.0 psi for Fiberglass pipes. The Contractor may have to dewater trench to maintain ground water at or below crown of fiberglass pipe when testing. Cost for this shall be included in unit price for pipe installation.

When the above required pressure is reached, throttle air supply to maintain internal pressure for at least two minutes to permit stabilization. When pressure has stabilized at required pressure, shut off air supply.

While observing the continuous monitoring pressure gauge, decrease pressure approximately 0.5 psi from required pressure.
At this reading timing shall commence with a stop watch and allowed to run until pressure has dropped 1.0 psi or allowable time has lapsed. Line shall be "Acceptable" if the pressure drop does not

exceed 1 psig in the time prescribed for the test in Table 1, Low Pressure Air Testing for Gravity Sewer Mains.

Deflection Test for SDR 35 and Ribbed (ASTM F 949) PVC pipe

Measure for deflection of pipe no sooner than thirty days after installation and backfill. Deflection shall not exceed 5 percent of pipe diameter. Maximum allowable long term deflection shall be 5 percent. Measure deflection with an approved "GO-NO-GO GAUGE" method or by an approved recording deflectometer. Verify gauge on site prior to testing.

Deflection Test for Fiberglass Pipe

Measure for deflection of pipe within 48 hours (initial test) after installation and backfill and again (final test) within thirty days. Deflection shall not exceed 3 percent of pipe diameter for the initial test and 4 percent of pipe diameter for the final test. Maximum allowable long term deflection shall be 5 percent. Measure deflection with an approved "GO-NO-GO GAUGE" method or by an approved recording deflectometer. Verify gauge on site prior to testing.

Cleaning and TV Inspection
Upon completion of other testing, clean all newly installed sewer mains. This shall include all sewer main and lateral connections. This cleaning shall meet the following requirements:

(i) The Engineer and Owner shall be present throughout the cleaning operations.

(ii) The sewer mains shall be cleaned with a high-velocity water jet. No debris of any kind shall be released into the sewer system.

Upon completion of cleaning operations, within 2 hours, Owner shall televise all newly installed sewer mains.

(i) Contractor shall coordinate cleaning and televising operations with Owner to ensure time schedules can be achieved.

(ii) If televising is not properly coordinated, Owner may request Contractor to clean sewer mains again at no additional cost to the Owner.

- Page 15-12; Sub-article 1520-4, Measurement and Payment, after the first Paragraph add the following:

**PROJECT SPECIAL PROVISIONS**
**Utility Construction**

Where sanitary gravity sewer is to be replaced in place, the removal of existing sanitary gravity sewer shall be ~~paid for as part of the~~**considered incidental to the** ___" Sanitary Gravity Sewer pay item. ~~and n~~No additional **measurement nor** payment shall be made.

**The mobilization, set-up, operation, demobilization, and all appurtenances associated with temporary bypass sewer bypass pumping operations shall be considered incidental to the ___" Sanitary Gravity Sewer pay item and no additional measurement nor payment shall be made.**

**Polyethylene encasement shall be considered incidental to the ____" Sanitary Gravity Sewer pay item. No additional measurement nor payment will be made.**

**Nitrile gaskets shall be considered incidental to the ____" Sanitary Gravity Sewer pay item. No additional measurement nor payment will be made.**

6. SECTION 1525 – UTILITY MANHOLES

- Page 15-13; Sub-article 1525-2, Materials, replace the last three paragraphs with the following:

Provide manholes made of precast concrete sections in conformance with ASTM C478, the Drawings, the City of Raleigh Public Utilities Handbook, NC Department of Transportation, and the following requirements:

(1) General

Provide manholes to the depth as indicated on the Drawings. Manhole style, type, and inside diameter shall be as noted on the Drawings.

Manholes on lines 12" and larger in diameter, as well as manholes that directly receive a force main discharge, shall be internally coated with a polyurea coating. Coating shall be per the City of Raleigh Public Utilities Handbook (pg. 103). Coatings may be applied by brush, spray, or roller. Coating shall be provide in three separate parts; primer, intermediate coat, and top coat.

(a) Primer coat shall be a 20% solids, deeply penetrating, dual-component polyurea primer applied to 0.5 – 1.0 mils dry film thickness (150 $ft^2$/gal).

(b) Intermediate coat shall be a dual component polyurea applied at 50 – 100 mils dry film thickness (50 ft2/gal).

(c) Top coat shall be a 65% solids, two-part polyurea applied at 7.5 – 10 mils dry film thickness (125 ft2/gal).

**Manholes with invert depths greater than or equal to 10' below existing grade within the limits of suspected groundwater and soil contamination shall be precast with a crystalline waterproofing additive. Concrete waterproofing system shall be of the crystalline type that chemically controls and permanently fixes a non-soluble crystalline structure throughout the capillary voids of the concrete. The system shall cause the concrete to become sealed against the penetration of liquids from any direction, and shall protect the concrete from deterioration due to harsh environmental conditions.**

Precast concrete manholes shall be as manufactured by Tindall Concrete Products, Inc., Adams Concrete, Hanson Pipe and Precast, D & M Concrete Specialties, Inc., N. C. Products Corp., Stay Right Tank, or approved substitute.

T-series manholes as manufactured by Tindall Concrete Products or approved equal shall be an acceptable substitute to round manholes as specified herein. The T-series shall be the same size manhole as shown on the Drawings for round manholes (e.g., 6' ID manhole, etc.) and shall meet all applicable requirements of the specifications. No reduction in size of the riser sections and top slab shall be allowable.

(2) Precast Concrete Sections

Minimum wall thickness shall be 5-inches.

Base: Cast monolithically without construction joints or with an approved PVC waterstop in the cold joint between the base slab and the walls. Minimum thickness of base shall be 6-inches.

The width of the base extensions on Extended Base Manholes shall be no less than the base slab thickness. Extended bases shall comply with the details on Drawings.

Riser: Minimum lay length of 16 inches.

Cone: Eccentric or concentric cones may be used on 8 through 12-inch mains. Concentric cones shall be used on all 15-inch and larger mains.

Transition Slab: Provide a flat transition from 60-inch and larger manholes to 48-inch diameter risers, cones, and flat slab top sections. The maximum height of manhole over the transition top section shall be 12 feet. Transition sections shall not be used in areas subject to vehicle traffic.

**PROJECT SPECIAL PROVISIONS**
**Utility Construction**

Flat Slab Top: Designed for HS-20 traffic loadings as defined in ASTM C890. Items to be cast into Special Flat Slab Tops (i.e. ring, cover, vent base) shall be sized to fit within the manhole ID and the top and bottom surfaces. Provide a float finish for exterior slab surface.

Precast or core holes for pipe connections. Diameter of hole shall not exceed outside diameter of pipe by more than 3-inches.

Lifting Devices: Devices for handling precast components shall be provided by the precast manufacturer and comply with OSHA Standard 1926.704.

(3) Joints

Manufacturer in accordance with tolerance requirements of ASTM C 990 for butyl type joints.

Minimize number of joints. Do not use riser section for manholes up to 6 feet tall and no more than one riser for each additional 4 feet in height.

Flexible Joint Sealants: Flexible Joint Sealants: Preformed butyl rubber based sealant material conforming to Federal Specification SS-S-210A, Type B and ASTM C990.

External Seal: Polyethylene backed flat butyl rubber sheet no less than 1/16-inch thick and 8-inches wide.

(4) Inverts

Brick and mortar or precast concrete invert constructed to the width of the effluent pipe.

Form and finish invert channel to provide a consistent slope from inlet(s) to outlet up to 6-inches.

Channel walls shall be formed to the springline of the outlet pipe diameter.

Finish benches at 60 degrees to manhole walls. Provide a 1/4-inch radius at the edge of bench and trough.

(5) Flexible Pipe Connectors

Provide flexible connectors for pipe to manhole that conform to ASTM C923. Location of connectors shall vary from Drawings no more than 1/2-inch vertically and 5 degrees horizontally. Boot sleeves shall have stainless

steel expansion bands and pipe clamps that meet or exceed ASTM C923 and A167.

(6) Manhole Steps

Steps shall be made of 1/2-inch grade 60 steel encapsulated by co-polymer polypropylene and have serrated tread and tall end lugs.

Secure steps to the wall with compression fit in tapered holes or cast-in-place. Align steps along a vertical wall and shall not be located over a pipe opening. First step shall be a maximum of 26 inches from the bottom.

Steps shall be provided inside manholes and shall be provided on the outside when the top of manhole elevation is greater than three (3) feet above the existing ground elevation.

Steps shall be as shown on the Drawings.

Steps shall be by American Step Co., Inc., Bowco Industries, Inc., M. A. Industries, Inc. or approved equal.

(7) Castings

Made of gray iron, ASTM A-48 - class 30.

Castings shall be free from imperfections not true to pattern. Casting tolerances shall be plus or minus 1/16-inch per foot of dimension. Top shall set neatly in frame, with edges machined for even bearing and proper fit to prevent rattling and flush with the edge of frame.

Castings shall be as manufactured by Neenah Foundry Co., U.S. Foundry & Manufacturing Corp., Vulcan Foundry, or approved equal.

(8) Manhole Frame and Cover

Minimum clear opening shall be 22 inches.

Minimum weight for frame and cover shall be 300 pounds and suitable for Heavy Duty Highway Traffic Loads of H-20.

Frame shall have four 3/8-inch anchor bolt holes equally spaced.

Cast "DANGER PERMIT REQUIRED – CONFINED SPACE DO NOT ENTER" on the cover. Casting shall bear the name of the manufacturer and the part number.

**PROJECT SPECIAL PROVISIONS**
**Utility Construction**

Provide camlocks on all manholes located in sanitary sewer easement.

Provide cover with one 1-inch perforated holes unless noted as watertight on the Drawings.

Provide the following where indicated on the Drawings:

(a) Ring and cover shall be watertight.

(b) Bolt down cover. Bolt down covers shall be provided with four (4) 3/8-inch stainless steel hex head bolts at 90 degrees.

- Page 15-14; Sub-article 1525-3(B), Installation of Precast Units, replace the entire section with the following:

Install manholes in accordance with manufacturer's recommendations and the following requirements:

(a) Set base plumb and level. If using precast inverts, then align manhole invert with pipe invert.

(b) Secure pipe connectors to pipe in accordance with manufacturer's recommendation.

(c) Clean bells and spigots of foreign material that may prevent sealing. Unroll the butyl sealant rope directly against base of spigot. Do not stretch. Follow manufacturer's instructions when using O-ring seals.

(d) Set precast components so that steps align.

(e) Plug lift holes using a non-shrink grout. Cover with a butyl sealant sheet on the outside and seal on the inside with an application of an epoxy gel 1/8-inch thick extending 2 inches beyond the opening.

(f) Set manhole frames to grade with grade rings in paved areas. Grade rings are not allowable for manholes located in easements. Seal joints between cone, adjusting rings, and manhole frame with butyl sealant rope and sheet. Concrete collar as shown in detail on the drawings shall be installed for manholes located in pavement.

(g) Apply external seal to the outside of joint.

(h) Finish the interior by filling fractures greater than 1/2-inch in length, width or depth with a sand cement mortar.

(i) Clean the interior of the manhole of foreign matter.

- Page 15-15; Sub-article 1525-3(D), Testing, Replace the entire section with the following:

Vacuum test each manhole in accordance with ASTM C1244 and the following:

(a) No personnel shall be allowed in manhole during testing.

(b) Test manhole after assembly and prior to backfilling.

(c) Plug pipes with suitably sized and rated pneumatic or mechanical pipeline plugs. Brace plugs to prevent displacement.

(d) Position vacuum test head assembly to seal against interior surface of the top of cone section in accordance with manufacturer's recommendation.

(e) Draw vacuum of 10 inches of mercury on manhole. Shut off the vacuum pump and close valve on vacuum line.

(f) Note: The required time for the test covers manholes to a depth of approximately 24 feet per the table in the ASTM standard. Standard does allow less time for shallower manholes, but a manhole will typically pass or not in the first few seconds of the test.

(g) Measure time for vacuum to drop to 9 inches of mercury. Manhole shall pass if time meets or exceeds the following:

| Manhole I.D. (inches) | 48 | 60 | 72 | 84 | 96 | 120 | T-series |
|---|---|---|---|---|---|---|---|
| Seconds | 60 | 75 | 90 | 105 | 120 | 150 | 105 |

(h) If manhole fails test, remove head assembly, coat interior with a soap and water solution, and repeat vacuum test for approximately 30 seconds. Leaking areas will have soapy bubbles. Make necessary repairs to the satisfaction of Engineer and repeat test until manhole passes.

7. SECTION 1530 – ABANDON OR REMOVE UTILITIES

- Page 15-15; Sub-article 1530-3(A), Abandoning Pipe, add the following to the end of the section:

Contractors abandoning water services shall remove the entire service including the corporation cock and insert a plug in the main. When plugging the line is not available, the corporation cock may be turned off, capped, and surrounded with 1 $ft^3$ of concrete. All remaining portions of the service shall be removed from the

**PROJECT SPECIAL PROVISIONS**
**Utility Construction**

main to the right of way line and shall be disposed of properly. Water main abandonment must be performed in accordance with a plan approved by the Public Utilities Department. Service and main abandonment require inspection by the Public Works Department at 919-890-3030.

- Page 15-16; Sub-article 1530-3, Construction Methods, Subparagraph D, delete line 26 and add the following:

  Removed hydrants become the property of the Contractor. The Contractor shall remove and dispose of all other ancillary items. The Contractor shall notify the utility owner's representative prior to the proposed "remove fire hydrant".

8. SECTION 1540 – ENCASEMENT

- Page 15-17; Sub-article 1540-3, Construction Methods, in Subparagraph (D), delete line 20 and insert the following:

  All carrier pipe spacers, regardless of the manufacturer, shall be manufactured with an ultra-high molecular (high-density) low coefficient of friction runner tip to isolate the spacer from the casing pipe and to minimize drag and damage to the casing pipe as the carrier pipe is installed. All spacers shall be manufactured from stainless steel.

***END OF SPECIAL PROVISION***

PROJECT SPECIAL PROVISIONS
Utilities by Others

WETHERILL ENGINEERING
WE Design Your Tomorrow . .

**1223 Jones Franklin Road**
**Raleigh, NC 27606**
**Phone: 919.851.8077**
**Fax: 919.851.8107**
**wei@wetherilleng.com**

**General:**

A) **Duke Energy (Power Transmission)**
Jamie Loy, 919-546-6034
Jamie.Loy@duke-energy.com

B) **Duke Energy (Power Distribution)**
Eddie Watkins, 919-882-5051
Eddie.Watkins@duke-energy.com

C) **AT&T (Telephone)**
Billy Griner, 919-785-7811
Wg239k@att.com

D) **Level 3 Communications (Telephone)**
Michael Moran, 919-710-8894
Michael.moran@level3.com

E) **Time Warner Cable (CATV)**
Bob Pfeiffer, 919-654-4428
pfeiffer@twcable.com

F) **PSNC Energy (Gas)**
Rhonda Lemon, 919-367-2755
Rhonda.lemon@scana.com

The conflicting facilities of these concerns will be relocated in phases coordinating with the Contractor's work. **The Contractor shall meet with the utility representatives within two weeks after the contract date of availability to coordinate work schedules.**

All utility work listed herein will be done by the utility owners. All utilities are shown on the plans from the best available information.

**Contractor shall perform all work in compliance with the Underground Utility Safety and Damage Prevention Act (Chapter 87 Article 8A GS § 87-115 thru GS § 87-130).**

The Contractor's attention is directed to Article 105.8 of the Standard Specifications.

PROJECT SPECIAL PROVISIONS
Utilities by Others

**Utilities Requiring Adjustment:**

**A) Duke Energy (Power Transmission)**
Duke Energy's transmission relocation work will begin prior to the date of availability. The completion date for the transmission work is 1 June 2017.

1) The contractor must contact Mr. Bruce Pait with Duke Energy Asset Protection (O: 919.329.5928 M: 919.219.9567 bruce.pait@duke-energy.com) two weeks prior to performing any work under the transmission lines.

**B) Duke Energy (Power Distribution)**
Duke Energy's relocation work will be conducted in phases as the Contractor completes demolition and utility construction. The Contractor shall meet with the Duke Energy representative within two weeks of the date of availability to coordinate work schedules.

1) The overhead power crossing Wade Avenue on the west side of Capital Boulevard will be relocated prior to the date of availability. See sheet UO-5 for details.
2) The streetlights at parcels 24-28 and -Y2RPB- will be removed and the underground power serving them will be de-energized and abandoned prior to the installation of the proposed water and sewer by the Contractor. The Contractor shall give Duke Energy one week notice and one week to complete this work. See sheet UO-5 for details.
3) Streetlights and underground power at parcels 24-28 and -Y2RPB- shall be installed when all curb, drainage, and utility construction is complete for that area. The contractor shall install the power conduit along Capital Boulevard and -Y2RPB-. Streetlights and power cables will be installed by Duke Energy under the terms of the Lighting Special Provisions. **See the Lighting Special Provisions for details.**
4) The temporary overhead power on West Johnson Street will be installed after the Contractor has completed the demolition of the buildings on parcels 7, 33, and 41. The Contractor shall give Duke Energy two weeks notice and two weeks to complete this work. See sheets UO-3 and UO-6 for details.
5) The permanent overhead power on West Johnson Street will be installed when all curb, drainage, and utility construction is complete for that area. The Contractor shall notify Duke Energy two weeks prior to when the work is complete and the area is clear for the permanent utility installation. The contractor shall allow two weeks for Duke Energy to complete this work. See sheets UO-3 and UO-6 for details.
6) The underground power on -Y1RPC- will be installed after the Contractor has completed the demolition of the buildings on parcels 8 and 10. The Contractor shall give Duke Energy two weeks notice and two weeks to complete this work. See Sheet UO-3 for details.
7) The temporary overhead power on Peace Street will be installed when the necessary right of way and easements are acquired and the Contractor is ready

to begin phase one of the culvert construction. The Contractor shall give Duke Energy two weeks notice and two weeks to complete this work. AT&T and Time Warner Cable will be joint use on these poles. See Sheet UO-6 for details.

8) The relocation of overhead power on Peace Street for phase two of the culvert construction will be performed after phase one is complete. The Contractor shall give Duke Energy two weeks notice prior to phase one completion and allow Duke Energy two weeks to complete this work. See sheet UO-6 for details.
9) The Contractor shall coordinate with Duke Energy for the construction of the drainage structures on parcels 36 and 39. A Ver-T-Pol, or similar device will be installed to support the existing pole while the drainage structures are installed. When the installation is complete the proposed pole will be set and the overhead utilities transferred to the new pole. The contractor shall give Duke two weeks notice and one week to complete their work.
10) Streetlights and underground conduit along the east side of Capital Boulevard shall be installed when all curb, drainage, and utility installation is complete for that area. The contractor shall install the power conduit along Capital Boulevard including the ramps, loop, and flyover. Streetlights and power cables will be installed by Duke Energy under the terms of the Lighting Special Provisions. **See the Lighting Special Provisions for details.**
11) Streetlights and underground conduit along the west side of Capital Boulevard shall be installed as curb, drainage, and utility installation work is completed. The contractor shall install the power conduit along Capital Boulevard including the ramps, loop, and flyover. Streetlights and power cables will be installed by Duke Energy under the terms of the Lighting Special Provisions.
12) Streetlights and underground conduit for streetlights at Peace Street, Harrington Street, and Johnston Street will be installed by Duke Energy after the project is complete. **See the Lighting Special Provisions for details.**

**C) AT&T (Telephone)**

AT&T's relocation work will be conducted in phases as the Contractor completes demolition and utility construction. The Contractor shall meet with the AT&T representative within two weeks of the date of availability to coordinate work schedules.

1) The underground telephone crossing the Wade Avenue flyover on the east side of Capital Boulevard will be relocated prior to the date of availability. See sheet UO-5 for details.
2) Temporary telephone service will be installed for parcels 24-28 and the existing underground facilities will be removed or abandoned when the necessary right of way and easements are acquired and the Contractor is ready to begin the installation of the proposed water and sewer. The

PROJECT SPECIAL PROVISIONS
Utilities by Others

Contractor shall give AT&T three weeks notice and two weeks to complete this work. See sheet UO-5 for details.

3) Permanent underground telephone for parcels 24-28 shall be installed when all curb, drainage, and utility construction is complete for that area. The Contractor shall notify AT&T three weeks prior to when the work is complete and the area is clear for the permanent telephone installation. The contractor shall allow two weeks for AT&T to complete this work.
4) The proposed underground telephone installation along the east side of Capital Boulevard shall begin after the Contractor has completed installing the proposed water, PSNC Energy has completed relocation work, and TWC has completed relocation work. The Contractor shall give AT&T three weeks notice prior to TWC completing their work and allow AT&T ten weeks to complete this work. See sheets UO-3 - UO-5.
5) The proposed underground telephone along the east side of -Y1RPC- will begin after the Contractor has completed the demolition of the buildings on parcels 8 and 10. The Contractor shall give AT&T three weeks notice and four weeks to complete this work. See Sheet UO-3 for details.
6) The temporary overhead telephone on Peace Street will be installed when the necessary right of way and easements are acquired and the Contractor is ready to begin phase one of the culvert construction. AT&T will be joint use on Duke Energy poles. The Contractor shall give AT&T three weeks notice and two weeks to complete this work. See Sheet UO-6 for details.
7) The relocation of overhead telephone on Peace Street for phase two of the culvert construction will be performed after phase one is complete. The Contractor shall give AT&T three weeks notice and two weeks to complete this work. See sheet UO-6 for details.
8) The Contractor shall coordinate with AT&T for the construction of the drainage structures on parcels 36 and 39. A Ver-T-Pol, or similar device will be installed by Duke Energy to support the existing pole while the drainage structures are installed. When the installation is complete the proposed pole will be set and the overhead utilities transferred to the new pole. The contractor shall give AT&T three weeks notice and one week to complete their work.

D) **Level 3 Communications (Telephone)**
Level 3's overhead telephone lines are currently attached to Duke Energy poles at ± -L- 33+12. They will be relocated to the new Duke Energy poles after Duke has completed the installation. They will require one week notice and one week to complete this work.

**E) Time Warner Cable (CATV)**
Time Warner Cable's relocation work will be conducted in phases as the Contractor completes demolition and utility construction. The Contractor shall

meet with the Time Warner Cable representative within two weeks of the date of availability to coordinate work schedules.

1) Temporary CATV service will be installed for parcels 24-28 and the existing underground facilities will be removed or abandoned prior to the installation of the proposed water and sewer by the Contractor. The Contractor shall give TWC two weeks notice and two weeks to complete this work. See sheet UO-5 for details.
2) Permanent underground CATV for parcels 24-28 shall be installed when all curb, drainage, and utility construction is complete for that area. The Contractor shall notify Time Warner Cable two weeks prior to when the work is complete and the area is clear and allow TWC two weeks to complete the permanent utility installation.
3) The temporary overhead CATV on West Johnson Street is attached to Duke Energy poles and will be installed after Duke Energy has completed their work. The Contractor shall give TWC two weeks notice and two weeks to complete this work. See sheets UO-3 and UO-6 for details.
4) The permanent overhead CATV on West Johnson Street will be installed when all curb, drainage, and utility construction is complete and Duke Energy has installed the permanent poles. The Contractor shall give TWC two weeks notice and two weeks to complete this work. See sheets UO-3 and UO-6 for details.
5) The temporary overhead CATV on Peace Street will be installed when the necessary right of way and easements are acquired and the Contractor is ready to begin phase one of the culvert construction. TWC will be joint use on Duke Energy poles. The Contractor shall give TWC two weeks notice and two weeks to complete this work. See Sheet UO-6 for details.
6) The relocation of overhead CATV on Peace Street for phase two of the culvert construction will be performed after phase one is complete. The Contractor shall give TWC two weeks notice prior to the completion of phase one and allow TWC two weeks to complete this work. See sheet UO-6 for details.
7) The proposed underground CATV along the east side of Capital Boulevard shall begin after the Contractor has completed installing the proposed water and PSNC Energy has completed their relocation work. The Contractor shall give TWC two weeks notice prior to the completion of PSNC Energy's work and allow TWC four weeks to complete this work. See Sheets UO-3 - UO-5.
8) The Contractor shall coordinate with TWC for the construction of the drainage structures on parcels 36 and 39. A Ver-T-Pol, or similar device will be installed by Duke Energy to support the existing pole while the drainage structures are installed. When the installation is complete the proposed pole will be set and the overhead utilities transferred to the new pole. The contractor shall give TWC two weeks notice and one week to complete their work.

**F) PSNC Energy(Gas)**

PROJECT SPECIAL PROVISIONS
Utilities by Others

PSNC's relocation work will be conducted in phases as the Contractor completes demolition and utility construction. The Contractor shall meet with the PSNC representative within two weeks of the date of availability to coordinate work schedules.

1) The existing underground gas crossing under Wade Avenue on the west side of Capital Boulevard will be retired and filled with grout prior to the date of availability. See sheet UO-5.
2) The installation of the proposed underground gas on West Johnson Street will be complete prior to the date of availability. See sheets UO-3 and UO-6 for details.
3) The installation of the proposed underground gas along the east side of Capital Boulevard shall begin after the Contractor has completed installing the proposed water. This work includes the proposed gas along the ramp to the north side of Peace Street and the tie into the existing gas main. The Contractor shall provide PSNC Energy two weeks notice prior to the completion of the proposed water and allow PSNC Energy four weeks to complete this work. See Sheet UO-3.
4) The existing underground gas on Peace Street at the culvert will be abandoned prior to the date of availability. See sheet UO-6.

PROJECT SPECIAL PROVISIONS
Utility Special

**Utility Coordinator**

**Description:**

The contractor shall provide a Utility Coordinator to coordinate the physical utility relocations and the protection of utility facilities with the highway project construction. The Coordinator shall harmonize the utility relocations with the highway project construction to expedite the project schedule and to maintain the safety of the workers and roadway users. The Coordinator shall facilitate communications between parties, i.e. the Contractor's personnel, the utility owners' personnel and contractors, and the Department's personnel.

The Utilities by Others plans and special provisions detail the utility relocations for the project. In accordance with 105-8, the Department has coordinated the design and construction of the relocations up to the date of the UO Special Provisions.

**Tasks include:**

- Facilitating the exchange of information on the status of the work, the upcoming plans, and the needs of the parties.
- Maintaining a schedule of activities and of relationships between the parties.
- Documenting the status and events as they occur and the effect of events upon the parties.
- Nurturing decision makers of the parties with information to assure that timely decisions are made and actions are taken.
- Overseeing daily operations and coordinating utility relocations with project construction.
- Ensuring compliance with the "Underground Utility Safety and Damage Prevention Act" for damage prevention.

**Methods for accomplishing the tasks include:**

Recommended methods for accomplishing the Tasks are:

- Providing facilities for meetings.
- Conducting weekly meetings.
- Publishing schedules and documents.
- Publishing minutes of meetings.
- Obtaining and updating Notices for damage prevention.
- Inspecting for maintenance of utility location markings on the ground.
- Coordinating the traffic controls of the Contractor and Utility Owners.
- Being a clearinghouse for utility related information exchange.

**Submittals:**

Provide monthly reports to the Resident Engineer detailing:

- Utility relocation activities completed for the month separated by utility owner.
- Utility relocation activities planned for the next month separated by utility owner.
- An overall assessment of utility relocation progress and the effect on the highway project.
- Critical needs and recommended actions to maintain the contract schedule.

**Measurement and Payment:**

The work of this provision will be paid for at the contract lump sum price for "Utility Coordinator." Partial payments will be made on each particular payment estimate based upon the percentage complete of the utility relocations. The Contractor shall submit a certified statement each month indicating the percentage of work completed. The Resident Engineer will determine if the amount indicated is reasonably correct and the Resident Engineer will pay accordingly on the next partial pay estimate.

Payment will be made under:

Utility Coordinator.....Lump Sum

3/31/2016

Roger Worthington
State Utilities Engineer
NCDOT Utilities Unit
1555 MSC
Raleigh, NC 27699

NORTH CAROLINA PROFESSIONAL SEAL 14601 ENGINEER ROGER G. WORTHINGTON, JR.

DocuSigned by:
Roger Gurman Worthington Jr (Seal)
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**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

| | | | |
|---|---|---|---|
| 06 Dust | Escalade | Justice | Serengeti |
| 2nd Millennium | Essential | Kalahari | Shelby |
| 3rd Millennium | Evergreen 2 | Kitty Hawk 2000 | Sheridan |
| Apache III | Falcon IV | Legitimate | Signia |
| Avenger | Falcon NG | Lexington | Silver Hawk |
| Barlexas | Falcon V | LSD | Sliverstar |
| Barlexas II | Faith | Magellan | Shenandoah Elite |
| Bar Fa | Fat Cat | Matador | Sidewinder |
| Barrera | Festnova | Millennium SRP | Skyline |
| Barrington | Fidelity | Monet | Solara |
| Barrobusto | Finelawn Elite | Mustang 4 | Southern Choice II |
| Barvado | Finelawn Xpress | Ninja 2 | Speedway |
| Biltmore | Finesse II | Ol' Glory | Spyder LS |
| Bingo | Firebird | Olympic Gold | Sunset Gold |
| Bizem | Firecracker LS | Padre | Taccoa |
| Blackwatch | Firenza | Patagonia | Tanzania |
| Blade Runner II | Five Point | Pedigree | Trio |
| Bonsai | Focus | Picasso | Tahoe II |
| Braveheart | Forte | Piedmont | Talladega |
| Bravo | Garrison | Plantation | Tarheel |
| Bullseye | Gazelle II | Proseeds 5301 | Terrano |
| Cannavaro | Gold Medallion | Prospect | Titan ltd |
| Catalyst | Grande 3 | Pure Gold | Titanium LS |
| Cayenne | Greenbrooks | Quest | Tracer |
| Cessane Rz | Greenkeeper | Raptor II | Traverse SRP |
| Chipper | Gremlin | Rebel Exeda | Tulsa Time |
| Cochise IV | Greystone | Rebel Sentry | Turbo |
| Constitution | Guardian 21 | Rebel IV | Turbo RZ |
| Corgi | Guardian 41 | Regiment II | Tuxedo RZ |
| Corona | Hemi | Regenerate | Ultimate |
| Coyote | Honky Tonk | Rendition | Venture |
| Darlington | Hot Rod | Rhambler 2 SRP | Umbrella |
| Davinci | Hunter | Rembrandt | Van Gogh |
| Desire | Inferno | Reunion | Watchdog |
| Dominion | Innovator | Riverside | Wolfpack II |
| Dynamic | Integrity | RNP | Xtremegreen |
| Dynasty | Jaguar 3 | Rocket | |
| Endeavor | Jamboree | Scorpion | |

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** | | **September 1 - February 28** | |
|---|---|---|---|
| 18# | Creeping Red Fescue | 18# | Creeping Red Fescue |
| 6# | Indiangrass | 6# | Indiangrass |
| 8# | Little Bluestem | 8# | Little Bluestem |
| 4# | Switchgrass | 4# | Switchgrass |
| 25# | Browntop Millet | 35# | Rye Grain |
| 500# | Fertilizer | 500# | Fertilizer |
| 4000# | Limestone | 4000# | Limestone |

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*.

## 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 ¾" 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.

## 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** | **Pay Unit** |
|---|---|
| Response for Erosion Control | Each |

**ENVIRONMENTALLY SENSITIVE AREAS:**

**Description**

This project is located in an *Environmentally Sensitive Area*. This designation requires special procedures to be used for clearing and grubbing, temporary stream crossings, and grading operations within the Environmentally Sensitive Areas identified on the plans and as designated by the Engineer. This also requires special procedures to be used for seeding and mulching and staged seeding within the project.

The Environmentally Sensitive Area shall be defined as a 50-foot buffer zone on both sides of the stream or depression measured from top of streambank or center of depression.

**Construction Methods**

(A) Clearing and Grubbing

In areas identified as Environmentally Sensitive Areas, the Contractor may perform clearing operations, but not grubbing operations until immediately prior to beginning grading operations as described in Article 200-1 of the *Standard Specifications*. Only clearing operations (not grubbing) shall be allowed in this buffer zone until immediately prior to beginning grading operations. Erosion control devices shall be installed immediately following the clearing operation.

(B) Grading

Once grading operations begin in identified Environmentally Sensitive Areas, work shall progress in a continuous manner until complete. All construction within these areas shall progress in a continuous manner such that each phase is complete and areas are permanently stabilized prior to beginning of next phase. Failure on the part of the Contractor to complete any phase of construction in a continuous manner in Environmentally Sensitive Areas will be just cause for the Engineer to direct the suspension of work in accordance with Article 108-7 of the *Standard Specifications*.

(C) Temporary Stream Crossings

Any crossing of streams within the limits of this project shall be accomplished in accordance with the requirements of Subarticle 107-12 of the *Standard Specifications*.

(D) Seeding and Mulching

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.

Seeding and mulching shall be performed on the areas disturbed by construction immediately following final grade establishment. No appreciable time shall lapse into the contract time without stabilization of slopes, ditches and other areas within the Environmentally Sensitive Areas.

(E) Stage Seeding

The work covered by this section shall consist of the establishment of a vegetative cover on cut and fill slopes as grading progresses. Seeding and mulching shall be done in stages on cut and fill slopes that are greater than 20 feet in height measured along the slope, or greater than 2 acres in area. Each stage shall not exceed the limits stated above.

Additional payments will not be made for the requirements of this section, as the cost for this work shall be included in the contract unit prices for the work involved.

**MINIMIZE REMOVAL OF VEGETATION:**

The Contractor shall minimize removal of vegetation within project limits to the maximum extent practicable. Vegetation along stream banks and adjacent to other jurisdictional resources outside the construction limits shall only be removed upon approval of Engineer. No additional payment will be made for this minimization work.

**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 1630-3 of the *Standard Specifications*.

## 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. Posts shall be installed a minimum of 2 ft. into the ground. 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)(5) 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** | **Pay Unit** |
|---|---|
| Safety Fence | Linear Foot |

**<u>SKIMMER BASIN WITH BAFFLES:</u>**

**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.

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 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. The coupling shall be rigid and non-buoyant and not exceed a diameter of 4" and 12" in length. 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 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*.

*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 |

## 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 |

**<u>IMPERVIOUS DIKE:</u>**

**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 |

## TEMPORARY PIPE FOR CULVERT CONSTRUCTION:

### Description

This work consists of furnishing, installing, maintaining and removing any and all temporary pipe used on this project in conjunction with the culvert construction.

### Construction Methods

The Contractor shall install temporary pipe in locations shown on the plans in such a manner approved by the Engineer. The temporary pipe shall provide a passageway for the stream through the work-site. The minimum size requirements will be as stated on the erosion control plans.

### Measurement and Payment

__" *Temporary Pipe* will be measured and paid for at the contract unit price per linear foot of temporary pipe approved by the Engineer and measured in place from end to end. Such price and payment will be full compensation for all work covered by this section including but not limited to furnishing all materials required for installation, construction, maintenance, and removal of temporary pipe.

Payment will be made under:

| **Pay Item** | **Pay Unit** |
|---|---|
| __" Temporary Pipe | 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** | **Section** |
|---|---|
| Coir Fiber Mat | 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 |

**CONCRETE WASHOUT STRUCTURE:**
(12-01-15)

**Description**

Concrete washout structures are enclosures above or below grade to contain concrete waste water and associated concrete mix from washing out ready-mix trucks, drums, pumps, or other equipment. Concrete washouts must collect and retain all the concrete washout water and solids, so that this material does not migrate to surface waters or into the ground water. These enclosures are not intended for concrete waste not associated with wash out operations.

The concrete washout structure may include constructed devices above or below ground and or commercially available devices designed specifically to capture concrete waste water.

**Materials**

| Item | Section |
|---|---|
| Temporary Silt Fence | 1605 |

*Safety Fence* shall meet the specifications as provided elsewhere in this contract.

Geomembrane basin liner shall meet the following minimum physical properties for low permeability; it shall consist of a polypropylene or polyethylene 10 mil think geomembrane. If the minimum setback dimensions can be achieved the liner is not required. (5 feet above groundwater, 50 feet from top of bank of perennial stream, other surface water body, or wetland.)

**Construction Methods**

Build an enclosed earthen berm or excavate to form an enclosure in accordance with the details and as directed.

Install temporary silt fence around the perimeter of the enclosure in accordance with the details and as directed if structure is not located in an area where existing erosion and sedimentation control devices are capable to containing any loss of sediment.

Post a sign with the words "Concrete Washout" in close proximity of the concrete washout area, so it is clearly visible to site personnel.

The construction details for the above grade and below grade concrete washout structures can be found on the following web page link:

http://www.ncdot.gov/doh/operations/dp_chief_eng/roadside/soil_water/details/

Alternate details for accommodating concrete washout may be submitted for review and approval.

The alternate details shall include the method used to retain and dispose of the concrete waste water within the project limits and in accordance with the minimum setback requirements. (5 feet above groundwater, 50 feet from top of bank of perennial stream, other surface water body, or wetland.)

**Maintenance and Removal**

Maintain the concrete washout structure(s) to provide adequate holding capacity plus a minimum freeboard of 12 inches. Remove and dispose of hardened concrete and return the structure to a functional condition after reaching 75% capacity.

Inspect concrete washout structures for damage and maintain for effectiveness.

Remove the concrete washout structures and sign upon project completion. Grade the earth material to match the existing contours and permanently seed and mulch area.

**Measurement and Payment**

*Concrete Washout Structure* will be paid for per each enclosure installed in accordance with the details. If alternate details are approved then those details will also be paid for per each approved and installed device.

*Temporary Silt Fence* will be measured and paid for in accordance with Article 1605-5 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** |
|---|---|
| Concrete Washout Structure | Each |

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# LANDSCAPE SPECIAL PROVISIONS

DocuSigned by:
Brandon P. White
05CEFD78BAA14F4...
NORTH CAROLINA LICENSED LANDSCAPE ARCHITECT
REG. 1625
BRANDON PHILLIP WHITE
6/3/2016

## Concrete Paver Sidewalk

### Description

Concrete pavers shall be installed in the locations at project site designated on the plans and in accordance with the details shown in the plans.

Concrete pavers installation shall consist of a 24" wide band located between the concrete sidewalk and curb, parallel to the adjoining street. The layout shall consist of an offset running bond pattern perpendicular to the direction of travel for the street or sidewalk.

Concrete Paver:
Paver Size & Type: 60MM Holland Stone (4" x 8" x 2 3/8") by Belgard or approved equal. Material shall comply with ASTM C936 standards. Average compressive strength shall be 8,000 psi per ASTM C140. Average Water Absorption shall be 5% with not unit greater than 7% per ASTM C140. Freeze / Thaw Resistance shall comply with ASTM C1645.

Color: "Capital Blend". Color pigment shall comply with ASTM C979 standards.

Bedding Course: Washed, clean, non-plastic, free from deleterious or foreign matter, symmetrically shaped, natural or manufactured from crushed rock. Do NOT use limestone screenings, stone dust, or sand that does not conform to the grading requirements of ASTM C33. Do NOT use mason sand or sand conforming to ASTM C144 for the bedding sand.

Aggregate Base Course: Coarse aggregate base course (CABC) approved by NCDOT compacted to at least 98 modified Proctor density per ASTM D698

Geotextile Fabric: Non-woven, 4 oz. fabric used for separation and approved by NCDOT.

Joint Material: RG+ Polymeric Sand by Techniseal or approved equal.

### Related Sections

1. City of Raleigh Standard Detail, T-30.03, Concrete / Brick Paver Sidewalk

### Quality Assurance

The Contractor shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and materials and techniques specified. The Contractor shall provide onsite supervision during all phases of the concrete paver installation with

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a current certificate of completion from the Interlocking Concrete Pavement Institute (ICPI) Concrete Paver Installer Certification program.

**Submittals**

The Contractor shall submit the following:

1. Three (3) actual concrete paver units represent each type, size, color and finish to the Project Landscape Architect for review and approval prior to purchasing product.

2. Independent laboratory test results for CABC, Bedding or Setting Bed, and Joint Sand materials.

3. Product Data, Independent laboratory test results for compliance of concrete pavers with ASTM C936.

4. Certificate for Subcontractor's completion from the Interlocking Concrete Pavement Institute (ICPI) Concrete Paver Installer Certification program

**Measurement and Payment**

The quantity of these items as described in this special provision section will be paid for at the contract unit price per square yard, completed, and accepted, which price will be full compensation for all labor, materials, equipment, tools, and any incidentals per this special provisions section.

Payment will be made under:

Concrete Paver Sidewalk ..... Square Yard

**<u>Concrete Paver Median Island</u>**

**Description**

Concrete Paver Median Islands shall be installed in the locations at project site designated on the plans and in accordance with the details shown in the plans.

Concrete Paver Median Islands installation shall consist of a raised median with concrete curb and gutter with a concrete paver field inset. The layout shall consist of an offset running bond pattern perpendicular to the direction of travel for the street or sidewalk.

<u>Concrete Paver:</u>
Paver Size & Type: 60MM Holland Stone (4" x 8" x 2 3/8") by Belgard or approved equal. Material shall comply with ASTM C936 standards. Average compressive strength shall

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be 8,000 psi per ASTM C140. Average Water Absorption shall be 5% with not unit greater than 7% per ASTM C140. Freeze / Thaw Resistance shall comply with ASTM C1645.

Color: "Capital Blend". Color pigment shall comply with ASTM C979 standards.

Bedding Course: Washed, clean, non-plastic, free from deleterious or foreign matter, symmetrically shaped, natural or manufactured from crushed rock. Do NOT use limestone screenings, stone dust, or sand that does not conform to the grading requirements of ASTM C33. Do NOT use mason sand or sand conforming to ASTM C144 for the bedding sand.

Bituminous Setting Bed: Asphalt cement mix design to be used shall conform to ASTM D3381 and approved by NCDOT.

Aggregate Base Course: Coarse aggregate base course (CABC) approved by NCDOT compacted to at least 98 modified Proctor density per ASTM D698

Geotextile Fabric: Non-woven, 4 oz. fabric used for separation and approved by NCDOT.

Joint Material: RG+ Polymeric Sand by Techniseal or approved equal.

**Related Sections**

1. City of Raleigh Standard Detail, T-30.03, Concrete / Brick Paver Sidewalk

**Quality Assurance**

The Contractor shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and materials and techniques specified. The Contractor shall provide onsite supervision during all phases of the concrete paver installation with a current certificate of completion from the Interlocking Concrete Pavement Institute (ICPI) Concrete Paver Installer Certification program.

**Submittals**

The Contractor shall submit the following:

1. Three (3) actual concrete paver units represent each type, size, color and finish to the Project Landscape Architect for review and approval prior to purchasing product.

2. Independent laboratory test results for CABC, Bedding or Setting Bed, and Joint Sand materials.

3. Product Data, Independent laboratory test results for compliance of concrete pavers with ASTM C936.

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4. Certificate for Subcontractor's completion from the Interlocking Concrete Pavement Institute (ICPI) Concrete Paver Installer Certification program

**Measurement and Payment**

The quantity of these items as described in this special provision section will be paid for at the contract unit price per square yard, completed, and accepted, which price will be full compensation for all labor, materials, equipment, tools, and any incidentals per this special provisions section.

Payment will be made under:

Concrete Paver Median Island ..... Square Yard

**Concrete Sidewalk (Capital City Grid)**

**Description**

Concrete pavement with the Capital City Grid pattern shall be installed in the locations at project site designated on the plans and in accordance with the details shown in the plans.

The Capital City Grid pattern shall consist of a 24" x 24" grid laid out perpendicular and parallel to the adjoining sidewalk and street alignment. Pattern shall consist of troweled control joints with a "picture frame" appearance. Pattern shall be extended the full width of the adjoining sidewalk or as shown on the Hardscape Plans.

Concrete sidewalk pavement (Capital City Grid) shall meet all performance criteria set forth in the contract documents and in accordance with the City of Raleigh Standard Detail T-30.01, Concrete Sidewalk, whichever is greater.

**Related Sections**

1. City of Raleigh Standard Detail, T-30.01, Concrete Sidewalk

**Quality Assurance**

The contractor shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and materials and techniques specified.

**Measurement and Payment**

The quantity of these items as described in this special provision section will be paid for at the contract unit price per each, completed, and accepted, which price will be full compensation for all labor, materials, equipment, tools, and any incidentals per this special provisions section.

Payment will be made under:

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Concrete Pavement (Capital City Grid) ..... Square Yard

**Ornamental Fencing**

**Description**

Ornamental fencing shall be installed in the locations at project site designated on the plans and in accordance with the details shown in the plans.

Ornamental fencing shall include all components necessary for a complete installation, including posts, caps, rails, pickets, and associated mounting hardware. Fence shall be a welded and rackable commercial grade, 3-rail fence with an overall height of 4'-0" and constructed from steel. Post caps shall be welded to the top of all posts. Picket spacing shall be constructed such that no opening will allow a 4" sphere to pass through except where there shall be a maximum 2" gap between the bottom of the picket and finish grade below the fencing.
Steel material for fence panels, and posts shall conform to the requirements of ASTM A653 / A653M, with a minimum yield strength of 45,000 PSI and minimum zinc (hot-dip galvanized) coating weight of 0.90 oz/ft2, Coating Designation G-90.

Fence posts shall be 2.5" square constructed with 12 Ga steel. All fence rails shall be 1.75" x 1.75" steel channel pre-punched to receive 1" square x 14 Ga steel pickets. Pickets shall be welded to rail with a uniform and neat appearance.

All fence components shall meet or exceed the vertical load, horizontal load, and infill performance for industrial weight fences under ASTM F2408.

All fence components shall receive a zinc phosphate pretreatment, primer, and acrylic topcoat with a minimum finish thickness of 2 mils. Color: Black. Finish shall meet or exceed the coating performance criteria of ASTM F2408.

**Quality Assurance**

The Contractor shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and materials and techniques specified. Ornamental fencing shall be obtained from a single source with resources to provide components of consistent quality in appearance and physical properties.

**Submittals**

The Contractor shall provide the following submittals for review and approval by the project landscape architect prior to ordering or fabricating any ornamental fencing. The contractor shall make such submittals within 60 days from receiving a Notice to Proceed.

1. Shop Drawings
2. Finish Samples for all components

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### Delivery, Storage, and Handling

Upon receipt at the job site, all materials shall be checked to ensure that no damage occurred during shipping or handling. Materials shall be stored in original undamaged packages and containers until ready for installation to protect against damage, weather, vandalism, and theft.

### Warranty

The Contractor shall provide a five year warranty against defects in materials or workmanship on the ornamental fencing. This warranty period shall begin at substantial completion of the project.

### Measurement and Payment

The quantity of these items as described in this special provision section will be paid for at the contract unit price per linear feet, completed, and accepted, which price will be full compensation for all labor, materials, equipment, tools, and any incidentals per this special provisions section.

Payment will be made under:

Ornamental Fence..... Linear Foot

## Tree Well System

### Description

Tree well systems as specified herein shall be installed in the locations at project site designated on the plans and in accordance with the details shown in the plans.

This Section includes the following:

1. Silva Cell2 System
2. Tree Well Underdrains
3. Root Barrier
4. Tree Well Frame and Grate System

### Project Conditions

Tree Well Systems occur along the project corridor in close proximity to existing and proposed utility infrastructure. The Contractor shall coordinate tree well excavations with utility locate services and other trades. The Contractor shall coordinate the installation of the underdrainage to facilitate connections to adjacent stormwater structures. The Contractor shall coordinate the installation of the Silva Cell2 System

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and structural soils with all utility providers to insure continuation of service, accommodation of proposed service lines, and prevention of contamination to structural soils from additional excavation.

**Materials & Performance**

1. The Contractor shall install the nineteen (19) 3x SilvaCell2 System per each Tree Well System per manufacturer's specifications.

2. The Contractor shall install 600 cubic feet of planting soil per each Tree Well System. Install planting soil mix per Silva Cell2 manufacturer's specifications.

3. The Contractor shall install 4" diameter, Schedule 40 PVC perforated underdrains along the perimeter of each Tree Well System and connect to the next adjacent downstream stormwater structure using 4" diameter, Schedule 40 PVC pipe. The Tree Well subgrade shall be sloped towards the underdrains for positive drainage. Perforated pipe sections shall be encased in a pre-manufactured permeable sock fabric. All pipe joints shall be solvent welded.

4. The Contractor shall install a Root Barrier lengthways, opposite the curbside of each Tree Well for the length of the Tree Well or approximately 6'.

5. The Contractor shall install a Frame and Grate System per Tree Well System. System shall meet or exceed current accessibility design guidelines per the ADA. Concrete edge restraint shall be installed as a part of and incidental to the System.

   The Frame and Grate System shall be Model R-8815-1 Cast Iron, 48" x 72" with an 18" expandable tree opening, 3/8" slot openings by Neenah Foundry (800 558 5076 or nfco.com) or approved equal. Color: No Paint (natural patina finish).

   The Contractor shall bolt both Grate halves together on the underside using the bolt slots provided.

**Quality Assurance**

The Contractor shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and materials and techniques specified.

**Submittals**

The Contractor shall provide the following submittals for review and approval by the Project Landscape Architect. The contractor shall make such submittals within 60 days from receiving a Notice to Proceed.

1. Shop Drawings for Silva Cell2 System.
2. Product data sheets for the planting soil.
3. Shop Drawings for Tree Well Underdrains

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4. Product data sheets for Root Barrier.
5. Shop Drawings for the Tree Well Frame and Grate System

**Measurement and Payment**

The quantity of Tree Well Systems as described in this special provision section will be paid for at the contract unit price per each, completed, and accepted, which price will be full compensation for all labor, materials, equipment, tools, and any incidentals per this special provisions section. The Silva Cell2 System, Structural Soils, Tree Well Underdrains, Root Barrier, and Tree Well Frame and Grate System shall be incidental to the Tree Well System.

Payment will be made under:

Tree Well System ..... Each

**B-5121/B-5317**

# Signals and Intelligent Transportation Systems Project Special Provisions

***(Version 12.5)***

*Prepared By: iou*
*9-Feb-16*

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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## 1. 2012 STANDARD SPECIFICATIONS FOR ROADS & STRUCTURES

***The 2012 Standard Specifications are revised as follows:***

### 1.1. Polymer Concrete (PC) Junction Boxes (1091-5(B))

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."

### 1.2. Submittal Requirements (1098-1(B))

Page 10-208, replace paragraph on line 34 with the following:

Submit for approval catalog cuts and/or shop drawings for materials proposed for use on the project. Allow 40 days for review of each submittal. Do not fabricate or order material until receipt of Engineer's approval.

Submit 4 copies of each catalog cut and/or drawing and show for each component the material description, brand name, stock-number, size, rating, manufacturing specification and the intended use (identified by labeling all components with the corresponding contract line item number). Present the submittals neatly arranged in the same order as the contract bid items. Electronic submittals of catalog cuts and drawings may be accepted in lieu of hard copies.

One hard copy and an electronic (PDF) copy of reviewed submittals will be returned to the Engineer from the ITS and Signals Unit.

### 1.3. 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)."

### 1.4. 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.

### 1.5. Pedestals (1098-14)

Page 10-218, sub-Section 1098-14(A) Pedestal Shaft

Replace "6063-T6" with "6061-T6" in the second paragraph on line 24.

Page 10-219, sub-Section 1098-14(B) Transformer Bases

Revise paragraph 2, lines 19 to 21 to read: "Provide a minimum access opening for all transformer bases of 8"x 8" with an access door that is attached with a ¼" x ¾" long stainless steel vandal proof screw to secure access door."

Add the following sentence after the second sentence of paragraph 3 on line 24: "Include a set screw prep and 3/8"-16 x 1" stainless steel set screw to secure the pedestal post to the pedestal base."

Page 10-219-220, sub-Section 1098-14 (C) Anchor Bolts

Replace entire paragraph on page 219, line 45-49 and page 220, line 1-5 with the following paragraphs:

For each pedestal, provide four (4) anchor bolts meeting the requirements of ASTM F1554, Grade 55, of the size and length specified in *Roadway Standard Drawings* No. 1743. Provide anchor bolts with coarse threads meeting the bolt/thread criteria specified by AISC. Provide threads for a minimum length of 4" on each end of the bolt. All thread anchor rods may be used. Ensure anchor bolts are hot-dipped galvanized in accordance with ASTM A153.

For each anchor bolt:

- Provide three (3) heavy hex nuts; one at the top, and 2 at the bottom (embedded end) of the anchor bolt. Provide hex nuts with coarse threads that match the anchor bolt thread requirements above. Provide hex nuts that meet the requirements of ASTM A563 Grade DH, ASTM A194, Grade 2H or equivalent. Galvanize all heavy hex nuts in accordance with ASTM A153.
- Provide one (1) standard size washer that meets the requirements of ASTM F436 for use between the two heavy hex nuts on the embedded end of the anchor bolt. Galvanize in accordance with ASTM A153.
- Provide one (1) extra thick, oversized washer for use over the slotted opening of the pedestal base. Fabricate washer to meet the chemical, physical, and heat treating requirements of ASTM F436. Fabricate the washer to the diameter and thickness needed. Galvanize fabricated washer in accordance with ASTM A153. Heat treat to the same requirements as F436 (i.e. 26 to 45 HRC).

  For a ¾" diameter anchor bolt mounted in a 1 ½" slotted opening, the dimensional requirements for an extra thick, oversized washer are as follows:

  - The minimum Outside Diameter (OD) required is 2 ¾".
  - The hole Inside Diameter (ID) = Nominal Bolt Diameter + 1/16"= 0.812".
  - The minimum washer thickness required is 3/8".

  If anchor bolts less than ¾" in diameter are proposed for use to anchor pedestal bases, provide a washer calculation to ensure the washer thickness is adequate. To account for any pedestal manufacturing differences, verify the actual slotted opening width of the pedestal base anchoring points, and include it in the calculation. Anchor bolts that are less than ½" in diameter may not be used as they are not structurally adequate to support the pedestal and may inhibit the performance of the breakaway base.

  The fabrication process for thick washers makes the washer slightly tapered (i.e. the top OD and the bottom OD are not the same). Install thick washers with the larger diameter face down against the pedestal base casting.

  Do not use standard washers over the slotted opening of the pedestal base. Do not substitute or stack thin washers to achieve the required thickness specified or required.

In addition to the submittal requirements of Section 1098-1(B), provide Mill Certifications, Galvanization Certifications, and Heat Treating Certifications for all anchor bolts, fabricated washers, and structural hardware.

### 1.6. 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 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 16-inch pedestrian signal head housings and end caps from die-cast aluminum. Provide visor mounting screws, door latches, and hinge pins fabricated from stainless steel. Provide interior screws, fasteners, and metal parts fabricated from stainless steel.

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, wire outlet bodies, wire entrance fitting brackets and end caps when supplied as components of 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, rigid vehicle signal head mounting brackets for mast-arm attachments, messenger cable hanger components or balance adjuster components.

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 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
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 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 messenger cable hanger components, wire outlet bodies and balance adjuster components from stainless steel or malleable iron galvanized in accordance with ASTM A153 (Class A) or ASTM A123. Provide serrated rings made of aluminum. Provide messenger cable hangers with U-bolt clamps. Fabricate washers, screws, hex-head bolts and associated nuts, clevis pins, cotter pins, U-bolt clamps and nuts 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.

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. 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 |
| 12-inch green circular | 15 | 15 |

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.

Note: Use a wattmeter having an accuracy of ±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 ±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.

**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.

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°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.

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. 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 ±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
- 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. TRAFFIC SIGNAL SUPPORTS

### 3.1. METAL TRAFFIC SIGNAL SUPPORTS – ALL POLES

**A. General:**

Furnish and install 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* 6th Edition, 2013 (hereafter called 6th 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 grommeted, and oversized to fit around the 2" diameter grommeted 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 drawing 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 unique drawing 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 unique drawing number for each project and identified for multiple pages.<br>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.**<br>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. Boring reports should include the following: Engineer's summary, boring location maps, soil classification per AASHTO Classification System, hammer efficiency, and Metal Pole Standard Foundation Selection Form. 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. Use full penetration groove welds with backing ring for all tube-to-transverse-plate connections in accordance with 6$^{th}$ Edition AASHTO. 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 and mast arm connecting plates from plate steel meeting, as a minimum, the requirements of ASTM A572 Gr 50, AASHTO M270 Gr 50, ASTM A709 Gr50, 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.

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 ¼" 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 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 ¼" thick plate for concrete foundation tag to include: concrete grade, depth, diameter, and reinforcement sizes of the installed foundation.

### 3.2. 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 A572 Gr 50, AASHTO M270 Gr 50, ASTM A709 Gr 50, 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.

## 1. 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 6$^{th}$ Edition AASHTO. Ensure maximum deflection at the top of the pole does not exceed 2.5 percent of the pole height.

## 2. MAST ARM POLE SHAFTS

Ensure that allowable pole deflection does not exceed that allowed per 6$^{th}$ Edition AASHTO. Ensure that maximum angular rotation of the top of the mast arm pole does not exceed 1 degree 40 minutes (1°40').

**B. 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.

### 3.3. 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 6th 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 6th 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.

### 3.4. DRILLED PIER FOUNDATIONS FOR METAL TRAFFIC SIGNAL POLES

Analysis procedures and formulas shall be based on AASHTO 6th Edition, latest ACI code and the *Drilled Shafts: Construction Procedures and Design Methods* FHWA-NHI-10-016 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 (**Broms method will not be accepted**). Detailed descriptions of the "α" and "β" methods can be found in *FHWA-NHI-10-016*.

Omit first 2.5ft for cohesive soils when calculating skin friction.

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 actual shear, axial and moment reactions from the Standard Foundation Selection Table shown on Standard Drawing No. M8.

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 Sheet M8. 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:**

**1. 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.

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.

**2. 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.

**3. Standard Foundation Determination:**

Use the following method for determining the Design N-value:

$$N_{AVG} = \frac{(N@1' + N@2.5' + \ldots\ldots\ldots N@\text{Deepest Boring Depth})}{\text{Total Number of N-values}}$$

$$Y = (N@1')^2 + (N@2.5')^2 + \ldots\ldots\ldots (N@\text{Deepest Boring Depth})^2$$

$$Z = (N@1' + N@2.5' + \ldots\ldots\ldots N@\text{Deepest Boring Depth})$$

$$N_{STD\ DEV} = \left( \frac{(\text{Total Number of N-values} \times Y) - Z^2}{(\text{Total Number of N-values}) \times (\text{Total Number of N-values} - 1)} \right)^{0.5}$$

**Design N-value** equals lesser of the following two conditions:

$N_{AVG} - (N_{STD\ DEV} \times 0.45)$

*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.

**4. 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.

## 3.5. 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 6$^{th}$ Edition AASHTO specifications:

- Design for a 50 year service life as recommended by Table 3.8.3-2.
- 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 11.7.1.2 and 11.7.1.3, 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 $ft^2$ (17.0 $ft^2$ without back plate)
- 4-section, 12-inch, Surface area: 32.0 $ft^2$ (21.0 $ft^2$ without back plate)
- 5-section, 12-inch, Surface area: 42.0 $ft^2$ (29.0 $ft^2$ 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 grommeted 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 3.9.4.2-3 of the 6th Edition AASHTO Specification for Group III loading.

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.

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 grommeted 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.

### 3.6. METAL SIGNAL POLE REMOVALS

**A. Description:**

Remove and dispose of 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:**

Assume ownership of the metal signal poles, remove the metal signal poles, and promptly transport the metal signal poles from the project. 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.

Transport and properly dispose of the materials.

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.

### 3.7. POLE NUMBERING SYSTEM

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".

### 3.8. MEASUREMENT AND PAYMENT

Actual number of metal poles with single mast arms furnished, installed, and accepted.

Actual number of metal poles with dual 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 disposed.

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 Pole with Single Mast Arm ..... Each
Metal Pole with Dual 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

## 4. CONTROLLERS WITH CABINETS

### 4.1. MATERIALS – TYPE 170E CONTROLLERS

Conform to the CALTRANS *Traffic Signal Control Equipment Specifications* and addendum 8, *Specifications for Model 170E Enhanced Controller Unit and Associated Model 412C and Model 172 Modules* except as required herein.

Provide model 412C Program Modules as defined in CALTRANS Addendum 8 except as specified otherwise herein. Provide program module delivery with Memory Select #4 Configuration except that all RAM must be DALLAS Non-volatile RAM or an approved equal. Ensure that the removal of the program module from the controller will place the intersection into flash.

Provide diagnostic software or removable diagnostic PROM modules that will test and diagnose the following:

- systems of the controller, including the internal memory, Program Module, Real Time Clock, I/O circuitry, display, and keyboard;
- systems of the cabinet, including the output file, input file, police panel, flashing operation, and cabinet switches; and
- systems of the conflict monitor by checking all possible conflicts in a logical sequence and resetting the conflict monitor each time, and by testing red failure function and red detect cable disconnects.

Ensure that the automatic reset function can be enabled by inserting a diagnostic plug in the jack labeled “Conflict Monitor Test” in the “TEST” position.

In addition to CALTRANS system communications capability between a central computer and master controller and master to local controller communications, provide communications capability with the intersection conflict monitor via an RS-232C/D port on the monitor. Ensure controller receives data from the conflict monitor through a controller Asynchronous Communications Interface Adapter (ACIA) determined by the controller software manufacturer. Ensure that with the appropriate software, the controller is capable of communicating directly

through a laptop nine pin serial port to the same monitor RS-232C/D to retrieve all event log information.

Furnish a communications connecting cable with the following pin connections.

| 170 | | Conflict Monitor DB-9 |
|---|---|---|
| RX pin L | Connect to | TX pin 2 |
| TX pin K | Connect to | RX pin 3 |
| +5 pin D | Connect to | DTR pin 4 |
| GND pin N | Connect to | GND pin 5 |

Provide a male DB-9 connector on the cable for connection to the monitor.

Provide socket mounting for through-hole mount devices with 14 or more pins. Ensure that all sockets are AUGAT-500 series machined sockets, or equal.

Provide a moisture resistant coating on all circuit boards. Mount circuit boards vertically.

### 4.2. 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.

### 4.3. 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)<br>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 200µh. 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 |

## 4.4. 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 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
- 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. 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.

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:

| 332 Cabinet | |
|---|---|
| **Detector Call Switches** | **Terminals** |
| Phase 1 | I1-W |
| Phase 2 | I4-W |
| Phase 3 | I5-W |
| Phase 4 | I8-W |
| Phase 5 | J1-W |
| Phase 6 | J4-W |
| Phase 7 | J5-W |
| 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.

| | P1 | | P2 | | P3 | |
|---|---|---|---|---|---|---|
| **PIN** | **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<br>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 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)
- 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.

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 that 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 Hz ± 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 Hz ± 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 pair for the following fault conditions: Conflict, Flash Rate Detection, 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 |

If a FYA channel pair is enabled for FYA operation, the conflict monitor will monitor the FYA logical channel pair for the additional following conditions:

1. **Conflict:** Channel conflicts are detected based on the permissive programming jumpers on the program card. This operation remains unchanged from normal operation except for the solid Yellow arrow (FYA clearance) signal.
2. **Yellow Change Interval Conflict:** During the Yellow change interval of the Permissive Turn channel (flashing Yellow arrow) the conflict monitor shall verify that no conflicting channels to the solid Yellow arrow channel (clearance) are active. These conflicting channels shall be determined by the program card compatibility programming of the Permissive Turn channel (flashing Yellow arrow). During the Yellow change interval of the Protected Turn channel (solid Green arrow) the conflict monitor shall verify that no

conflicting channels to the solid Yellow arrow channel (clearance) are active as determined by the program card compatibility programming of the Protected Turn channel (solid Green arrow).

3. **Flash Rate Detection:** The conflict monitor unit shall monitor for the absence of a valid flash rate for the Permissive turn channel (flashing Yellow arrow). If the Permissive turn channel (flashing Yellow arrow) is active for a period greater than 1600 milliseconds, ensure the conflict monitor triggers and puts the intersection into flash. If the Permissive turn channel (flashing Yellow arrow) is active for a period less than 1400 milliseconds, ensure the conflict monitor does not trigger. Ensure the conflict monitor 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. Provide a jumper or switch that will enable and disable the Flash Rate Detection function. Ensure that when the jumper is not present or the switch is in the OFF position the Flash Rate Detection function is enabled. Ensure that when the jumper is present or the switch is in the ON position the Flash Rate Detection function is disabled.
4. **Red Monitoring or Absence of Any Indication (Red Failure):** The conflict monitor unit shall detect a red failure if there is an absence of voltage on all four of the inputs of a FYA channel pair (RA, YA, FYA, GA).
5. **Dual Indications on the Same Channel:** The conflict monitor unit shall detect a dual indication if two or more inputs of a FYA channel pair (RA, YA, FYA, GA) are "on" at the same time.
6. **Short/Missing Yellow Indication Fault (Clearance Error):** The conflict monitor unit shall monitor the solid Yellow arrow for a clearance fault when terminating both the Protected Turn channel (solid Green arrow) interval and the Permissive Turn channel (flashing Yellow arrow) interval.

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 170/2070 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

## 4.5. 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.

## 5. ETHERNET EDGE SWITCH

Furnish and install an Ethernet edge switch as specified below that is fully compatible, interoperable, and completely interchangeable and functional within the existing City of Raleigh traffic signal system communications network.

### 5.1. DESCRIPTION

**A. Ethernet Edge Switch:**

Furnish and install a hardened, field Ethernet edge switch (hereafter "edge switch") for traffic signal controllers as specified below. Ensure that the edge switch provides wire-speed, fast Ethernet connectivity at transmission rates of 100 megabits per second from each remote ITS device location to the routing switches.

**B. Network Management:**

Ensure that the edge switch is fully compatible with the City's existing Network Management Software.

### 5.2. MATERIALS

**A. General:**

Ensure that the edge switch is fully compatible and interoperable with the trunk Ethernet network interface and that the edge switch supports half and full duplex Ethernet communications.

Furnish an edge switch that provide 99.999% error-free operation, and that complies with the Electronic Industries Alliance (EIA) Ethernet data communication requirements using single-mode fiber-optic transmission medium and copper transmission medium. Ensure that the edge switch has a minimum mean time between failures (MTBF) of 10 years, or 87,600 hours, as calculated using the Bellcore/Telcordia SR-332 standard for reliability prediction.

**B. Standards:**

Ensure that the edge switch complies with all applicable IEEE networking standards for Ethernet communications, including but not limited to:

- IEEE 802.1D standard for media access control (MAC) bridges used with the Spanning Tree Protocol (STP);
- IEEE 802.1Q standard for port-based virtual local area networks (VLANs);
- IEEE 802.1P standard for Quality of Service (QoS);

- IEEE 802.1w standard for MAC bridges used with the Rapid Spanning Tree Protocol (RSTP);
- IEEE 802.1s standard for MAC bridges used with the Multiple Spanning Tree Protocol;
- IEEE 802.1x standard for port based network access control, including RADIUS;
- IEEE 802.3 standard for local area network (LAN) and metropolitan area network (MAN) access and physical layer specifications;
- IEEE 802.3u supplement standard regarding 100 Base TX/100 Base FX;
- IEEE 802.3x standard regarding flow control with full duplex operation; and
- IFC 2236 regarding IGMP v2 compliance.

**C. Functional:**

Ensure that the edge switch supports all Layer 2 management features and certain Layer 3 features related to multicast data transmission and routing. These features shall include, but not be limited to:

- An STP healing/convergence rate that meets or exceeds specifications published in the IEEE 802.1D standard.
- An RSTP healing/convergence rate that meets or exceeds specifications published in the IEEE 802.1w standard.
- An Ethernet edge switch that is a port-based VLAN and supports VLAN tagging that meets or exceeds specifications as published in the IEEE 802.1Q standard, and has a minimum 4-kilobit VLAN address table (254 simultaneous).
- A forwarding/filtering rate that is a minimum of 14,880 packets per second for 10 megabits per second and 148,800 packets per second for 100 megabits per second.
- A minimum 4-kilobit MAC address table.
- Support of Traffic Class Expediting and Dynamic Multicast Filtering.
- Support of, at a minimum, snooping of Version 2 of the Internet Group Management Protocol (IGMP).
- Support of remote and local setup and management via telnet or secure Web-based GUI and command line interfaces.
- Support of the Simple Network Management Protocol version 3 (SNMPv3). Verify that the Ethernet edge switch can be accessed using the resident EIA-232 management port, a telecommunication network, or the Trivial File Transfer Protocol (TFTP).
- Port security through controlling access by the users. Ensure that the Ethernet edge switch has the capability to generate an alarm and shut down ports when an unauthorized user accesses the network.
- Support of remote monitoring (RMON-I) of the Ethernet agent.
- Support of the TFTP and SNTP. Ensure that the Ethernet edge switch supports port mirroring for troubleshooting purposes when combined with a network analyzer.

**D. Physical Features:**

*Ports:* Provide 10/100 Mbps auto-negotiating ports (RJ-45) copper Fast Ethernet ports for all edge switches. Provide auto-negotiation circuitry that will automatically negotiate the highest possible data rate and duplex operation possible with attached devices supporting the IEEE 802.3 Clause 28 auto-negotiation standard.

*Optical Ports:* Ensure that all fiber-optic link ports operate at 1310 or 1550 nanometers in single mode. Provide Type LC connectors for the optical ports, as specified in the Plans or by the Engineer. Do not use mechanical transfer registered jack (MTRJ) type connectors.

Provide an edge switch having a minimum of two optical 100 Base FX ports capable of transmitting data at 100 megabits per second. Ensure that each optical port consists of a pair of fibers; one fiber will transmit (TX) data and one fiber will receive (RX) data. Ensure that the optical ports have an optical power budget of at least 15 dB.

*Copper Ports:* Provide an edge switch that includes a minimum of four copper ports. Provide Type RJ-45 copper ports and that auto-negotiate speed (i.e., 10/100 Base) and duplex (i.e., full or half). Ensure that all 10/100 Base TX ports meet the specifications detailed in this section and are compliant with the IEEE 802.3 standard pinouts. Ensure that all Category 5E unshielded twisted pair/shielded twisted pair network cables are compliant with the EIA/TIA-568-B standard.

*Port Security*: Ensure that the edge switch supports/complies with the following (remotely) minimum requirements:

- Ability to configure static MAC addresses access;
- Ability to disable automatic address learning per ports; know hereafter as Secure Port. Secure Ports only forward; and
- Trap and alarm upon any unauthorized MAC address and shutdown for programmable duration. Port shutdown requires administrator to manually reset the port before communications are allowed.

**E. Management Capabilities:**

Ensure that the edge switch supports all Layer 2 management features and certain Layer 3 features related to multicast data transmission and routing. These features shall include, but not be limited to:

- An STP healing/convergence rate that meets or exceeds specifications published in the IEEE 802.1 D standards;
- An RSTP healing/convergence rate that meets or exceeds specifications published in the IEEE 802.1w standard;
- An Ethernet edge switch that is a port-based VLAN and supports VLAN tagging that meets or exceeds specifications as published in the IEEE 802.1Q standard, and has a minimum 4-kilobit VLAN address table (254 simultaneous);
- A forwarding/filtering rate that is a minimum of 14,880 packets per second for 10 megabits per second and 148,800 packets per second for 100 megabits per second;
- A minimum 4-kilobit MAC address table;
- Support of Traffic Class Expediting and Dynamic Multicast Filtering.
- Support of, at a minimum, snooping of Version 2 of the Internet Group Management Protocol (IGMP);
- Support of remote and local setup and management via telnet or secure Web-based GUI and command line interfaces; and
- Support of the Simple Network Management Protocol (SNMP). Verify that the Ethernet edge switch can be accessed using the resident EIA-232 management port, a telecommunication network, or the Trivial File Transfer Protocol (TFTP).

*Network Capabilities*: Provide an edge switch that supports/complies with the following minimum requirements:

- Provide full implementation of IGMPv2 snooping (RFC 2236);
- Provide full implementation of SNMPv1, SNMPv2c, and/or SNMPv3;
- Provide support for the following RMON–I groups, at a minimum:
  - Part 1: Statistics
  - Part 2: History
  - Part 3: Alarm
  - Part 9: Event
- Capable of mirroring any port to any other port within the switch;
- Meet the IEEE 802.1Q (VLAN) standard per port for up to four VLANs;
- Meet the IEEE 802.3ad (Port Trunking) standard for a minimum of two groups of four ports;
- Password manageable;
- Telnet/CLI;
- HTTP (Embedded Web Server) with Secure Sockets Layer (SSL); and
- Full implementation of RFC 783 (TFTP) to allow remote firmware upgrades.

*Network Security*: Provide an edge switch that supports/complies with the following (remotely) minimum network security requirements:

- Multi-level user passwords;
- RADIUS centralized password management (IEEE 802.1X);
- SNMPv3 encrypted authentication and access security;
- Port security through controlling access by the users: ensure that the Ethernet edge switch has the capability to generate an alarm and shut down ports when an unauthorized user accesses the network;
- Support of remote monitoring (RMON) of the Ethernet agent; and
- Support of the TFTP and SNTP. Ensure that the Ethernet edge switch supports port mirroring for troubleshooting purposes when combined with a network analyzer.

**F. Electrical Specifications:**

Ensure that the edge switch operates and power is supplied with 115 volts of alternating current (VAC). Ensure that the edge switch has a minimum operating input of 110 VAC and a maximum operating input of 130 VAC. Ensure that if the device requires operating voltages other than 120 VAC, supply the required voltage converter. Ensure that the maximum power consumption does not exceed 50 watts. Ensure that the edge switch has diagnostic light emitting diodes (LEDs), including link, TX, RX, speed (for Category 5E ports only), and power LEDs.

**G. Environmental Specifications:**

Ensure that the edge switch performs all of the required functions during and after being subjected to an ambient operating temperature range of -30 degrees to 165 degrees Fahrenheit as defined in the environmental requirements section of the NEMA TS 2 standard, with a noncondensing humidity of 0 to 95%.

Provide certification that the device has successfully completed environmental testing as defined in the environmental requirements section of the NEMA TS 2 standard. Provide certification that the device meets the vibration and shock resistance requirements of Sections 2.1.9 and 2.1.10, respectively, of the NEMA TS 2 standard. Ensure that the edge switch is

protected from rain, dust, corrosive elements, and typical conditions found in a roadside environment.

The edge switch shall meet or exceed the following environmental standards:

- IEEE 1613 (electric utility substations)
- IEC 6185003 (electric utility substations)
- IEEE 61800-3 (variable speed drive systems)
- IEC 61000-6-2 (generic industrial)

**H. Ethernet Patch Cable:**

Furnish a factory pre-terminated/pre-connectorized Ethernet patch cable with each edge switch. Furnish Ethernet patch cables meeting the following physical requirements:

- Five (5)-foot length
- Category 5e or better
- Factory-installed RJ-45 connectors on both ends
- Molded anti-snag hoods over connectors
- Gold plated connectors

Furnish Fast Ethernet patch cords meeting the following minimum performance requirements:

- TIA/EIA-568-B-5, Additional Transmission Performance Specifications for 4-pair 100 Ω Enhanced Category 5 Cabling
- Frequency Range: 1-100 MHz
- Near-End Crosstalk (NEXT): 30.1 dB
- Power-sum NEXT: 27.1 dB
- Attenuation to Crosstalk Ratio (ACR): 6.1 dB
- Power-sum ACR: 3.1 dB
- Return Loss: 10dB
- Propagation Delay: 548 nsec

**I. Interconnect Patch Cable:**

Furnish SMFO jumpers that are a minimum of 3 feet in length with factory-assembled ST/PC connectors on one end and LC/PC connectors on the other end. Furnish the LC/PC connectors in a molded snap plug assembly labeled "A" and "B" and designed to insert both connectors simultaneously. Furnish each pair of jumpers with uniquely colored strain relief boots (i.e., blue and white) such that the boot color on the ST/PC end matches the boot color on the LC/PC end.

## 5.3. CONSTRUCTION METHODS

**A. General:**

Ensure that the edge switch is UL listed.

Verify that network/field/data patch cords meet all ANSI/EIA/TIA requirements for Category 5E and Category 6 four-pair unshielded twisted pair cabling with stranded conductors and RJ45 connectors.

Contact the City of Raleigh Signal Shop a minimum of 5 days prior to installation for the most current edge switch IP Address, VLAN, subnet mask, default gateway and configuration files.

**B. Edge Switch:**

Mount the edge switch inside each field cabinet by securely fastening the edge switch to the upper end of the right rear vertical rail of the equipment rack using manufacturer-recommended or Engineer-approved attachment methods, attachment hardware and fasteners. Refer any questions concerning edge switch mounting to the City of Raleigh.

Ensure that the edge switch is mounted securely in the cabinet and is fully accessible by field technicians without blocking access to other equipment. Verify that fiber-optic jumpers consist of a length of cable that is connectorized on both ends, primarily used for interconnecting termination or patching facilities and/or equipment.

Connect the edge switch to the fiber-optic patch panel using SMFO jumpers with ST/PC to LC/PC connectors. In the molded snap plug assembly, install the jumper with the blue strain relief boot on the "A" side and the jumper with white strain relief boot on the "B" side.

Do not connect the Ethernet cable between the Ethernet edge switch and the controller. Contact the City of Raleigh, Traffic Signal Shop at 919-996-6020 with a minimum of 5 days advance notice to arrange for Raleigh Signal Technicians to make the final connections.

### 5.4. MEASUREMENT AND PAYMENT

Actual number of Ethernet edge switches furnished, installed, and accepted.

No separate measurement will be made for Ethernet patch cable, power cord, mounting hardware, nuts, bolts, brackets, or edge switch programming as these will be considered incidental to furnishing and installing the edge switch. No separate measurement will be made for fiber-optic patch panel interconnect patch cables.

**Payment will be made under:**

Ethernet Edge Switch.....Each

## 6. 900 MHZ SPREAD SPECTRUM ETHERNET RADIO

### 6.1. DESCRIPTION

Furnish an operational 900MHz Spread Spectrum Ethernet Radio to be installed in the signal controller cabinet.

Furnish material and workmanship conforming to the *National Electrical Code* (NEC), the *National Electrical Safety Code* (NESC), Underwriter's Laboratories (UL) or a third-party listing agency accredited by the North Carolina Department of Insurance, and all local safety codes in effect on the date of advertisement. Comply with all regulations and codes imposed by the owner of affected utility poles.

### 6.2. MATERIALS

**A. 900 MHz Wireless Radio System:**

Furnish license free 902 – 928 MHz Ethernet radio transceivers with antennas, coaxial cable and mounting hardware, and configuration software. Design radio transceivers to work in "point-

to-point", "store and forward repeater", "point-to-multipoint" and "peer to peer" configurations. Provide radios that can operate as repeaters. Ensure the 900 MHz Ethernet radio transceivers meet the following minimum requirements:

- License free (ISM) spread spectrum radio band (902 – 928 MHz),
- Frequency hopping technology (direct sequence spread spectrum technology is not acceptable),
- Bi-directional, full duplex,
- Programmable radio frequency (RF) output levels of 1mW, 10mW, 100mW, or 1 Watt,
- A minimum of 139 user-selectable radio frequency channels, with 62 available hopping sequences (2 non-overlapping),
- Ethernet interface capable of operating at 1.1 Mbs with a data rate of 345 Kbps,
- DB9-F connector for RS-232/422/485 serial port,
- 32 bit Cyclic Redundancy Check (CRC) error checking with auto re-transmit,
- Built-in store-and-forward (single radio repeater – back to back radio set-ups are not allowed to accomplish this function),
- Data encryption 128 bit WEP, 128 bit WPA, 256 Bit AES,
- Receiver sensitivity of –110dBm @ $10^{-6}$ BER,
- Antenna port: Reverse Polarity - Threaded Normalized Connector-Female (RP TNC-F) antenna connector,
- Front panel LED indicators:
  - Power,
  - Transmit data,
  - Receive data,
  - Data port indicator, and
  - Signal strength.
- Operating temperature of –40 to +176 degrees F at 0 to 95% Humidity.
- Power supply requirements:
  - Wall adapter: 120 VAC UL/CSA wall cube plug-in module with 12 VDC, 1 Amp, nominal output.
  - Typical current draw of no greater than 600 mA when powered with 12 VDC input, and transmitting 1 Watt of RF output power.
- Shelf mounted design not to exceed 5" long x 2" wide x 7" high.

Furnish a Radio Frequency Signal Jumper constructed of an RG-58 Coaxial Cable with Reverse Polarity - Threaded Normalized Connector-Male (RP TNC-M) on one end for connection to a radio unit and a Standard N-Type Male Connector on the other end for connection to the lightning arrestor. Provide the jumper in 6-foot lengths.

Furnish an Ethernet data interface cable to be installed between the Ethernet radio transceivers and either a traffic signal controller or Ethernet edge switch. Ensure cable is a minimum of 6 feet long.

Ensure that installing the Ethernet radio transceivers with a fully functional traffic signal controller does not require any field device modifications with regards to hardware or software.

Furnish units with a Windows® XP compatible software program that uses a GUI (Graphical User Interface) to provide "remote programming, radio configuration, remote maintenance, diagnostics and spectrum analyzer" features. Provide software approved by the Engineer that is

designed to function with the approved radio. Provide configuration software that can be upgraded in the future at no additional charge.

Ensure the radio transceiver is configurable from a single location (i.e. master radio location) via supplied software (no extra cost). Furnish software supplied with drivers to allow easy set-up with all industry standard traffic signal controllers, including 2070 controllers containing custom software written specifically for the North Carolina Department of Transportation or the City of Raleigh Signal System. Ensure the supplied software contains pre-written drivers for industry standard radar and video detection packages.

Furnish 8.5 dB or 13 dB gain Directional Antenna (Yagi Antenna) that complies with Section 1098-18 (D) of the 2012 Standard Specifications for Roads and Structures.

Furnish 3dB or 6 dB Omni Directional Antenna that complies with Section 1098-18 (E) of the 2012 Standard Specifications for Roads and Structures.

Furnish Antenna Mounting Hardware Kits that comply with Section 1098-18 (F) of the 2012 Standard Specifications for Roads and Structures.

Furnish 400 Series Coaxial Cable that complies with Section 1098-18 (G) of the 2012 Standard Specifications for Roads and Structures.

Furnish Standard N-Type Connectors that comply with Section 1098-18 (H) of the 2012 Standard Specifications for Roads and Structures.

Furnish Coaxial Cable Shield Grounding and Weatherproofing Kits that comply with Section 1098-18 (I) of the 2012 Standard Specifications for Roads and Structures.

Furnish Lightning Arrestors that comply with Section 1098-18 (J) of the 2012 Standard Specifications for Roads and Structures.

## 6.3. CONSTRUCTION METHODS

### A. General:

**Perform a radio path Site Survey test before installing any equipment.** Ensure the test evaluates the Signal Strength (dBm), fade Margin (dB), Signal-to-Noise Ratio, Data Integrity (poll test), and a complete frequency spectrum scan. Ensure the radio path site survey test is performed using the supplied brand of radio equipment to be deployed. During the initial radio path signal strength test it may be determined that a repeater station may be necessary to complete the intended link. Provide the test results to the Engineer for review and approval. Submit copies of the test results and colored copies of the frequency spectrum scan along with an electronic copy of this information. The Engineer will approve final locations of antennas and any necessary repeater stations. Install a coaxial cable-power divider, antenna splitter cable and additional antenna at locations where it is determined that a dual antenna configuration is necessary to accommodate communications in multiple directions.

### B. Antenna Mounting:

Install the antenna, antenna mounting hardware, coaxial cable, power divider, antenna splitter cable and additional antenna at locations where it is determined that a dual antenna configuration is necessary to accommodate communications in multiple directions.

Install antenna in accordance with the antenna manufacturer's recommendations. Secure the antenna mounting hardware to the pole and route the coaxial cable such that no strain is placed on the N-Type Male coaxial connectors.

Install the coaxial cable shield grounding system by removing the outer jacket of the coaxial cable without damaging the cable shield. Install the shield grounding system following the cable manufacturer's recommendations. Install and weatherproof the connection using the appropriate weatherproofing materials and following the manufacturer's recommendations. On wood poles, secure the #6 AWG grounding lead cable to the pole ground using split bolt or compression type fitting or an Engineer approved method. On metal poles, secure the #6 AWG grounding lead cable to the pole using an Engineer approved method.

Install the coaxial cable in a 2 inch riser with weatherhead for connecting into the equipment cabinet. Do not exceed the 1-inch bend radius of the coaxial cable as it traverses from the cabinet to the antenna assembly. Connect the lightning arrestor to the coaxial cable in the equipment cabinet. Properly ground and secure the arrestor in the cabinet. Permanently label all cables entering the cabinet.

Place a copy of all manufacturer equipment specifications and instruction and maintenance manuals in the equipment cabinet.

### 6.4. MEASUREMENT AND PAYMENT

Actual number of 900 MHz Spread Spectrum Ethernet Radio Systems furnished, installed and accepted.

This item includes the radio, Ethernet data interface cable, antenna(s), radio, data interface cable, coaxial cable, lightning arrestor, radio frequency signal jumper, coaxial cable connectors, coaxial cable shield grounding system with weatherproofing, labeling and any integration, installation materials and configuration software necessary to complete this work will be incidental. Additionally performing the radio path site survey test will be considered incidental.

**Payment will be made under:**

900 MHz Spread Spectrum Ethernet Radio……..Each

## 7. FIBER-OPTIC CABLE IDENTIFICATION MARKERS

### 7.1. DESCRIPTION

Furnish and install communications cable identification markers.

### 7.2. MATERIAL

Furnish communications cable identification markers that are resistant to fading when exposed to UV sources and changes in weather. Use markers designed to coil around fiber-optic cable that do not slide or move along the surface of the cable once installed. Ensure exposure to UV light and weather does not affect the markers natural coiling effect or deteriorate performance. Provide communications cable wraps that permit writing with an indelible marking pen.

Furnish cable identification markers with the following text for signal system communications cables:

**WARNING**

**CITY OF RALEIGH FIBER-OPTIC CABLE**

**CONTACT TELEPHONE NUMBER:**

**(919) 996-3020**

**WARNING**

**CITY OF RALEIGH FIBER-OPTIC CABLE**

| | |
|---|---|
| *Overall Marker Dimensions:* | *7(l) x 4 (w) inches* |
| *Lettering Height:* | *3/8 inch for "WARNING"; 1/4" for all other lettering* |
| *Colors:* | *Black text on yellow background* |

Submit a sample of proposed communications cable identification markers to the Engineer for approval before installation.

### 7.3. CONSTRUCTION METHODS

Install one communications cable identification marker on the signal system cable within 36 inches of pole attachment points and at locations where more than one cable originates or terminates. At splice enclosures, install a communications cable marker on one of the cables where it enters or exits the splice enclosure and ensure that the marker is installed so that it visible (but not necessarily readable) from the ground below.

### 7.4. MEASUREMENT AND PAYMENT

No measurement will be made for communications cable identification markers, as these will be considered incidental to the installation of fiber-optic cable.

## 8. RELOCATE FLASHER CABINET/SOLAR ASSEMBLY/RADIO ASSEMBLY

### 8.1. DESCRIPTION

Relocate the existing flasher cabinet, solar power assembly and radio system to the new type III, heavy duty pedestal assembly.

### 8.2. CONSTRUCTION METHODS

The Engineer will approve final locations of all field located devices. Prior to removing the existing cabinet label all wires and identify their termination points to aid in re-installation. Relocate the flasher cabinet with its contents listed below to the new pedestal assemble:

- solar charge controller
- battery
- disconnects

- radio

Relocate the solar array, antenna and mounting hardware to the new pedestal assembly. Reuse existing wiring where applicable and/or replace with new wiring as needed.

Orient the solar array to obtain maximum sunlight exposure for the new location.

The solar assembly should resemble the installation shown below:

**NOTES:**

1. CONSTRUCT SOLAR POWER ASSEMBLY OR A HEAVY DUTY TYPE III FEDERAL IN ACCORDANCE WITH SECTION 1743 OF THE NCDOT 2012 "ROADWAY STANDARD DRAWINGS." REFER TO STANDARD DRAWING 1743.03 AND 1743.04 FOR CONSTRUCTION AND FOUNDATION DETAILS.

2. REFER TO SECTION 1025-14 OF NCDOT 2012 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" FOR MATERIAL REQUIREMENTS.

**SOLAR POWER ASSEMBLY**

Secure the cabinet and risers to the pole using stainless steel banding straps. Install separate 1" risers for the solar array and the radio antenna.

Integrate the flasher cabinet with the advance warning beacons. Install new wire gauged as per manufacturer's recommendation to connect the flasher cabinet with the advance warning beacons.

Leave all data interface cables, installation manuals, and specifications and materials used to program any equipment in the Equipment Cabinet. Neatly secure all wiring and harness inside the cabinet in a method approved by the Engineer.

Upon completion of the installation, conduct a test of the system in the presence on the Engineer to demonstrate that he completed system is operating as designed. At a minimum, demonstrate that the solar array is properly charging the battery through the solar charge controller and that the radio up-link is functioning. Demonstrate that the cabinet is wired correctly to drive the advance warning beacons.

## 8.3. MEASUREMENT AND PAYMENT

Actual number of Flasher Cabinet/Solar Assembly/Radio Assembly relocated, installed and accepted.

No separate payment will be made new wiring, coaxial cable, 1" risers, mounting hardware, banding straps or other labor associated with relocating the flasher cabinet, solar assembly, radio assembly or testing as these items of work will be considered incidental.

The Type III Pedestal with Foundation will be paid for in accordance with Section 1743 "Pedestals" of the 2012 Standard Specifications for Roads and Structures.

**Payment will be made under:**

Relocate Flasher Cabinet/Solar Assembly/Radio Assembly ..... Each

# ST-1

**Project B-5121 / B-5317** **Wake County**

**Project Special Provisions**
**Structures and Culvert**

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For Piles, Drilled Piers, and MSE Retaining Walls,
see Geotechnical special provisions.

6/6/2016

NORTH CAROLINA PROFESSIONAL SEAL 022506 ENGINEER JESSE McARTHUR BAILEY

DocuSigned by:
J. M. Bailey
9026554D952B471...

For all except "Architectural Metal Fascia"

6/6/2016

NORTH CAROLINA PROFESSIONAL SEAL 038447 ENGINEER ANDREW S. MILLER

DocuSigned by:
Andrew S. Miller
C5D97672AC5E436...

Only for "Architectural Metal Fascia"

# PROJECT SPECIAL PROVISIONS
# STRUCTURES AND CULVERT

**PROJECT B-5121 / B-5317** **WAKE COUNTY**

**MAINTENANCE AND PROTECTION OF TRAFFIC** **(8-13-04)**
**BENEATH PROPOSED STRUCTURE AT STATION 22+06.91 –L-**

## 1.0 GENERAL

Maintain traffic on Peace Street as shown in Traffic Control Plans and as directed by the Engineer.

Provide a minimum temporary vertical clearance of 15'-6" at all times during construction.

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.

**B-5121 / B-5317** **Wake Co.**

**MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE AT STATION 20+19.94 –FLYOVER-** **(8-13-04)**

## 1.0 GENERAL

Maintain traffic on US-401 (Capitol Blvd.) as shown in Traffic Control Plans and as directed by the Engineer.

Provide a minimum temporary vertical clearance of 17'-0" at all times during construction.

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.

**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<br>At 100% elongation<br>At 200% elongation | D412 | <br>2000<br>3700 | - - - - |
| Tensile Strength psi | D412 | 5000 | - - - - |
| Ultimate Elongation % | D412 | 220 | - - - - |
| Compression Set %<br>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.

# 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 $ft^2$ measure 2 spots/surface per piece and for pieces greater than 200 $ft^2$ add 1 additional spots/surface for each 500 $ft^2$).

| 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<br>Al - 8 mils minimum<br>Zn Al - 8 mils minimum<br>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<br>Al > 1000 psi<br>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.

## SAND LIGHTWEIGHT CONCRETE (9-30-11)

Use sand lightweight concrete, as noted on the plans, that meets the requirements of this Special Provision.

Sand lightweight concrete is composed of portland cement, fine aggregate, lightweight coarse aggregate, water, and admixtures. Provide sand lightweight concrete that complies with the applicable requirements of Sections 420, 1000, and 1024 of the Standard Specifications and the additional requirements herein.

Submit a mix design from a testing laboratory approved by the NC Division of Highways for approval at least 35 days prior to the proposed use. Provide a mix meeting Table 1000-1 of the Standard Specifications and the following design criteria:

| TEST | TEST METHOD | REQUIREMENT |
|---|---|---|
| Max. Unit Weight, plastic, lbs/ft$^3$ | AASHTO T121 | 120 |
| Max. Unit Weight, dry, lbs/ft$^3$ | ASTM C567 using equilibrium air dried unit weight | 115 |
| Min. Relative Dynamic Modulus, (percent) | AASHTO T161 Procedure A | 80 |

When submitting the mix design, include the source of the aggregates, cement, and admixtures and the gradation, specific gravity and fineness modulus (fine aggregate only) of the aggregates. Submit test results showing the mix design conforms to the criteria, including the 28 day compressive strength of a minimum of six cylinders. Provide a mix design that produces an average compressive strength sufficient to ensure that a minimum strength of 4500 psi is achieved in the field.

Produce an additional mix in accordance with AASHTO M195 to determine the drying shrinkage. The maximum drying shrinkage for this mix is 0.07%.

For lightweight aggregate, use expanded shale or slate that meets the requirements of AASHTO M195. Grade the lightweight aggregate in accordance with 1014-2(E)(6).

Determine the soundness in accordance with AASHTO T104. Loss of more than 10% of the lightweight aggregate in five cycles of the accelerated soundness test using sodium sulfate is not permitted.

Ensure the lightweight aggregate is in a saturated surface-dry condition when it is proportioned and incorporated into the mix.

## 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 ± 5, Neoprene (upward corrugated shape - fabric reinforced)<br>75 ± 5, EPDM and Neoprene (upward non-corrugated shape)<br>80 ± 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" ± 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.

# FALSEWORK AND FORMWORK (4-5-12)

## 1.0 DESCRIPTION

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

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

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

## 2.0 MATERIALS

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

## 3.0 DESIGN REQUIREMENTS

A. Working Drawings

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

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

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

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

If requested by the Engineer, submit with the working drawings manufacturer's catalog data listing the weight of all construction equipment that will be supported on the temporary work. Show anticipated total settlements and/or deflections of falsework

and forms on the working drawings. Include falsework footing settlements, joint take-up, and deflection of beams or girders.

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

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

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

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

For MBT prestressed concrete girders, 45-degree angle holes for falsework hanger rods shall be cast through the girder top flange and located, measuring along the top of the member, 1'-2 ½" from the edge of the top flange. Hanger hardware and rods must have a minimum safe working load of 6,000 lbs.

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

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

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

Falsework hangers that support concentrated loads and are installed at the edge of thin top flange concrete girders (such as bulb tee girders) shall be spaced so as not to exceed 75% of the manufacturer's stated safe working load. Use of dual leg hangers (such as Meadow Burke HF-42 and HF-43) are not allowed on concrete girders with thin top

flanges. Design the falsework and forms supporting deck slabs and overhangs on girder bridges so that there will be no differential settlement between the girders and the deck forms during placement of deck concrete.

When staged construction of the bridge deck is required, detail falsework and forms for screed and fluid concrete loads to be independent of any previous deck pour components when the mid-span girder deflection due to deck weight is greater than ¾".

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

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

1. Wind Loads

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

**Table 2.2 - Wind Pressure Values**

| Height Zone | Pressure, lb/ft$^2$ for Indicated Wind Velocity, mph | | | | |
|---|---|---|---|---|---|
| feet above ground | 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 (6-19-15)

## 1.0 GENERAL

Submit working drawings in accordance with Article 105-2 of the *Standard Specifications* and this provision. For this provision, "submittals" refers to only those listed in this provision. The list of submittals contained herein does not represent a list of required

submittals for the project. Submittals are only necessary for those items as required by the contract. Make submittals that are not specifically noted in this provision directly to the Engineer. Either the Structures Management Unit or the Geotechnical Engineering Unit or both units will jointly review submittals.

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

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

## 2.0 ADDRESSES AND CONTACTS

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

Via US mail:

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

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

Via other delivery service:

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

Attention: Mr. P. D. Lambert, 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)

mrorie@ncdot.gov (Madonna Rorie)

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

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

Via US mail:

Mr. K. J. Kim, Ph. D., P. E.
Eastern Regional Geotechnical Manager
North Carolina Department of Transportation
Geotechnical Engineering Unit
Eastern Regional Office
1570 Mail Service Center
Raleigh, NC 27699-1570

Via other delivery service:

Mr. K. J. Kim, Ph. D., P. E.
Eastern Regional Geotechnical Manager
North Carolina Department of Transportation
Geotechnical Engineering Unit
Eastern Regional Office
3301 Jones Sausage Road, Suite 100
Garner, NC 27529

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

Via US mail:

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

Via other delivery service:

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

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

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

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

Secondary Structures Contacts: James Gaither (919) 707 – 6409
Madonna Rorie (919) 707 – 6508

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

**B-5121 / B-5317** **Wake Co.**

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

## 3.0 SUBMITTAL COPIES

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

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

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

**STRUCTURE SUBMITTALS**

| Submittal | Copies Required by Structures Management Unit | Copies Required by Geotechnical Engineering Unit | Contract Reference Requiring Submittal [1] |
|---|---|---|---|
| Arch Culvert Falsework | 5 | 0 | Plan Note, SN Sheet & "Falsework and Formwork" |
| Box Culvert Falsework [7] | 5 | 0 | Plan Note, SN Sheet & "Falsework and Formwork" |
| Cofferdams | 6 | 2 | Article 410-4 |
| Foam Joint Seals [6] | 9 | 0 | "Foam Joint Seals" |
| Expansion Joint Seals (hold down plate type with base angle) | 9 | 0 | "Expansion Joint Seals" |
| Expansion Joint Seals (modular) | 2, then 9 | 0 | "Modular Expansion Joint Seals" |

| | | | |
|---|---|---|---|
| Expansion Joint Seals (strip seals) | 9 | 0 | "Strip Seals" |
| Falsework & Forms [2] (substructure) | 8 | 0 | Article 420-3 & "Falsework and Formwork" |
| Falsework & Forms (superstructure) | 8 | 0 | Article 420-3 & "Falsework and Formwork" |
| Girder Erection over Railroad | 5 | 0 | Railroad Provisions |
| Maintenance and Protection of Traffic Beneath Proposed Structure | 8 | 0 | "Maintenance and Protection of Traffic Beneath Proposed Structure at Station ___" |
| Metal Bridge Railing | 8 | 0 | Plan Note |
| Metal Stay-in-Place Forms | 8 | 0 | Article 420-3 |
| Metalwork for Elastomeric Bearings [4,5] | 7 | 0 | Article 1072-8 |
| Miscellaneous Metalwork [4,5] | 7 | 0 | Article 1072-8 |
| Disc Bearings [4] | 8 | 0 | "Disc Bearings" |
| Overhead and Digital Message Signs (DMS) (metalwork and foundations) | 13 | 0 | Applicable Provisions |
| Placement of Equipment on Structures (cranes, etc.) | 7 | 0 | Article 420-20 |
| Precast Concrete Box Culverts | 2, then 1 reproducible | 0 | "Optional Precast Reinforced Concrete Box Culvert at Station ___" |
| Prestressed Concrete Cored Slab (detensioning sequences) [3] | 6 | 0 | Article 1078-11 |
| Prestressed Concrete Deck Panels | 6 and 1 reproducible | 0 | Article 420-3 |
| Prestressed Concrete Girder (strand elongation and detensioning sequences) | 6 | 0 | Articles 1078-8 and 1078-11 |
| Removal of Existing Structure over Railroad | 5 | 0 | Railroad Provisions |

| | | | |
|---|---|---|---|
| Revised Bridge Deck Plans (adaptation to prestressed deck panels) | 2, then 1 reproducible | 0 | Article 420-3 |
| Revised Bridge Deck Plans (adaptation to modular expansion joint seals) | 2, then 1 reproducible | 0 | "Modular Expansion Joint Seals" |
| Sound Barrier Wall (precast items) | 10 | 0 | Article 1077-2 & "Sound Barrier Wall" |
| Sound Barrier Wall Steel Fabrication Plans [5] | 7 | 0 | Article 1072-8 & "Sound Barrier Wall" |
| Structural Steel [4] | 2, then 7 | 0 | Article 1072-8 |
| Temporary Detour Structures | 10 | 2 | Article 400-3 & "Construction, Maintenance and Removal of Temporary Structure at Station ____" |
| TFE Expansion Bearings [4] | 8 | 0 | Article 1072-8 |

**FOOTNOTES**

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

# ST-29

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## GEOTECHNICAL SUBMITTALS

| Submittal | Copies Required by Geotechnical Engineering Unit | Copies Required by Structures Management Unit | Contract Reference Requiring Submittal [1] |
|---|---|---|---|
| Drilled Pier Construction Plans [2] | 1 | 0 | Subarticle 411-3(A) |
| Crosshole Sonic Logging (CSL) Reports [2] | 1 | 0 | Subarticle 411-5(A)(2) |
| Pile Driving Equipment Data Forms [2,3] | 1 | 0 | Subarticle 450-3(D)(2) |
| Pile Driving Analyzer (PDA) Reports [2] | 1 | 0 | Subarticle 450-3(F)(3) |
| Retaining Walls [4] | 8 drawings, 2 calculations | 2 drawings | Applicable Provisions |
| Temporary Shoring [4] | 5 drawings, 2 calculations | 2 drawings | "Temporary Shoring" & "Temporary Soil Nail Walls" |

**FOOTNOTES**

1. References are provided to help locate the part of the contract where the submittals are required. References in quotes refer to the provision by that name. Subarticles refer to the *Standard Specifications*.

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

3. The Pile Driving Equipment Data Form is available from:
   https://connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
   See second page of form for submittal instructions.

4. Electronic copy of submittal is required. See referenced provision.
5.

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## 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.

## ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES (12-30-15)

### 1.0 INSPECTION FOR ASBESTOS CONTAINING MATERIAL

Prior to conducting bridge demolition or renovation activities, the Contractor shall thoroughly inspect the bridge or affected components for the presence of asbestos containing material (ACM) using a firm prequalified by NCDOT to perform asbestos surveys. The inspection must be performed by a N.C. accredited asbestos inspector with experience inspecting bridges or other industrial structures. The N.C. accredited asbestos inspector must conduct a thorough inspection, identifying all asbestos-containing material as required by the Environmental Protection Agency National Emission Standards for Hazardous Air Pollutants (NESHAP) Code of Federal Regulations (CFR) 40 CFR, Part 61, Subpart M.

The Contractor shall submit an inspection report to the Engineer, which at a minimum must include information required in 40 CFR 763.85 (a)(4) vi)(A)-(E), as well as a project location map, photos of existing structure, the date of inspection and the name, N.C. accreditation number, and signature of the N.C. accredited asbestos inspector who

performed the inspection and completed the report. The cover sheet of the report shall include project identification information. Place the following notes on the cover sheet of the report and check the appropriate box:

___ ACM was found
___ ACM was not found

## 2.0 REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIAL

If ACM is found, notify the Engineer. Compensation for removal and disposal of ACM is considered extra work in accordance with Article 104-7 of the Standard Specifications.

An Asbestos Removal Permit must be obtained from the Health Hazards Control Unit (HHCU) of the N.C. Department of Health & Human Services, Division of Public Health, if more than 35 cubic feet, 160 square feet, or 260 linear feet of regulated ACM (RACM) is to be removed from a structure and this work must be completed by a contractor prequalified by NCDOT to perform asbestos abatement. RACM is defined in 40 CFR, Part 61, Subpart M. Note: 40 CFR 763.85 (a)(4) vi)(D) defines ACM as surfacing, TSI and Miscellaneous which does not meet the NESHAP RACM.

## 3.0 DEMOLITION NOTIFICATION

Even if no ACM is found (or if quantities are less than those required for a permit), a Demolition Notification (DHHS-3768) must be submitted to the HHCU. Notifications and Asbestos Permit applications require an original signature and must be submitted to the HHCU 10 working days prior to beginning demolition activities. The 10 working day period starts based on the post-marked date or date of hand delivery. Demolition that does not begin as originally notified requires submission of a separate revision form HHCU 3768-R to HHCU. Reference the North Carolina Administrative Code, Chapter 10A, Subchapter 41C, Article .0605 for directives on revision submissions.

Contact Information
Health Hazards Control Unit (HHCU)
N.C. Department of Health and Human Services
1912 Mail Service Center
Raleigh, NC 27699-1912
Telephone: (919) 707-5950
Fax: (919) 870-4808

## 4.0 SPECIAL CONSIDERATIONS

Buncombe, Forsyth, and Mecklenburg counties also have asbestos permitting and NESHAP requirements must be followed. For projects involving permitted RACM removals, both the applicable county and the state (HHCU) must be notified.

For demolitions with no RACM, only the local environmental agencies must be notified. Contact information is as follows:

Buncombe County
WNC Regional Air Pollution Control Agency
49 Mt. Carmel Road
Asheville, NC 28806
(828) 250-6777

Forsyth County
Environmental Affairs Department
537 N. Spruce Street
Winston-Salem, NC 27101
(336) 703-2440

Mecklenburg County
Land Use and Environmental Services Agency
Mecklenburg Air Quality
700 N. Tryon Street
Charlotte, NC 28202
(704) 336-5430

## 5.0 ADDITIONAL INFORMATION

Additional information may be found on N.C. asbestos rules, regulations, procedures and N.C. accredited inspectors, as well as associated forms for demolition notifications and asbestos permit applications at the N.C. Asbestos Hazard Management Program website:

www.epi.state.nc.us/epi/asbestos/ahmp.html

## 6.0 BASIS OF PAYMENT

Payment for the work required in this provision will be at the lump sum contract unit price for "Asbestos Assessment". Such payment will be full compensation for all asbestos inspections, reports, permitting and notifications.

# CONCRETE PARAPET WITH MOMENT SLAB (SPECIAL)

## 1.0 GENERAL

Construct concrete parapet connected to moment slabs to resist traffic impact above retaining walls. Construct concrete parapet with moment slab in accordance with the contract and accepted submittals.

## 2.0 MATERIALS

Refer to Division 10 of the *Standard Specifications*.

| Item | Section |
|---|---|
| Barrier Delineators | 1088-2 |
| Portland Cement Concrete | 1000 |
| Reinforcing Steel | 1070 |

Concrete for the concrete parapet shall meet the requirements for Class AA concrete and the maximum size coarse aggregate used in the concrete mix shall be #78M. The slump shall be within the range of 5" to 8" when tested in accordance with AASHTO T119. A high range water reducer shall be used. The quantity of high range water reducer per pound of cement shall be within the range recommended on the current list of approved admixtures issued by M&T Unit.

Class A concrete shall be used for moment slabs.

Provide epoxy coated reinforcing steel that meets Article 1070-7 of the *Standard Specifications* for concrete parapet.

## 3.0 CONSTRUCTION METHODS

Construct concrete parapet with moment slab in accordance with the plans and accepted submittals. Construct cast-in-place reinforced concrete moment slabs in accordance with Section 420 of the *Standard Specifications.* The plans for the concrete parapet are detailed for cast-in-place concrete and must be placed using conventional forms. Do not remove forms until concrete attains a compressive strength of at least 2,400 psi.

All exposed surfaces of the concrete parapet which are not satisfactory to the Engineer as to uniformity of color and texture or because of excessive patching shall be corrected as required by the Engineer. All surfaces of the concrete parapet shall be given a Class I surface finish in accordance with the Standard Specifications unless directed otherwise by the Engineer.

## 4.0 MEASUREMENT AND PAYMENT

*Concrete Parapet with Moment Slab* will be measured and paid in linear feet. Concrete parapet with moment slab will be measured as the length of concrete parapet installed and accepted. The contract unit price for *Concrete Parapet with Moment Slab* will be full compensation for submittals, labor, tools, equipment and concrete parapet with moment slab materials, excavating, backfilling, hauling and removing excavated materials and supplying any incidentals necessary to construct concrete parapet with moment slab.

Payment will be made under:

| Pay Item | Pay Unit |
|---|---|
| Concrete Parapet with Moment Slab | Linear Foot |

# ST-36

**B-5121 / B-5317** **Wake Co.**

**DECORATIVE CONCRETE PARAPET** **(SPECIAL)**

## 1.0 GENERAL

The "Decorative Concrete Parapet" shall be in accordance with applicable parts of the Standard Specifications, the details shown on the plans and as outlined in these special provisions. Plans for the bridge rails are detailed for cast in place concrete and must be placed using conventional forms.

## 2.0 CONCRETE MIX

Concrete for the bridge rail shall meet the requirements for class AA concrete with exception noted below:

The maximum size coarse aggregate used in the concrete mix shall be #78M. The slump shall be within the range of 5" to 8" when tested in accordance with AASHTO T119. A high range water reducer shall be used. The quantity of high range water reducer per pound of cement shall be within the range recommended on the current list of approved admixtures issued by M&T Unit.

## 3.0 CONSTRUCTION

The bridge rails shall be placed to the established shape, line, grade and dimensions shown on the plans.

Joints in the rails shall be constructed at the locations and of the type specified on the plans.

## 4.0 FINISHING

All exposed surfaces which are not satisfactory to the Engineer as to uniformity of color and texture or because of excessive patching shall be corrected as required by the Engineer. All surfaces of the bridge rails shall be given a Class I surface finish in accordance with the Standard Specifications unless directed otherwise by the Engineer.

## 5.0 MEASUREMENT

The quantity to be paid for under this item shall be the actual number of linear feet of "Decorative Concrete Parapet", complete in place and accepted, measured continuously along the top surface of completed rail from end to end without deductions for spaces between sections.

## 6.0 PAYMENT

The quantity, measured as described above, will be paid for at the contract unit price per linear foot bid for "Decorative Concrete Parapet", which price and payment shall be full compensation for all materials, admixtures, forms, falsework, curing, surface finish, tools, labor, equipment and incidentals necessary to complete the item.

**B-5121 / B-5317** **Wake Co.**

## PRECAST CONCRETE PANELS (SPECIAL)

Construct and erect the "Precast Panels" as detailed in the plans, in accordance with applicable parts of the Standard Specifications, and as outlined in these special provisions.

All exposed surfaces which are not satisfactory to the Engineer as to uniformity of color and texture or because of excessive patching shall be corrected as required by the Engineer. All surfaces of the precast concrete panels shall be given a Class I surface finish in accordance with the Standard Specifications unless directed otherwise by the Engineer.

**Payment**
The price and payment below will be full compensation for all items required to construct and erect the "Precast Concrete Panels", including but not limited to, materials, admixtures, forms, falsework, curing, surface finish, tools, labor, equipment and incidentals.

The "Precast Panels will be paid as the number of square feet shown on the plans.

Payment will be made under:

| Pay Item | Pay Unit |
|---|---|
| Precast Concrete Panels | Square Feet |

## APPLICATION OF BRIDGE COATING (SPECIAL)

### GENERAL

This work consists of preparing and cleaning concrete and galvanized surfaces as well as furnishing and applying a colored base coating with a compatible anti-graffiti finish coating to the surfaces described herein for the structure at Sta. 22+06.91 –L- (Bridge On Capital Blvd. Over Peace St.). The base coating and anti-graffiti coating shall be applied to all surfaces indicated in the provision and shall be applied only after the surface preparation specified herein has been completed, inspected and approved by the Engineer.

Alternate coating methods may be submitted for review and approval.

### MATERIALS

The base coating shall be compatible with the anti-graffiti finish coating and must be designed specifically for coating galvanized surfaces or damp, uncured concrete. The coating material shall be delivered to the job site in sealed containers bearing the manufacturer's original labels. The brand, color, and type shall be clearly marked on each container. A copy of the manufacturer's Materials Safety Data Sheet and a copy of the manufacturer's printed instructions shall be presented to the Engineer at the time of delivery.

The coating material shall be stored in airtight, upright containers. The containers shall be stored in a dry location where the temperature remains above 40° F and less than 100° F.

The coating material shall have a shelf life of not less than 12 months. After application, the base coating shall be dry to the touch within 48 hours and shall achieve a final cure within 2 to 3 weeks under ideal conditions. After application, the anti-graffiti coating shall be dry to the touch within 1 hour and shall achieve a final cure within 3 hours.

The color of the base coating shall be in accordance with the Federal Standard 595. Colors and areas of application shall be as follows:

Superstructure

A shade of brown that matches the steel girders of the proposed structure at Sta. 20+19.94 –FLYOVER- (Bridge On Wade Ave. Over Capital Blvd.) or similar color approved by the Engineer shall be applied to the outside face and bottom of exterior girders.

The color of the anti-graffiti coating shall be clear after full cure.

Provide one gallon of graffiti remover, thinners, dryers and all necessary components recommended by the manufacturer to the North Carolina Department of Transportation Materials and Tests Unit, Chemical Testing Engineer.

**MATERIAL TESTING AND CERTIFICATION**

Before coating material is applied, a Type 2 certification shall be supplied attesting that the product furnished is in accordance with the same formula as that previously subjected to the tests specified below and approved. Copies of the current tests reports shall be attached to the certification. Reports for tests made more than 4 years prior to shipment to the project site will not be accepted.

All testing shall be performed by a qualified commercial testing laboratory that has been approved by the North Carolina Department of Transportation Materials and Tests Unit.

The applied coating shall be subjected to and shall satisfy the requirements of the tests listed below, prior to use on the structure.

Freeze-Thaw

1. Three concrete specimens, not less than 4 inches by 6 inches by 6 inches, of the mix design for the structure shall be cast and cured. Fourteen days moist curing with a drying period at room temperature, 60° F to 80° F, for 24 hours will be required before applying the coating material to the specimens. Caution shall be taken that there be no excessive oil on specimen forms. The coating shall be applied to the sides of specimens at a spreading rate of 50 ± 10 square feet per gallon. Brush application will be permitted. Cementitious coatings shall be cured at room temperature and 30 percent relative

humidity for 24 hours, at room temperature and 90 percent relative humidity for 48 hours, at room temperature and 50 percent relative humidity for 4 days for a total curing time of 7 days.

2. The specimens shall be immersed in water at room temperature for 3 hours, then removed.

3. The specimens shall be placed in cold storage at -15°F for 1 hour and then removed.

4. The specimens shall be thawed at room temperature for one hour.

5. Steps 3 and 4 shall be repeated for a total of 250 cycles. At the end of 250 cycles, the specimens shall show no visible defects.

Accelerated Weathering

Coating shall be subjected to a 7,500 hour exposure test in a Twin-Carbon-Arc-Weatherometer, ASTM G 23, Type D, at an opening temperature of 145° F. The test shall be made at 20-minute cycles consisting of 17 minutes of light and 3 minutes of water spray plus light. At the end of the exposure test, the exposed samples shall show no chipping, flaking, or peeling. The panels for this test shall be prepared by applying the coating at a spreading rate of 50 ± 10 square feet per gallon to both sides and edges of panels cut from asbestos cement shingles in accordance with Federal Specification SS-S-346, Type I. Curing time shall be in accordance with Freeze-Thaw Test curing time.

Fungus Growth Resistance

Coating shall pass a fungus resistance test in accordance with Federal Specification TT-P-29g. Fungus growth shall not be indicated after a minimum incubation period of 21 days.

Abrasion Resistance

Coating shall pass the 2,000 litre sand abrasion test in accordance with Method 6191 Abrasion Resistance-Falling Sand, Federal Test Method Standard 141a, ASTM D968-81. The specimens for this test shall be prepared by applying the coating to a cleaned steel panel at a spreading rate of 50 ± 10 square feet per gallon. The specimens shall be cured at room temperature for 21 days.

Impact Resistance

Coating shall be applied to a concrete panel prepared according to Federal Test Method Standard 141a, Method 2051, at a spreading rate of 50 ± 10 square feet per gallon, and allowed to cure for 21 days at room temperature. The test shall then be run using the Gardner Mandrel Impact Tester in accordance with ASTM D 2794 using a one-half inch indenter with an impact load of 6 inch-pounds. The coating shall show no chipping under this impact load.

Salt-Spray Resistance

A concrete specimen shall be coated at the rate of 50 ± 10 square feet per gallon and cured for 21 days at room temperature. The coated specimen shall be exposed to a 5 percent salt solution in accordance with ASTM B 117 for 2,500 hours where the atmospheric temperature is maintained at 90° ± 2 °F. At the end of 2,500 hours of exposure, the coating shall show no ill effects, loss of adhesion, or deterioration.

Flexibility

A sheet metal specimen shall be coated at a rate of 50 ± 10 square feet per gallon and allowed to cure for 48 hours at room temperature. The coated specimen shall be bent 180 degrees over a one inch round mandrel. After bending, the coating shall show no breaking.

In addition to the certification and test reports required above, a service record shall be supplied showing that the coating material has a satisfactory service record on concrete and, when applicable, galvanized surfaces for a period of not less than 5 years prior to the date of submission of the service record. The coating shall also have shown satisfactory service characteristics without peeling, chipping, flaking, and non-uniform change in texture or color. The structure for the specific product shall be named in the service record.

In addition to the above requirements, each batch delivered to the project shall be sampled and tested for color and the following product analysis data submitted:

(a) Weight per gallon
(b) Viscosity in Kreb units
(c) Weight percent pigment
(d) Weight percent vehicle solids
(e) Infrared spectra of vehicle solution
(f) Drying time

**SURFACE PREPARATION**

Prepare concrete surfaces and galvanized surfaces in accordance with Section 420-17(B) and Section 442-12 of the Standard Specifications, respectively, or the manufacturer's recommendations, whichever is more restrictive. All surfaces to be coated shall be free of efflorescence, flaking coatings, dirt, oil, curing compounds, release agents and other deleterious substances prior to the application of the coating.

Concrete curing compounds and release agents must be removed. Water blasting will be allowed; however, the blasting operation must not remove or damage the concrete.

Prior to application of the coating, all concrete surfaces to be coated shall be sprayed with water. If the water soaks into the concrete surfaces, the coating may be applied once all surfaces dry. If

the water beads up and is repelled, the surfaces require further cleaning before application of the coating.

### APPLICATION

The coating application, including equipment used, shall be in accordance with the manufacturer's recommendations. The coating shall be applied by qualified personnel with previous experience similar to the work outlined in the contract plans.

The material shall be thoroughly mixed in its original container and shall not be thinned. Containers with coatings that have formed skins shall not be permitted for use.

The base coating may be applied over damp, but not wet concrete surfaces and shall be applied at a rate of 50 ± 10 square feet per gallon. The application rate shall produce a uniform color texture. The base coating shall be applied only when the ambient temperature is between 40° F and rising, and 100° F. It shall not be applied over frozen surfaces or if rain is imminent. If a freshly applied surface is damaged by rain, re-coating may be necessary based on the Engineers assessment of the damage.

Schedule the application of the base coating as one of the final finishing operations or when construction-generated dust will be minimal. To prevent lap marks, a wet edge shall be maintained at all times. Stopping and starting in mid-sections will not be allowed. Start or end at natural breaks in the surface, i.e. at a panel edges, corners or joints. When applying the base coating with a roller, the material shall be applied in vertical strokes initially, cross rolled for even film and appearance, and then finished with vertical strikes.

Apply the anti-graffiti coating by brush, roller or airless spray when the ambient temperature is between 45° F and 90° F, and the surface temperature is between 50° F and 100° F. Ensure the surface is clean and dry before applying the anti-graffiti coating.

### FINISHED PRODUCT

All coating material in the finished state shall be capable of accommodating the thermal and elastic expansion ranges of the concrete or, when applicable, galvanized surfaces without cracking.

The texture of the completed finish coat shall be similar to that of rubbed concrete. The completed finished coating shall be tightly bonded to the structure and present a uniform appearance and texture. Additional coats may be required by the Engineer in order to produce the desired surface texture and uniformity.

Coatings shall be entirely removed from the structure and reapplied if there is failure to positively adhere as evident by chipping, flaking, peeling, or the desired surface appearance is not achieved.

The average thickness of the completed finish coating shall not exceed 1/8 of an inch. The minimum dry film thickness of the anti-graffiti coating shall be 2.0 mils.

**BASIS OF PAYMENT**

The bridge coating will be paid for at the contract lump sum price bid for "Application of Bridge Coating." Price and payment shall be full compensation for surface preparation, furnishing and applying the materials, labor, equipment and any incidentals necessary to complete this work.

**B-5121 / B-5317** **Wake Co.**

## ARCHITECTURAL METAL FASCIA (SPECIAL)

### 1.0 GENERAL

"Architectural Metal Fascia" shall be in accordance with applicable parts of the Standard Specifications, the details shown on the plans and as outlined in these special provisions.

The work shall consist of computer-aided manufacturing (CAM) cutting a specified pattern as indicated in the plans by laser, HD plasma, or water jet into stainless steel panels. These panels will mount to structural steel frames which will attach to the exterior girders of both the Wade Avenue and Peace Street bridges as shown in the plans.

The work shall include CAM cutting the stainless steel fascia panels, and fabricating all elements necessary to complete and attach the metal fascias to the bridge girders. The work shall also include fabricating the brackets for the aesthetic lighting to the bridge girders of both bridges, to the center edge beam of the Peace Street bridge, and to the ends of the bent caps of the Wade Avenue bridge.

### 2.0 QUALIFICATIONS

The CAM Cutting specialist shall furnish documented evidence, including current contact information, of a minimum of 5 years' experience performing work of similar size, complexity and scope to that proposed and detailed herein and on the plans for this project.

The fabricator of the steel frames and connections shall be AISC certified in Simple Steel Bridges.

Fabrication processes shall not infringe on any copyrights or on proprietary processes or licenses whatsoever.

### 3.0 MATERIALS

**Fascia Panels:** The "Architectural Metal Fascia" panels shall be fabricated from ½-inch thick ASTM A240 Type AISI 304L stainless steel with a #4 finish on the out facing surface (the surface visible to traveling vehicles).

**Framing and Brackets:** The structural steel fascia framing, connection angles, plates, and brackets shall be fabricated from AASHTO M270 Grade 36 steel. Structural steel frames and connection angles or plates and brackets shall be metallized in accordance with "Thermal Sprayed Coatings (Metallization), see Special Provisions. Luminaire brackets may be either hot dip galvanized or metallized. All fasteners for the Architectural Metal Fascia panels and frames and fasteners for the aesthetic luminaire fixtures and brackets shall be galvanized unless otherwise noted on the plans.

### 4.0 INTEGRATED SHOP DRAWINGS

Shop drawings for the "Architectural Metal Fascia" panels, frames and hardware shall include the layout of all panels on the bridge girders in their as-built geometry and shall be fully integrated to include all items connected to or internal to the girders upon which the panels will

be attached to demonstrate that the panel connections will not conflict with these items. The integrated shop drawings will include all luminaire fixture brackets.

Preliminary shop drawings may be submitted for preliminary approval of all information except final field verified location of connection holes. These preliminary shop drawings shall be based on the theoretical geometry of the girders after the placement of the deck, railings and sidewalk, if any, have occurred. If preliminary approval is granted, the preliminary shop drawings shall be revised as needed based on field verification of connection locations as indicated in section 7.0 Fabrication and Construction.

## 5.0 ARTWORK SHOP DRAWINGS

Shop drawings for the "Architectural Metal Fascia" panels artwork which will be cut into the stainless steel fascia panels shall be prepared and submitted as part of the integrated shop drawing or as a separate package. The artwork shop drawings shall include pictorial and numeric pattern maps for ease of review and accuracy. As part of this submittal, electronic files in MicroStation, AutoCAD, or Adobe Illustrator format may also be submitted to aid in the review. No work may be started on fabrication of the "Architectural Metal Fascia" panels until the vector drawings of the artwork have been obtained from the Department.

## 6.0 MOCK-UP REQUIREMENTS

Fabricate four (4) "Architectural Metal Fascia" with frames and all hardware with art pattern as indicated in the plans as mock ups for each bridge (four (4) for the Peace Street Bridge and four (4) for the Wade Avenue Bridge). These panels shall be mounted on the production girders for each bridge or a girder of similar proportions if approved by the Engineer. The panels shall be mounted using the same attachments as production panels, to the extent possible, and the panels shall be illuminated with bridge lighting fixtures as indicated in the lighting special provisions.

The concrete girder for the Peace Street bridge mock-up shall be stained. For "Application of Bridge Coating", see the Special Provisions.

Submit documentation including working drawings and text files indicating how and where mock-ups will be assembled. Submit this documentation to the Engineer for approval 30 calendar days prior to start of fabrication of the mock-ups.

The mock-up for each bridge must be approved by the City of Raleigh and the Engineer before beginning fabrication of production panels for that bridge. Provide 14 calendar days' notice of assembly of mock-up on girders to the Engineer and provide the location where the mock-up can be viewed for review and approval.

## 7.0 FABRICATION & CONSTRUCTION

The "Architectural Metal Fascias" shall closely follow vertical curvature of the exterior girders of each bridge. The panels shall not be bent to match the horizontal curvature of the Wade Avenue bridge girders but will be placed on chords of the curve. Form sections true to shape, accurate in size, and free from distortion or defects

Protect finishes by applying heavy duty removable plastic film during production. Package all parts for delivery to protect against transportation damage. Provide markings to identify components consistently with drawings. Exercise care in loading, unloading, storing and installing panels to prevent bending, warping, twisting, and surface damage.

The "Architectural Metal Fascias" are spaced as indicated in the plans with a ½ inch nominal gap between panel frames. This gap may vary from top to bottom by +/- ¼ inch.

After deck, railing and sidewalk, if any, placement has occurred for each bridge, and within seven (7) days from the removal of the overhang brackets, the Architectural Fascia locations and locations of the pre-formed or shop drilled connection holes as well as any relevant girder and framing geometry and interfaces with other work shall be field measured and verified. Fabrication of the panels or their frames shall not begin until after this field verification has been completed and any adjustments have been made to previously submitted shop drawings and the revised shop drawings approved.

Fasten "Architectural Metal Fascias" to girders, as indicated in the plans, maintaining the following installation tolerances:

- Variation from plane or location: ½ inch in 30 feet (10 mm in 10 m) of length and up to ¾ inch in 300 feet, maximum.
- Deviation of horizontal and vertical alignment of installed metal panels: ¼ inch in 20 feet, noncumulative.
- Offset From true alignment between two adjacent members abutting end to end, in line: 1/16 inch, maximum.

Do not install panels that are defective, including warped, bowed, dented, and broken members, and/or members with damaged finishes. Do not rout, bend, or otherwise form the panels in the field without approval by the Engineer.

Remove site cuttings from finish surfaces. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water. Clean stainless steel surfaces with non-abrasive detergents, soap, ammonia and warm water; rinse with clean water.

## 8.0 MEASUREMENT

The quantity to be paid for under this item shall be the actual number of linear feet of "Architectural Metal Fascia", complete in place and accepted, measured continuously along the outside face of completed fascia from end to end without deductions for spaces between panels.

## 9.0 PAYMENT

The quantity, measured as described above, will be paid for at the contract unit price per linear foot bid for "Architectural Metal Fascia", which price and payment shall be full compensation for submittals, labor, tools, equipment, all materials, mock-ups, and incidentals necessary to complete the item including fabrication of the brackets for the aesthetic lighting attached to the

bridge girders, to the center edge beam of the Peace Street bridge, and to the ends of the bent caps of the Wade Avenue bridge.

**INSURANCE SPECIAL PROVISIONS** (04/15)

**CSX TRANSPORTATION, INC.**

STATE PROJECT: B-5121/B-5317 (42263.2.1) COUNTY: Wake

A. In addition to any other forms of insurance or bonds required under the terms of the contract and specifications, the Prime Contractor will be required to carry insurance of the following kinds and amounts:

1. **CONTRACTOR'S COMMERCIAL GENERAL LIABILITY INSURANCE:**

The Contractor shall procure and maintain, at its expense, an original and one certified copy of the policy **to the Department** as evidence of:

a. Statutory Worker's Compensation and Employers Liability Insurance with available limits of not less than $1,000,000, which insurance must contain a waiver of subrogation against CSXT and its Affiliates
b. Commercial General Liability coverage (inclusive of contractual liability) with available limits of not less than $5,000,000 in combined single limits for bodily injury and property damage and covering the contractual liabilities assumed under this Agreement
c. Business automobile liability insurance with available limits of not less than $1,000,000 combined single limit for bodily injury and/or property damage per occurrence
d. Such other insurance as CSXT may reasonably require.

Upon request, Licensee shall provide CSXT with a copy of Licensee's applicable insurance policies. A policy endorsement naming CSXT as an additional insured and specifying such coverage shall be furnished to CSXT, and the required coverage will be kept in force until all of the licensee's obligations under this Agreement have been fully discharged and fulfilled, or until Licensee shall have been specifically released by a written instrument signed by an authorized officer of CSXT.

The insurance policies shall provide that the insurance carrier must give CSXT notice at least thirty (30) days in advance of cancellation of coverage, of any change in coverage, or of cancellation of the policy. Notwithstanding any provisions of this Section, the liability assumed by Licensee shall not be limited to the required insurance.

2. **RAILROAD PROTECTIVE LIABILITY INSURANCE:**

The Contractor shall furnish **to the Department** an original and one duplicate of the Railroad Protective Liability Insurance Policy to protect CSXT in connection with operations to be performed on or adjacent to CSXT right of way. The specifications for proper evidence of insurance are as follows:

a) The Insurer must be financially stable and rated A- or better in A. M. Best Insurance Reports.

b) The policy must be written using the ISO/RIMA Form of Railroad Protective Insurance - Insurance Services Office (ISO) Form CG 00 35.
c) Named Insured and Address:

**CSX Transportation, Inc.**
**Insurance Dept. (C- 907)**
**500 Water Street**
**Jacksonville, FL 32202**

d) **Limits of Liability: $5,000,000 per occurrence, $10,000,000 annual aggregate required.**
e) Name and Address of Contractor must be shown on the Declarations page.
f) Name and Address of the Project Sponsor must be shown on the Declarations page.

Description of operations must appear on the Declarations page and must match the project description, including project or contract identification numbers.

The Description and Designation shall read: All work within Railroad Right of Way for project B-5121/B-5317 in Raleigh, Wake County, NC at mileposts S 156.53 and S 156.27.

Authorized endorsements:

A. **Must**

1) **Pollution Exclusion Amendment - CG 28 31**
*(Not required with CG 00 35 01 96 and newer versions)*
2) **Delete Common Policy Conditions** – Section E. Premiums

B. **Acceptable**
1) Broad Form Nuclear Exclusion - IL 00 21
2) 30-day Advance Notice of Non-renewal
3) Required State Cancellation Endorsement
4) Quick Reference or Index - CL/IL 240

C. **Unacceptable**
1) Any Pollution Exclusion Endorsement except CG 28 31
2) Any Punitive or Exemplary Damages Exclusion
3) Any endorsement not named in A or B
4) Any type of deductible policy

You must submit the original policy, via the Department of Transportation, for our approval and filing **prior** to the commencement of construction or demolition operations.

B. Prior to entry on CSXT right-of-way, the original Railroad Protective Liability Insurance Policy shall be submitted by the Prime Contractor to the Department at the address below for its review and transmittal to CSXT. In addition, certificates of insurance evidencing the Prime Contractor's Commercial General Liability Insurance shall be "issued" to

CSXT **and** the Department at the addresses below, and **forwarded to the Department** for its review and transmittal to CSXT. No work will be permitted by CSXT on its right-of-way until it has reviewed and approved the evidence of insurance required herein.

DEPARTMENT:
Department of Transportation
Rail Division
C/O Meredith McLamb
1556 Mail Service Center
Raleigh NC 27699-1556

RAILROAD:
CSX Transportation, Inc.
insurancedocuments@csx.com

C. All insurance herein before specified shall be carried until the final inspection and acceptance of the project, or that portion of the project within railroad right-of-way, by the Department of Transportation or, in the case of subcontractors, until the Contractor furnishes a letter to the Engineer stating that the subcontractor has completed his subcontracted work within railroad right-of-way to the satisfaction of the Contractor and that the Contractor will accomplish any additional work necessary on railroad right-of-way with his own forces. It is understood that the amounts specified are minimum amounts and that the Contractor may carry insurance in larger amounts if he so desires. As to "aggregate limits", if the insurer establishes loss reserves equal to or in excess of the aggregate limit specified in any of the required insurance policies, Contractor shall immediately notify the Department of Transportation and shall cease all operations until the aggregate limit is reinstated. If the insurer establishes loss reserves equal to or in excess of one/half of the aggregate limit, Contractor shall arrange to restore the aggregate limit to at least the minimum amount stated in these requirements. Any insurance policies and certificates taken out and furnished due to these requirements shall be approved by the Department of Transportation and the Railroad Company as to form and amount prior to beginning work on railroad right-of-way.
No extra allowance will be made for the insurance required hereunder; the entire cost of same is to be included in the unit contract price bids for the several pay items.

D. The insurance required herein shall in no way serve to limit the liability of Department or its Contractors under the terms of this agreement.

**RAILROAD SITE DATA:**

The following information is provided as a convenience to the Contractor. This information is subject to change and the Contractor should contact the Railroad to verify the accuracy. Since this information is shown as a convenience to the Contractor but is subject to change, the Contractor shall have no claims whatsoever against either the Railroad or the Department of Transportation for any delays or additional costs incurred based on changes in this information.

| | | |
|---|---|---|
| Number of tracks | - | **1** |
| Number of trains per day | - | **8** (Freight) |
| Maximum speed of trains | - | **20** mph |

**SPECIAL PROVISIONS FOR PROTECTION OF RAILWAY INTEREST**
**NORFOLK SOUTHERN RAILWAY COMPANY** 04/15

14. **INSURANCE**: State Project: B-5121/B-5317 (42263.2.1) County: Wake

A. In addition to any other forms of insurance or bonds required under the terms of the contract and specifications, the Prime Contractor will be required to provide coverage conforming to the requirements of the Federal-Aid Policy Guide outlined under 23 CFR 646A for all work to be performed on Railroad right(s) of way by carrying insurance of the following kinds and amounts:

1. **CONTRACTOR'S COMMERCIAL GENERAL LIABILITY INSURANCE:**

The Contractor shall furnish an original and one copy of the certificate of insurance and one certified copy of the policy to the Railroad and Department as evidence that, with respect to the operations he performs on railroad right of way, he carries regular Commercial General Liability Insurance having a combined single limit of not less than $2,000,000 per occurrence for all loss, damage, cost and expense, including attorneys' fees, arising out of bodily injury liability and property damage liability during the policy period. Said policy shall include explosion, collapse, and underground hazard (XCU) coverage, **shall be endorsed to name Railroad specified in item A.2.c. below as an additional insured, and shall include a severability of interests provision.** Also, Automobile Liability Insurance with a combined single limit of not less than $1,000,000 each occurrence for injury to or death of persons and damage to or loss or destruction of property. **Said policy or policies shall be endorsed to name Railroad specified in item A.2.c. below both as the certificate holder and as an additional insured and shall include a severability of interests provision**;

2. **RAILROAD PROTECTIVE LIABILITY INSURANCE:**

The Contractor shall furnish to the Railroad and Department an original and one duplicate of the Railroad Protective Liability Insurance having a combined single limit of not less than $2,000,000 each occurrence and $6,000,000 in the aggregate applying separately to each annual period. If the project involves track over which passenger trains operate, the insurance limits required are not less than a combined single limit of $5,000,000 each occurrence and $10,000,000 in the aggregate applying separately to each annual period. Said policy shall provide coverage for all loss, damage or expense arising from bodily injury and property damage liability, and physical damage to property attributed to acts or omissions at the job site.

The standards for the Railroad Protective Liability Insurance are as follows:

a. The insurer must be rated A- or better by A.M. Best Company, Inc. *(NOTE: NS does not accept from insurers Chartis (AIG or Affiliated Company including Lexington Insurance Company), Hudson Group or ACE or Affiliated Company.)*

b. The policy must be written using one of the following combinations of Insurance Services Office ("ISO") Railroad Protective Liability Insurance Form Numbers:
(1) CG 00 35 01 96 and CG 28 31 10 93; or
(2) CG 00 35 07 98 and CG 28 31 07 98; or
(3) CG 00 35 10 01; or
(4) CG 00 35 12 04; or
(5) CG 00 35 12 07; or
(6) CG 00 35 04 13.

c. The named insured shall read:

Norfolk Southern Railway Company
Three Commercial Place
Norfolk, Virginia 23510-2191
Attn: Scott Dickerson, Director Risk Management

*(NOTE: NS does not share coverage on RRPL with any other entity on this policy.)*

d. The description of operations must appear on the Declarations, must match the project description in this agreement, and must include the appropriate Department project and contract identification numbers.

The Description and Designation shall read: All construction within Railroad Right of Way on Wade Avenue for project B-5121/B-5317 in Raleigh, Wake County, NC.

e. The job location must appear on the Declarations and must include the city, state, and appropriate highway name/number. *(Note: Do not include any references to milepost, valuation station, or mile marker on the insurance policy.)*

f. The name and address of the prime contractor must appear on the Declarations.

g. The name and address of the Department must be identified on the Declarations as the "Involved Governmental Authority or Other Contracting Party."

h. Endorsements/forms that are required are:
   (1) Physical Damage to Property Amendment
   (2) Terrorism Risk Insurance Act (TRIA) coverage must be included

i. Other endorsements/forms that will be accepted are:
   (1) Broad Form Nuclear Exclusion – Form IL 00 21
   (2) 30-day Advance Notice of Non-renewal or cancellation
   (3) 60- day written notice be given the Department prior to cancellation or change
   (4) Quick Reference or Index Form CL/IL 240

j. Endorsements/forms that are **NOT** acceptable are:
   (1) Any Pollution Exclusion Endorsement except CG 28 31
   (2) Any Punitive or Exemplary Damages Exclusion
   (3) Known injury or Damage Exclusion form CG 00 59
   (4) Any Common Policy Conditions form
   (5) Any Endorsement that limits or excludes Professional Liability coverage
   (6) A Non-Cumulation of Liability or Pyramiding of Limits Endorsement
   (7) An Endorsement that excludes TRIA coverage
   (8) A Sole Agent Endorsement
   (9) Any type of deductible endorsement or amendment
   (10) Any other endorsement/form not specifically authorized in item no. 2.h above.

B. If any part of the work is sublet, similar insurance, and evidence thereof as specified in A.1 above, shall be provided by or on behalf of the subcontractor to cover its operations on Railroad's right of way.

C. All insurance required under the preceding subsection A shall be underwritten by insurers and be of such form and content, as may be acceptable to the Company. Prior to entry on Railroad right-of-way, the original Railroad Protective Liability Insurance Policy shall be submitted by the Prime Contractor to the Department at the address below for its review and transmittal to the Railroad. In addition, certificates of insurance evidencing the Prime Contractor's and any subcontractors' Commercial General Liability Insurance shall be issued to the Railroad and the Department at the addresses below, and forwarded to the Department for its review and transmittal to the Railroad. The certificates of insurance shall state that the insurance coverage will not be suspended, voided, canceled, or reduced in coverage or limits without (30) days advance written notice to Railroad and the Department. No work will be permitted by Railroad on its right-of-way until it has reviewed and approved the evidence of insurance required herein.

| DEPARTMENT: | RAILROAD: |
|---|---|
| NCDOT Rail Division | Risk Management |
| 1556 Mail Service Center | Norfolk Southern Railway Company |
| Raleigh NC 27699-1556 | Three Commercial Place |
| Attn: Meredith McLamb | Norfolk, Virginia 23510-2191 |

D. The insurance required herein shall not limit the obligations of Department or its Contractors under the terms of this agreement.

E Submission Requirements

1. Railroad will only accept initial insurance submissions via US Mail or Overnight carrier to the address noted in C above. Railroad will NOT accept initial insurance submissions via email or faxes.

2. Railroad requires the following two (2) forms of insurance in the initial insurance submission to be submitted under a cover letter providing details of the project and contact information:

a. The full original or certified true countersigned copy of the railroad protective liability insurance policy in its entirety inclusive of all declarations, schedule of forms and endorsements along with the policy forms and endorsements.

b. The Contractor's commercial general, automobile, and workers' compensation liability insurance certificate of liability insurance evidencing a combined single limit of a minimum of $2M per occurrence of general and $1M per occurrence of automobile liability insurance naming Norfolk Southern Railway Company, Three Commercial Place, Norfolk, VA 23510 as the certificate holder and as an additional insured on both the general and automobile liability insurance policy.

3. It should be noted that the Railroad does not accept notation of Railroad Protective Insurance on a certificate of liability insurance form or Binders as Railroad must have the full original countersigned policy. Further, please note that mere receipt of the policy is not the only issue but review for compliance. Due to the number of projects system-wide, it typically takes a minimum of 30-45 days for the Railroad to review.

15. **FAILURE TO COMPLY**:

A. In the event the Contractor violates or fails to comply with any of the requirements of these Special Provisions:

(1) The Railroad Engineer may require that the Contractor vacate Railroad property.

(2) The Engineer may withhold all monies due the Contractor on monthly statements.

Any such orders shall remain in effect until the Contractor has remedied the situation to the satisfaction of the Railroad Engineer and the Engineer.

16. **PAYMENT FOR COST OF COMPLIANCE**:

A. No separate payment will be made for any extra cost incurred on account of compliance with these special provisions. All such cost shall be included in prices bid for other items of the work as specified in the payment items.

**RAILROAD SITE DATA:**

The following information is provided as a convenience to the Contractor. This information is subject to change and the Contractor should contact the Railroad to verify the accuracy. Since this information is shown as a convenience to the Contractor but is subject to change, the Contractor shall have no claims whatsoever against either the Railroad or the Department of Transportation for any delays or additional costs incurred based on changes in this information.

| | | |
|---|---|---|
| Number of tracks | - | **1** |
| Number of trains per day | | **21** (freight) |
| Maximum speed of trains | - | **25** mph |

## PROJECT SPECIAL PROVISION

(10-18-95) (Rev. 10-15-13) Z-1

## PERMITS

The Contractor's attention is directed to the following permits, which have been issued to the Department of Transportation by the authority granting the permit.

| PERMIT | AUTHORITY GRANTING THE PERMIT |
|---|---|
| Dredge and Fill and/or<br>Work in Navigable Waters (404) | U. S. Army Corps of Engineers |
| Water Quality (401) | Division of Environmental Management, NCDEQ<br>State of North Carolina |
| Buffer Certification | Division of Environmental Management, NCDEQ<br>State of North Carolina |

The Contractor shall comply with all applicable permit conditions during construction of this project. Those conditions marked by * are the responsibility of the Department and the Contractor has no responsibility in accomplishing those conditions.

Agents of the permitting authority will periodically inspect the project for adherence to the permits.

The Contractor's attention is also directed to Articles 107-10 and 107-13 of the *2012 Standard Specifications* and the following:

Should the Contractor propose to utilize construction methods (such as temporary structures or fill in waters and/or wetlands for haul roads, work platforms, cofferdams, etc.) not specifically identified in the permit (individual, general, or nationwide) authorizing the project it shall be the Contractor's responsibility to coordinate with the Engineer to determine what, if any, additional permit action is required. The Contractor shall also be responsible for initiating the request for the authorization of such construction method by the permitting agency. The request shall be submitted through the Engineer. The Contractor shall not utilize the construction method until it is approved by the permitting agency. The request normally takes approximately 60 days to process; however, no extensions of time or additional compensation will be granted for delays resulting from the Contractor's request for approval of construction methods not specifically identified in the permit.

**Where construction moratoriums are contained in a permit condition which restricts the Contractor's activities to certain times of the year, those moratoriums will apply only to the portions of the work taking place in the waters or wetlands provided that activities outside those areas is done in such a manner as to not affect the waters or wetlands.**

# P-2

## U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT

Action Id. **SAW-2009-01001** County: **Wake** U.S.G.S. Quad: **NC-RALEIGH WEST**

## GENERAL PERMIT (NATIONWIDE) VERIFICATION

Permittee: **NC Department of Transportation**
**Richard Hancock**
Address: **1598 Mail Service Center**
**Raleigh, NC, 27699-1598**
Telephone Number: **919.707.6156 (Tyler Stanton)**

Size (acres) **N/A** Nearest Town **Raleigh**
Nearest Waterway **Pigeon House Branch** River Basin **Upper Neuse**
USGS HUC **03020201** Coordinates Latitude: **35.792**; Longitude: **-78.642**
Location description: **On US 70 (Capital Blvd) over Peace Street (BR 227) and Wade Avenue (BR 213), north of downtown Raleigh, NC.**

Description of projects area and activity: **TIPs B-5121 and B-5317; Replacement of Bridges 213 & 227 over Wade Avenue and Peace Street, impacting 192 linear feet of stream** .

Applicable Law: ☒ Section 404 (Clean Water Act, 33 USC 1344)
☐ Section 10 (Rivers and Harbors Act, 33 USC 403)

Authorization: Nationwide Permit Number: **NWP 14 Linear Transportation Projects.**
***SEE ATTACHED RGP or NWP GENERAL, REGIONAL AND SPECIAL CONDITIONS***

**Your work is authorized by the above referenced permit provided it is accomplished in strict accordance with the attached conditions and your submitted application and attached information dated 01/12/2016. Any violation of the attached conditions or deviation from your submitted plans may subject the permittee to a stop work order, a restoration order, a Class I administrative penalty, and/or appropriate legal action.**

**SPECIAL CONDITION:** This USACE permit does not authorize you to take a threatened or endangered species, in particular, the Northern Long-eared Bat (NLEB) (Myotis septentrionalis). In order to legally take a listed species, you must have separate authorization under the Endangered Species Act (ESA) (e.g., a Biological Opinion (BO) under the ESA, Section 7, with "incidental take" provisions with which you must comply). The U.S. Fish and Wildlife Service's (USFWS's) Programmatic BO titled "Northern Long-eared Bat (NLEB) Programmatic Biological Opinion for North Carolina Department of Transportation (NCDOT) Activities in Eastern North Carolina (Divisions 1-8)," dated March 25, 2015, and adopted on May 4, 2015, contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" that are specified in the BO. Your authorization under this USACE permit is conditioned upon your compliance with all the mandatory terms and conditions (incorporated by reference into this permit) associated with incidental take of the BO. 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 an unauthorized take, and would also constitute non-compliance with your USACE permit. The USFWS is the appropriate authority to determine compliance with the terms and conditions of its BO and with the ESA.

End of special condition

This verification will remain valid until the expiration date identified below unless the nationwide authorization is modified, suspended or revoked. If, prior to the expiration date identified below, the nationwide permit authorization is reissued and/or modified, this verification will remain valid until the expiration date identified below, provided it complies with all requirements of the modified nationwide permit. If the nationwide permit authorization expires or is suspended, revoked, or is modified, such that the activity would no longer comply with the terms and conditions of the nationwide permit, activities which have commenced (i.e., are under construction) or are under contract to commence in reliance upon the nationwide permit, will remain authorized provided the activity is completed within twelve months of the date of the nationwide permit's expiration, modification or revocation, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend or revoke the authorization.

Action Id. **SAW-2009-01001**

This Department of the Army verification does not relieve the permittee of the responsibility to obtain any other required Federal, State or local approvals/permits.

## Determination of Jurisdiction:

**A.** ☐ Based on preliminary information, there appear to be waters of the US including wetlands within the above described project area. This preliminary determination is not an appealable action under the Regulatory Program Administrative Appeal Process ( Reference 33 CFR Part 331).

**B.** ☐ There are Navigable Waters of the United States within the above described project area subject to the permit requirements of Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

**C.** ☐ There are waters of the US and/or wetlands within the above described project area subject to the permit requirements of Section 404 of the Clean Water Act (CWA)(33 USC § 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

**D.** ☒ The jurisdictional areas within the above described project area have been identified under a previous action. Please reference jurisdictional determination issued 12-DEC-2011. Action ID: **SAW-2009-01001**.

If there are any questions regarding this verification, any of the conditions of the Permit, or the Corps of Engineers regulatory program, please contact **Eric Alsmeyer at 919-554-4884 x23 or Eric.C.Alsmeyer@usace.army.mil**.

Eric C. Alsmeyer

Digitally signed by ALSMEYER.ERIC.C.1087624486
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=ALSMEYER.ERIC.C.1087624486
Date: 2016.01.13 12:07:14 -05'00'

Corps Regulatory Official: _____ Date: **01/13/2016**

Expiration Date of Verification: **03/18/2017**

The Wilmington District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete our customer Satisfaction Survey online at http://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0.

# P-4

**Action ID Number:** SAW-2009-01001 **County:** Wake

**Permittee:** NC Department of Transportation
Richard Hancock

**Project Name:** NCDOT/B-5121 & B-5317/US70 (Capital Boulevard) over Peace Street & Wade Ave/BRs 213 & 227/Div5/Bridge Replacement

**Date Verification Issued:** 01/13/2016

**Project Manager:** Eric Alsmeyer

**Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the following address:**

**US ARMY CORPS OF ENGINEERS**
**WILMINGTON DISTRICT**
**Attn: Eric Alsmeyer**
**US Army Corps of Engineers, Wilmington District**
**Raleigh Regulatory Field Office**
**3331 Heritage Trade Drive, Suite 105**
**Wake Forest, NC 27587**

**Please note that your permitted activity is subject to a compliance inspection by a U. S. Army Corps of Engineers representative. Failure to comply with any terms or conditions of this authorization may result in the Corps suspending, modifying or revoking the authorization and/or issuing a Class I administrative penalty, or initiating other appropriate legal action.**

**I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and condition of the said permit, and required mitigation was completed in accordance with the permit conditions.**

_____ _____

**Signature of Permittee** **Date**

**NATIONWIDE PERMIT 14**
**DEPARTMENT OF THE ARMY**
**CORPS OF ENGINEERS**
**FINAL NOTICE OF ISSUANCE AND MODIFICATION OF NATIONWIDE PERMITS**
**FEDERAL REGISTER**
**AUTHORIZED MARCH 19, 2012**

**Linear Transportation Projects**. Activities required for the construction, expansion, modification, or improvement of linear transportation projects (e.g., roads, highways, railways, trails, airport runways, and taxiways) in waters of the United States. For linear transportation projects in non-tidal waters, the discharge cannot cause the loss of greater than 1/2-acre of waters of the United States. For linear transportation projects in tidal waters, the discharge cannot cause the loss of greater than 1/3-acre of waters of the United States. Any stream channel modification, including bank stabilization, is limited to the minimum necessary to construct or protect the linear transportation project; such modifications must be in the immediate vicinity of the project.

This NWP also authorizes temporary structures, fills, and work necessary to construct the linear transportation project. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

This NWP cannot be used to authorize non-linear features commonly associated with transportation projects, such as vehicle maintenance or storage buildings, parking lots, train stations, or aircraft hangars.

* Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if: (1) the loss of waters of the United States exceeds 1/10-acre; or (2) there is a discharge in a special aquatic site, including wetlands. (See general condition 31.) (Sections 10 and 404)

Note: Some discharges for the construction of farm roads or forest roads, or temporary roads for moving mining equipment, may qualify for an exemption under Section 404(f) of the Clean Water Act (see 33 CFR 323.4).

## NATIONWIDE PERMIT CONDITIONS

The following General Conditions must be followed in order for any authorization by a NWP to be valid:

1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation.

(b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.

(c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species.

3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. Management of Water Flows. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.

13. Removal of Temporary Fills. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. Wild and Scenic Rivers. No activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service).

17. Tribal Rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

18. Endangered Species. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed.

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will review the documentation and determine whether it is sufficient to address ESA compliance for the NWP activity, or whether additional ESA consultation is necessary.

* (c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that might be affected by the proposed work or that utilize the designated critical habitat that might be affected by the proposed work. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps' determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the project, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification the proposed activities will have "no effect" on listed species or critical habitat, or until Section 7 consultation has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific regional endangered species conditions to the NWPs.

(e) Authorization of an activity by a NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the U.S. FWS or the NMFS, The Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word "harm" in the definition of "take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(f) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. FWS and NMFS or their world wide web pages at http://www.fws.gov/ or http://www.fws.gov/ipac and http://www.noaa.gov/fisheries.html respectively.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for obtaining any "take" permits required under the U.S. Fish and Wildlife Service's regulations governing compliance with the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act. The permittee should contact the appropriate local office of the U.S. Fish and Wildlife Service to determine if such "take" permits are required for a particular activity.

20. Historic Properties. (a) In cases where the district engineer determines that the activity may affect properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(b) Federal permittees should follow their own procedures for complying with the requirements of Section 106 of the National Historic Preservation Act. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will review the documentation and determine whether it is sufficient to address section 106 compliance for the NWP activity, or whether additional section 106 consultation is necessary.

* (c) Non-federal permittees must submit a pre-construction notification to the district engineer if the authorized activity may have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of or potential for the presence of historic resources can be sought from the State Historic Preservation Officer or Tribal Historic Preservation Officer, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of Section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted and these efforts, the district engineer shall determine whether the proposed activity has the potential to cause an effect on the historic properties. Where the non-Federal applicant has identified historic properties on which the activity may have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects or that consultation under Section 106 of the NHPA has been completed.

(d) The district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA Section 106 consultation is required. Section 106 consultation is not required when the Corps determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR §800.3(a)). If NHPA

section 106 consultation is required and will occur, the district engineer will notify the non-Federal applicant that he or she cannot begin work until Section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(e) Prospective permittees should be aware that section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. Designated Critical Resource Waters. Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment.

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, and 52 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with general condition 31, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

23. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that adverse effects on the aquatic environment are minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse effects of the proposed activity are minimal, and provides a project-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effects on the aquatic environment. Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332.

(1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in minimal adverse effects on the aquatic environment.

(2) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, wetland restoration should be the first compensatory mitigation option considered.

(3) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) – (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)).

(4) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan only needs to address the baseline conditions at the impact site and the number of credits to be provided.

(5) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan.

(d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation, such as stream rehabilitation, enhancement, or preservation, to ensure that the activity results in minimal adverse effects on the aquatic environment.

(e) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any project resulting in the loss of greater than 1/2-acre of waters of

the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that a project already meeting the established acreage limits also satisfies the minimal impact requirement associated with the NWPs.

(f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the restoration or establishment, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, riparian areas may be the only compensatory mitigation required. Riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to establish a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or establishing a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(g) Permittees may propose the use of mitigation banks, in-lieu fee programs, or separate permittee-responsible mitigation. For activities resulting in the loss of marine or estuarine resources, permittee-responsible compensatory mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management.

(h) Where certain functions and services of waters of the United States are permanently adversely affected, such as the conversion of a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse effects of the project to the minimal level.

24. Safety of Impoundment Structures. To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. Water Quality. Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA Section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

"When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

_____
(Transferee)

_____
(Date)

* 30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include:

(a) A statement that the authorized work was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions;

(b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and

(c) The signature of the permittee certifying the completion of the work and mitigation.

* 31. Pre-Construction Notification. (a) Timing. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

(1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

(2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or in the vicinity of the project, or to notify the Corps pursuant to general condition 20 that the activity may have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or Section 106 of the National Historic Preservation (see 33 CFR 330.4(g)) has been completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) Contents of Pre-Construction Notification: The PCN must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed project;

(3) A description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause, including the anticipated amount of loss of water of the United States expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. The description should be sufficiently detailed to allow the district engineer to determine that the adverse effects of the project will be minimal and to determine the need for compensatory mitigation. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the project and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans);

(4) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many waters of the United States. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate;

(5) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse effects are minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(6) If any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, for non-Federal applicants the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work. Federal applicants must provide documentation demonstrating compliance with the Endangered Species Act; and

(7) For an activity that may affect a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, for non-Federal applicants the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property. Federal applicants must provide documentation demonstrating compliance with Section 106 of the National Historic Preservation Act.

(c) Form of Pre-Construction Notification: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is a PCN and must include all of the information required in paragraphs (b)(1) through (7) of this general condition. A letter containing the required information may also be used.

(d) Agency Coordination: (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

(2) For all NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States, for NWP 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 activities that require pre-construction notification and will result in the loss of greater than 300 linear feet of intermittent and ephemeral stream bed, and for all NWP 48 activities that require pre-construction notification, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (U.S. FWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Office (THPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to telephone or fax the district engineer notice that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure the net adverse environmental effects to the aquatic environment of the proposed activity are minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

(3) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

(4) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of pre-construction notifications to expedite agency coordination.

D. District Engineer's Decision

1. In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. For a linear project, this determination will include an evaluation of the individual crossings to determine whether they individually satisfy the terms and conditions of the NWP(s), as well as the cumulative effects caused by all of the crossings authorized by NWP. If an applicant requests a waiver of the 300 linear foot limit on impacts to intermittent or ephemeral streams or of an otherwise applicable limit, as provided for in NWPs 13, 21, 29, 36, 39, 40, 42, 43, 44, 50, 51 or 52, the district engineer will only grant the waiver upon a written determination that the NWP activity will result in minimal adverse effects. When making minimal effects determinations the district engineer will consider the direct and indirect effects caused by the NWP activity. The district engineer will also consider site specific factors, such as the environmental setting in the

vicinity of the NWP activity, the type of resource that will be affected by the NWP activity, the functions provided by the aquatic resources that will be affected by the NWP activity, the degree or magnitude to which the aquatic resources perform those functions, the extent that aquatic resource functions will be lost as a result of the NWP activity (e.g., partial or complete loss), the duration of the adverse effects (temporary or permanent), the importance of the aquatic resource functions to the region (e.g., watershed or ecoregion), and mitigation required by the district engineer. If an appropriate functional assessment method is available and practicable to use, that assessment method may be used by the district engineer to assist in the minimal adverse effects determination. The district engineer may add case-specific special conditions to the NWP authorization to address site-specific environmental concerns.

2. If the proposed activity requires a PCN and will result in a loss of greater than 1/10-acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for projects with smaller impacts. The district engineer will consider any proposed compensatory mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment of the proposed activity are minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects on the aquatic environment are minimal, after considering mitigation, the district engineer will notify the permittee and include any activity-specific conditions in the NWP verification the district engineer deems necessary. Conditions for compensatory mitigation requirements must comply with the appropriate provisions at 33 CFR 332.3(k). The district engineer must approve the final mitigation plan before the permittee commences work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the proposed compensatory mitigation plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure no more than minimal adverse effects on the aquatic environment. If the net adverse effects of the project on the aquatic environment (after consideration of the compensatory mitigation proposal) are determined by the district engineer to be minimal, the district engineer will provide a timely written response to the applicant. The response will state that the project can proceed under the terms and conditions of the NWP, including any activity-specific conditions added to the NWP authorization by the district engineer.

3. If the district engineer determines that the adverse effects of the proposed work are more than minimal, then the district engineer will notify the applicant either: (a) That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (b) that the project is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level; or (c) that the project is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse effects occur to the aquatic environment, the activity will be authorized within the 45-day PCN period, with activity-specific

conditions that state the mitigation requirements. The authorization will include the necessary conceptual or detailed mitigation or a requirement that the applicant submit a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level. When mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan or has determined that prior approval of a final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation.

## FURTHER INFORMATION

1. District Engineers have authority to determine if an activity complies with the terms and conditions of an NWP.
2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law.
3. NWPs do not grant any property rights or exclusive privileges.
4. NWPs do not authorize any injury to the property or rights of others.
5. NWPs do not authorize interference with any existing or proposed Federal project.

## DEFINITIONS

Best management practices (BMPs): Policies, practices, procedures, or structures implemented to mitigate the adverse environmental effects on surface water quality resulting from development. BMPs are categorized as structural or non-structural.

Compensatory mitigation: The restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

Currently serviceable: Useable as is or with some maintenance, but not so degraded as to essentially require reconstruction.

Direct effects: Effects that are caused by the activity and occur at the same time and place.

Discharge: The term "discharge" means any discharge of dredged or fill material.

Enhancement: The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

Ephemeral stream: An ephemeral stream has flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

Establishment (creation): The manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area.

High Tide Line: The line of intersection of the land with the water's surface at the maximum height reached by a rising tide. The high tide line may be determined, in the absence

of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gages, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other high tides that occur with periodic frequency but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds such as those accompanying a hurricane or other intense storm.

Historic Property: Any prehistoric or historic district, site (including archaeological site), building, structure, or other object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria (36 CFR part 60).

Independent utility: A test to determine what constitutes a single and complete non-linear project in the Corps regulatory program. A project is considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility.

Indirect effects: Effects that are caused by the activity and are later in time or farther removed in distance, but are still reasonably foreseeable.

Intermittent stream: An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

Loss of waters of the United States: Waters of the United States that are permanently adversely affected by filling, flooding, excavation, or drainage because of the regulated activity. Permanent adverse effects include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody. The acreage of loss of waters of the United States is a threshold measurement of the impact to jurisdictional waters for determining whether a project may qualify for an NWP; it is not a net threshold that is calculated after considering compensatory mitigation that may be used to offset losses of aquatic functions and services. The loss of stream bed includes the linear feet of stream bed that is filled or excavated. Waters of the United States temporarily filled, flooded, excavated, or drained, but restored to pre-construction contours and elevations after construction, are not included in the measurement of loss of waters of the United States. Impacts resulting from activities eligible for exemptions under Section 404(f) of the Clean Water Act are not considered when calculating the loss of waters of the United States.

Non-tidal wetland: A non-tidal wetland is a wetland that is not subject to the ebb and flow of tidal waters. The definition of a wetland can be found at 33 CFR 328.3(b). Non-tidal wetlands contiguous to tidal waters are located landward of the high tide line (i.e., spring high tide line).

Open water: For purposes of the NWPs, an open water is any area that in a year with normal patterns of precipitation has water flowing or standing above ground to the extent that an ordinary high water mark can be determined. Aquatic vegetation within the area of standing or

flowing water is either non-emergent, sparse, or absent. Vegetated shallows are considered to be open waters. Examples of "open waters" include rivers, streams, lakes, and ponds.

Ordinary High Water Mark: An ordinary high water mark is a line on the shore established by the fluctuations of water and indicated by physical characteristics, or by other appropriate means that consider the characteristics of the surrounding areas (see 33 CFR 328.3(e)).

Perennial stream: A perennial stream has flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.

Practicable: Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

Pre-construction notification: A request submitted by the project proponent to the Corps for confirmation that a particular activity is authorized by nationwide permit. The request may be a permit application, letter, or similar document that includes information about the proposed work and its anticipated environmental effects. Pre-construction notification may be required by the terms and conditions of a nationwide permit, or by regional conditions. A pre-construction notification may be voluntarily submitted in cases where pre-construction notification is not required and the project proponent wants confirmation that the activity is authorized by nationwide permit.

Preservation: The removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.

Re-establishment: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.

Rehabilitation: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

Restoration: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: re-establishment and rehabilitation.

Riffle and pool complex: Riffle and pool complexes are special aquatic sites under the 404(b)(1) Guidelines. Riffle and pool complexes sometimes characterize steep gradient sections of streams. Such stream sections are recognizable by their hydraulic characteristics. The rapid movement of water over a course substrate in riffles results in a rough flow, a turbulent surface, and high dissolved oxygen levels in the water. Pools are deeper areas associated with riffles. A slower stream velocity, a streaming flow, a smooth surface, and a finer substrate characterize pools.

Riparian areas: Riparian areas are lands adjacent to streams, lakes, and estuarine-marine shorelines. Riparian areas are transitional between terrestrial and aquatic ecosystems, through

which surface and subsurface hydrology connects riverine, lacustrine, estuarine, and marine waters with their adjacent wetlands, non-wetland waters, or uplands. Riparian areas provide a variety of ecological functions and services and help improve or maintain local water quality. (See general condition 23.)

Shellfish seeding: The placement of shellfish seed and/or suitable substrate to increase shellfish production. Shellfish seed consists of immature individual shellfish or individual shellfish attached to shells or shell fragments (i.e., spat on shell). Suitable substrate may consist of shellfish shells, shell fragments, or other appropriate materials placed into waters for shellfish habitat.

Single and complete linear project: A linear project is a project constructed for the purpose of getting people, goods, or services from a point of origin to a terminal point, which often involves multiple crossings of one or more waterbodies at separate and distant locations. The term "single and complete project" is defined as that portion of the total linear project proposed or accomplished by one owner/developer or partnership or other association of owners/developers that includes all crossings of a single water of the United States (i.e., a single waterbody) at a specific location. For linear projects crossing a single or multiple waterbodies several times at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. However, individual channels in a braided stream or river, or individual arms of a large, irregularly shaped wetland or lake, etc., are not separate waterbodies, and crossings of such features cannot be considered separately.

Single and complete non-linear project: For non-linear projects, the term "single and complete project" is defined at 33 CFR 330.2(i) as the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers. A single and complete non-linear project must have independent utility (see definition of "independent utility"). Single and complete non-linear projects may not be "piecemealed" to avoid the limits in an NWP authorization.

Stormwater management: Stormwater management is the mechanism for controlling stormwater runoff for the purposes of reducing downstream erosion, water quality degradation, and flooding and mitigating the adverse effects of changes in land use on the aquatic environment.

Stormwater management facilities: Stormwater management facilities are those facilities, including but not limited to, stormwater retention and detention ponds and best management practices, which retain water for a period of time to control runoff and/or improve the quality (i.e., by reducing the concentration of nutrients, sediments, hazardous substances and other pollutants) of stormwater runoff.

Stream bed: The substrate of the stream channel between the ordinary high water marks. The substrate may be bedrock or inorganic particles that range in size from clay to boulders. Wetlands contiguous to the stream bed, but outside of the ordinary high water marks, are not considered part of the stream bed.

Stream channelization: The manipulation of a stream's course, condition, capacity, or location that causes more than minimal interruption of normal stream processes. A channelized stream remains a water of the United States.

Structure: An object that is arranged in a definite pattern of organization. Examples of structures include, without limitation, any pier, boat dock, boat ramp, wharf, dolphin, weir, boom, breakwater, bulkhead, revetment, riprap, jetty, artificial island, artificial reef, permanent

mooring structure, power transmission line, permanently moored floating vessel, piling, aid to navigation, or any other manmade obstacle or obstruction.

Tidal wetland: A tidal wetland is a wetland (i.e., water of the United States) that is inundated by tidal waters. The definitions of a wetland and tidal waters can be found at 33 CFR 328.3(b) and 33 CFR 328.3(f), respectively. Tidal waters rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water surface can no longer be practically measured in a predictable rhythm due to masking by other waters, wind, or other effects. Tidal wetlands are located channelward of the high tide line, which is defined at 33 CFR 328.3(d).

Vegetated shallows: Vegetated shallows are special aquatic sites under the 404(b)(1) Guidelines. They are areas that are permanently inundated and under normal circumstances have rooted aquatic vegetation, such as seagrasses in marine and estuarine systems and a variety of vascular rooted plants in freshwater systems.

Waterbody: For purposes of the NWPs, a waterbody is a jurisdictional water of the United States. If a jurisdictional wetland is adjacent – meaning bordering, contiguous, or neighboring – to a waterbody determined to be a water of the United States under 33 CFR 328.3(a)(1)-(6), that waterbody and its adjacent wetlands are considered together as a single aquatic unit (see 33 CFR 328.4(c)(2)). Examples of "waterbodies" include streams, rivers, lakes, ponds, and wetlands.

**Final Regional Conditions 2012**

*NOTICE ABOUT WEB LINKS IN THIS DOCUMENT:*
*The web links (both internal to our District and any external links to collaborating agencies) in this document are valid at the time of publication. However, the Wilmington District Regulatory Program web page addresses, as with other agency web sites, may change over the timeframe of the five-year Nationwide Permit renewal cycle, in response to policy mandates or technology advances. While we will make every effort to check on the integrity of our web links and provide re-direct pages whenever possible, we ask that you report any broken links to us so we can keep the page information current and usable. We apologize in advanced for any broken links that you may encounter, and we ask that you navigate from the regulatory home page (wetlands and stream permits) of the Wilmington District Corps of Engineers, to the "Permits" section of our web site to find links for pages that cannot be found by clicking directly on the listed web link in this document.*

# Final 2012 Regional Conditions for Nationwide Permits (NWP) in the Wilmington District

## 1.0 Excluded Waters

The Corps has identified waters that will be excluded from the use of all NWP's during certain timeframes. These waters are:

### 1.1 Anadromous Fish Spawning Areas

Waters of the United States identified by either the North Carolina Division of Marine Fisheries (NCDMF) or the North Carolina Wildlife Resources Commission (NCWRC) as anadromous fish spawning areas are excluded during the period between February 15 and June 30, without prior written approval from NCDMF or NCWRC and the Corps.

### 1.2 Trout Waters Moratorium

Waters of the United States in the twenty-five designated trout counties of North Carolina are excluded during the period between October 15 and April 15 without prior written approval from the NCWRC. (See Section 2.7 for a list of the twenty-five trout counties).

### 1.3 Sturgeon Spawning Areas as Designated by the National Marine Fisheries Service (NMFS)

Waters of the United States designated as sturgeon spawning areas are excluded during the period between February 1 and June 30, without prior written approval from the NMFS.

## * 2.0 Waters Requiring Additional Notification

The Corps has identified waters that will be subject to additional notification requirements for activities authorized by all NWP's. These waters are:

## * 2.1 Western NC Counties that Drain to Designated Critical Habitat

For proposed activities within Waters of the U.S. that require a Pre-Construction Notification pursuant to General Condition 31 (PCN) and are located in the sixteen counties listed below, applicants must provide a copy of the PCN to the US Fish and Wildlife Service, 160 Zillicoa Street, Asheville, North Carolina 28801. This PCN must be sent concurrently to the US Fish and Wildlife Service and the Corps Asheville Regulatory Field Office. Please see General Condition 18 for specific notification requirements related to Federally Endangered Species and the following website for information on the location of designated critical habitat.

Counties with tributaries that drain to designated critical habitat that require notification to the Asheville US Fish and Wildlife Service: Avery, Cherokee, Forsyth, Graham, Haywood, Henderson, Jackson, Macon Mecklenburg, Mitchell, Stokes, Surry, Swain, Transylvania, Union and Yancey.

Website and office addresses for Endangered Species Act Information:

The Wilmington District has developed the following website for applicants which provides guidelines on how to review linked websites and maps in order to fulfill NWP general condition 18 requirements: http://www.saw.usace.army.mil/wetlands/ESA

Applicants who do not have internet access may contact the appropriate US Fish and Wildlife Service offices listed below or the US Army Corps of Engineers at (910) 251- 4633:

US Fish and Wildlife Service
Asheville Field Office
160 Zillicoa Street
Asheville, NC 28801
Telephone: (828) 258-3939

Asheville US Fish and Wildlife Service Office counties: All counties west of and including Anson, Stanly, Davidson, Forsyth and Stokes Counties

US Fish and Wildlife Service
Raleigh Field Office
Post Office Box 33726
Raleigh, NC 27636-3726
Telephone: (919) 856-4520

Raleigh US Fish and Wildlife Service Office counties: all counties east of and including Richmond, Montgomery, Randolph, Guilford, and Rockingham Counties.

* **2.2 Special Designation Waters**

Prior to the use of any NWP in any of the following identified waters and contiguous wetlands in North Carolina, applicants must comply with Nationwide Permit General Condition 31 (PCN). The North Carolina waters and contiguous wetlands that require additional notification requirements are:

"Outstanding Resource Waters" (ORW) or "High Quality Waters" (HQW) as designated by the North Carolina Environmental Management Commission; "Inland Primary Nursery Areas" (IPNA) as designated by the NCWRC; "Contiguous Wetlands" as defined by the North Carolina Environmental Management Commission; or "Primary Nursery Areas" (PNA) as designated by the North Carolina Marine Fisheries Commission.

**2.3 Coastal Area Management Act (CAMA) Areas of Environmental Concern**

Non-federal applicants for any NWP in a designated "Area of Environmental Concern" (AEC) in the twenty (20) counties of Eastern North Carolina covered by the North Carolina Coastal Area Management Act (CAMA) must also obtain the required CAMA permit. Development activities for non-federal projects may not commence until a copy of the approved CAMA permit is furnished to the appropriate Wilmington District Regulatory Field Office (Wilmington Field Office – 69 Darlington Avenue, Wilmington, NC 28403 or Washington Field Office – 2407 West 5th Street, Washington, NC 27889).

* **2.4 Barrier Islands**

Prior to the use of any NWP on a barrier island of North Carolina, applicants must comply with Nationwide Permit General Condition 31 (PCN).

* **2.5 Mountain or Piedmont Bogs**

Prior to the use of any NWP in a Bog classified by the North Carolina Wetland Assessment Methodology (NCWAM), applicants shall comply with Nationwide Permit General Condition 31 (PCN). The latest version of NCWAM is located on the NC DWQ web site at: http://portal.ncdenr.org/web/wq/swp/ws/pdu/ncwam .

* **2.6 Animal Waste Facilities**

Prior to use of any NWP for construction of animal waste facilities in waters of the US, including wetlands, applicants shall comply with Nationwide Permit General Condition 31 (PCN).

* **2.7 Trout Waters**

Prior to any discharge of dredge or fill material into streams or waterbodies within the twenty-five (25) designated trout counties of North Carolina, the applicant shall comply with Nationwide Permit General Condition 31 (PCN). The applicant shall also provide a copy of the notification to the appropriate NCWRC office to facilitate the determination of any potential

impacts to designated Trout Waters. Notification to the Corps of Engineers will include a statement with the name of the NCWRC biologist contacted, the date of the notification, the location of work, a delineation of wetlands, a discussion of alternatives to working in the mountain trout waters, why alternatives were not selected, and a plan to provide compensatory mitigation for all unavoidable adverse impacts to mountain trout waters.

NCWRC and NC Trout Counties

| | | | |
|---|---|---|---|
| Western Piedmont Region Coordinator | Alleghany | Caldwell | Watauga |
| 20830 Great Smoky Mtn. Expressway | Ashe | Mitchell | Wilkes |
| Waynesville, NC 28786 | Avery | Stokes | |
| Telephone: (828) 452-2546 | Burke | Surry | |

| | | | |
|---|---|---|---|
| Mountain Region Coordinator | Buncombe | Henderson | Polk |
| 20830 Great Smoky Mtn. Expressway | Cherokee | Jackson | Rutherford |
| Waynesville, NC 28786 | Clay | Macon | Swain |
| Telephone: (828) 452-2546 | Graham | Madison | Transylvania |
| Fax: (828) 452-7772 | Haywood | McDowell | Yancey |

**3.0 List of Corps Regional Conditions for All Nationwide Permits**

The following conditions apply to all Nationwide Permits in the Wilmington District:

**3.1 Limitation of Loss of Perennial Stream Bed**

NWPs may not be used for activities that may result in the loss or degradation of greater than 300 total linear feet of perennial, intermittent or ephemeral stream, unless the District Commander has waived the 300 linear foot limit for ephemeral and intermittent streams on a case-by-case basis and he determines that the proposed activity will result in minimal individual and cumulative adverse impacts to the aquatic environment. Loss of stream includes the linear feet of stream bed that is filled, excavated, or flooded by the proposed activity. Waivers for the loss of ephemeral and intermittent streams must be in writing and documented by appropriate/accepted stream quality assessments*. This waiver only applies to the 300 linear feet threshold for NWPs.

*NOTE: Applicants should utilize the most current methodology prescribed by Wilmington District to assess stream function and quality. Information can be found at:

http://www.saw.usace.army.mil/wetlands/permits/nwp/nwp2012 (see "Quick Links")

### 3.2 Mitigation for Loss of Stream Bed

For any NWP that results in a loss of more than 150 linear feet of perennial and/or ephemeral/intermittent stream, the applicant shall provide a mitigation proposal to compensate for more than minimal individual and cumulative adverse impacts to the aquatic environment. For stream losses less than 150 linear feet, that require a PCN, the District Commander may determine, on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effect on the aquatic environment.

### 3.3 Pre-construction Notification for Loss of Streambed Exceeding 150 Feet.

Prior to use of any NWP for any activity which impacts more than 150 total linear feet of perennial stream or ephemeral/ intermittent stream, the applicant must comply with Nationwide Permit General Condition 31 (PCN). This applies to NWPs that do not have specific notification requirements. If a NWP has specific notification requirements, the requirements of the NWP should be followed.

### 3.4 Restriction on Use of Live Concrete

For all NWPs which allow the use of concrete as a building material, live or fresh concrete, including bags of uncured concrete, may not come into contact with the water in or entering into waters of the US. Water inside coffer dams or casings that has been in contact with wet concrete shall only be returned to waters of the US when it is no longer poses a threat to aquatic organisms.

### 3.5 Requirements for Using Riprap for Bank Stabilization

For all NWPs that allow for the use of riprap material for bank stabilization, the following measures shall be applied:

**3.5.1.** Filter cloth must be placed underneath the riprap as an additional requirement of its use in North Carolina waters.

**3.5.2.** The placement of riprap shall be limited to the areas depicted on submitted work plan drawings.

**3.5.3.** The riprap material shall be clean and free from loose dirt or any pollutant except in trace quantities that would not have an adverse environmental effect.

**3.5.4.** It shall be of a size sufficient to prevent its movement from the authorized alignment by natural forces under normal conditions.

**3.5.5.** The riprap material shall consist of clean rock or masonry material such as, but not limited to, granite, marl, or broken concrete.

**3.5.6.** A waiver from the specifications in this Regional Condition may be requested in writing. The waiver will only be issued if it can be demonstrated that the impacts of complying with this Regional condition would result in greater adverse impacts to the aquatic environment.

**3.6 Safe Passage Requirements for Culvert Placement**

For all NWPs that involve the construction/installation of culverts, measures will be included in the construction/installation that will promote the safe passage of fish and other aquatic organisms. The dimension, pattern, and profile of the stream above and below a pipe or culvert should not be modified by widening the stream channel or by reducing the depth of the stream in connection with the construction activity. The width, height, and gradient of a proposed culvert should be such as to pass the average historical low flow and spring flow without adversely altering flow velocity. Spring flow should be determined from gage data, if available. In the absence of such data, bankfull flow can be used as a comparable level.

In the twenty (20) counties of North Carolina designated as coastal counties by the Coastal Area Management Act (CAMA): All pipes/culverts must be sufficiently sized to allow for the burial of the bottom of the pipe/culvert at least one foot below normal bed elevation when they are placed within the Public Trust Area of Environmental Concern (AEC) and/or the Estuarine Waters AEC as designated by CAMA, and/or all streams appearing as blue lines on United States Geological Survey (USGS) 7.5-minute quadrangle maps.

In all other counties: Culverts greater than 48 inches in diameter will be buried at least one foot below the bed of the stream. Culverts 48 inches in diameter or less shall be buried or placed on the stream bed as practicable and appropriate to maintain aquatic passage, and every effort shall be made to maintain the existing channel slope. The bottom of the culvert must be placed at a

depth below the natural stream bottom to provide for passage during drought or low flow conditions.

Culverts are to be designed and constructed in a manner that minimizes destabilization and head cutting. Destabilizing the channel and head cutting upstream should be considered and appropriate actions incorporated in the design and placement of the culvert.

A waiver from the depth specifications in this condition may be requested in writing. The waiver will be issued if it can be demonstrated that the proposal would result in the least impacts to the aquatic environment.

All counties: Culverts placed within riparian and/or riverine wetlands must be installed in a manner that does not restrict the flow and circulation patterns of waters of the United States. Culverts placed across wetland fills purely for the purposes of equalizing surface water do not have to be buried.

**3.7 Notification to NCDENR Shellfish Sanitation Section**

Applicants shall notify the NCDENR Shellfish Sanitation Section prior to dredging in or removing sediment from an area closed to shell fishing where the effluent may be released to an area open for shell fishing or swimming in order to avoid contamination from the disposal area and cause a temporary shellfish closure to be made. Such notification shall also be provided to the appropriate Corps of Engineers Regulatory Field Office. Any disposal of sand to the ocean beach should occur between November 1 and April 30 when recreational usage is low. Only clean sand should be used and no dredged sand from closed shell fishing areas may be used. If beach disposal were to occur at times other than stated above or if sand from a closed shell fishing area is to be used, a swimming advisory shall be posted, and a press release shall be issued by the permittee.

**3.8 Preservation of Submerged Aquatic Vegetation**

Adverse impacts to Submerged Aquatic Vegetation (SAV) are not authorized by any NWP within any of the twenty coastal counties defined by North Carolina's Coastal Area Management Act of 1974 (CAMA).

**3.9 Sedimentation and Erosion Control Structures and Measures**

**3.9.1.** All PCNs will identify and describe sedimentation and erosion control structures and measures proposed for placement in waters of the US. The structures and measures should be depicted on maps, surveys or drawings showing location and impacts to jurisdictional wetlands and streams.

## 4.0 Additional Regional Conditions for Specific Nationwide Permits

### 4.1 NWP #14 - Linear Transportation Crossings

**4.1.1**. If appropriate, applicants shall employ natural channel design (see definition below and NOTE below) to the maximum extent practicable for stream relocations. In the event it is not appropriate to employ natural channel design, any stream relocation shall be considered a permanent impact and the applicant shall provide a mitigation plan to compensate for the loss of aquatic function associated with the proposed activity.

Natural Channel Design: A geomorphologic approach to stream restoration based on an understanding of valley type, general watershed conditions, dimension, pattern, profile, hydrology and sediment transport of natural, stable channels (reference condition) and applying this understanding to the reconstruction of a stable channel.
NOTE: For projects located within the Coastal Plain ecoregion of North Carolina and within headwater areas across the state, applicants should reference the following links for more information regarding appropriate stream design:

http://www.saw.usace.army.mil/wetlands/permits/nwp

**4.1.2**. Bank-full flows (or less) shall be accommodated through maintenance of the existing bank-full channel cross sectional area. Additional culverts at such crossings shall be allowed only to receive flows exceeding bank-full.

**4.1.3.** Where adjacent floodplain is available, flows exceeding bank-full should be accommodated by installing culverts at the floodplain elevation.

**4.1.4**. This NWP authorizes only upland to upland crossings and cannot be used in combination with Nationwide Permit 18 to create an upland within waters of the United States, including wetlands.

**4.1.5.** This NWP cannot be used for private projects located in tidal waters or tidal wetlands.

**4.1.6.** Excavation of existing stream channels shall be limited to the minimum necessary to construct or install the proposed culvert. The final width of the impacted streams at the culvert inlet and outlet should be no greater than the original stream width. A waiver from this condition may be requested in writing. The waiver will be issued if it can be demonstrated that it is not

practicable to limit the final width of the culvert to that of the impacted stream at the culvert inlet and outlet and the proposed design would result in less impacts to the aquatic environment.

Water Resources
ENVIRONMENTAL QUALITY

PAT MCCRORY
Governor

DONALD R. VAN DER VAART
Secretary

S. JAY ZIMMERMAN
Director

January 15, 2016
Wake County
NCDWR Project No. 20151246
Bridges 227 & 213 on US 401/70
TIPs B-5121 & B-5317

**APPROVAL of 401 WATER QUALITY CERTIFICATION and NEUSE BUFFER AUTHORIZATION, with ADDITIONAL CONDITIONS**

Mr. Colin Mellor, Group Leader
NCDOT PDEA
1598 Mail Service Center
Raleigh NC 27695-1598

Dear Mr. Mellor:

You have our approval, in accordance with the conditions listed below, for the following impacts for the purpose of replacing Bridges 227 and 213 in Wake County:

**Stream Impacts in the Neuse River Basin**

| Site | Riprap Stabilization to Perennial Stream (linear ft) | Temporary Impact to Perennial Stream (linear ft) | Total Stream Impact (linear ft) |
|---|---|---|---|
| 1 | 12 | 91 | 103 |
| 2 | 0 | 69 | 69 |
| 3 | 9 | 11 | 20 |
| **Total** | **21** | **171** | **192** |

**Total Stream Impact for Project: 192 linear feet.**

**Neuse Riparian Buffer Impacts**

| Site | Zone 1 Impact (sq ft) | Zone 1 Buffer Mitigation Required (using 3:1 ratio) | Zone 2 Impact (sq ft) | Zone 2 Buffer Mitigation Required (using 1.5:1 ratio) |
|---|---|---|---|---|
| 1 | 136 | N/A | 0 | N/A |
| 2 | 1823 | N/A | 0 | N/A |
| 3A | 3522 | N/A | 1690 | N/A |
| 3B Crossing | 4704 | N/A | 1603 | N/A |
| 3B Parallel | 1282 | 3846 | 734 | 1101 |
| 4 | 3321 | N/A | 803 | N/A |
| **Totals** | **14788** | **3846** | **4830** | **1101** |

* n/a = Site impact Allowable, no mitigation required
**Total Buffer Impact for Project: 19618 square feet.**

The project shall be constructed in accordance with your application received December 2, 2015 and revised January 12, 2016. After reviewing your application, we have decided that these impacts are covered by General Water Quality Certification Number 3886. This certification corresponds to the Nationwide Permit 14 issued by the Corps of Engineers. This approval is also valid for the Neuse Riparian Buffer Rules (15A NCAC 2B .0233). In addition, you should acquire any other federal, state or local permits before you proceed with your project including (but not limited to) Sediment and Erosion Control, Non-Discharge and Water Supply Watershed regulations. This approval will expire with the accompanying 404 permit.

This approval is valid solely for the purpose and design described in your application (unless modified below). Should your project change, you must 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 total wetland fills for this project (now or in the future) exceed one acre, or of total impacts to streams (now or in the future) exceed 150 linear feet, compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7). Additional buffer impacts may require compensatory mitigation as described in 15A NCAC 2B.0233. For this approval to remain valid, you must adhere to the conditions listed in the attached certification and any additional conditions listed below.

* **Conditions of Certification:**

1. Compensatory mitigation for impacts to 1282 square feet of protected riparian buffers in Zone 1 and 734 square feet of protected buffers in Zone 2 shall be required. We understand that you have chosen to perform compensatory mitigation for these impacts through the use of debiting credits from the Marks Creek Mitigation Site. This approval confirms the debit of 4947 square feet of buffer restoration from the Marks Creek Mitigation Site in Wake County.

2. 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. [15A NCAC 02H .0506(b)(2)]

3. As a condition of this 401 Water Quality Certification, the bridge demolition and construction must be accomplished in strict compliance with the most recent version of NCDOT's Best Management Practices for Construction and Maintenance Activities. [15A NCAC 02H .0507(d)(2) and 15A NCAC 02H .0506(b)(5)]

4. 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*. [15A NCAC 02H .0507(d)(2) and 15A NCAC 02H .0506(b)(5)]

5. No drill slurry or water that has been in contact with uncured concrete shall be allowed to enter surface waters. This water shall be captured, treated, and disposed of properly. [15A NCAC 02H .0506(b)(3)]

6. A turbidity curtain will be installed in the stream if driving or drilling activities occur within the stream channel, on the stream bank, or within 5 feet of the top of bank. This condition can be waived with prior approval from the NCDWR. [15A NCAC 02H .0506(b)(3)]

7. Unless otherwise approved in this certification, placement of culverts and other structures in open waters and streams, 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 the NCDWR. If this condition is unable to be met due to bedrock or other limiting features encountered during construction, please contact the NCDWR for guidance on how to proceed and to determine whether or not a permit modification will be required. [15A NCAC 02H.0506(b)(2)]

8. 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. [15A NCAC 02H.0506(b)(2)]

9. For streams being impacted due to site dewatering activities, the site shall be graded to its preconstruction contours and revegetated with appropriate native species. [15A NCAC 02H.0506(b)(2)]

10. All riparian buffers impacted by the placement of temporary fill or clearing activities shall be restored to the preconstruction contours and revegetated. Maintained buffers shall be permanently revegetated with non-woody species by the end of the growing season following completion of construction. For the purpose of this condition, maintained buffer areas are defined as areas within the transportation corridor that will be subject to regular NCDOT maintenance activities including mowing. The area with non-maintained buffers shall be permanently revegetated with native woody species before the next growing season following completion of construction. [15A NCAC 2B.0233]

11. Pursuant to 15A NCAC 2B.0233, sediment and erosion control devices shall not be placed in Zone 1 of any Neuse Buffer without prior approval by the NCDWR. At this time, the NCDWR has approved no sediment and erosion control devices in Zone 1, outside of the approved project impacts, anywhere on this project. Moreover, sediment and erosion control devices shall be allowed in Zone 2 of the buffers provided that Zone 1 is not compromised and that discharge is released as diffuse flow.

12. 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. [15A NCAC 02B.0200]

13. 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. [15A NCAC 02H.0506(b)(2)]

14. 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. [15A NCAC 02H.0506(b)(2)]

15. All portions of the proposed project draining to 303(d) listed watersheds that are impaired due to turbidity shall be designed, constructed, and operated with sediment and erosion control measures that meet Design Standards in Sensitive Watersheds (15A NCAC 4B .0124). However, due to the size of the project, NC DOT shall not be required to meet 15A NCAC 4B .0124(a) regarding the maximum amount of uncovered acres.

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. [15A NCAC 02H.0506(b)(2)]

17. 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. [15A NCAC 02H.0506(b)(3) and (c)(3)]

18. 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. [15A NCAC 02H.0506(b)(3)]

19. 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. [15A NCAC 02H.0506(b)(3)]

20. No rock, sand or other materials shall be dredged from the stream channel except where authorized by this certification. [15A NCAC 02H.0506(b)(3)]

21. Discharging hydroseed mixtures and washing out hydroseeders and other equipment in or adjacent to surface waters is prohibited. [15A NCAC 02H.0506(b)(3)]

22. 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 the NCDWR 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, the NCDWR may reevaluate and modify this certification. [15A NCAC 02B.0200]

23. A copy of this Water Quality Certification shall be maintained on 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. [15A NCAC 02H .0507(c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

24. 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. [15A NCAC 02H.0501 and .0502]

25. 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.

* 26. The Permittee shall report any violations of this certification to the Division of Water Resources within 24 hours of discovery. [15A NCAC 02B.0506(b)(2)]

27. Upon completion of the project (including any impacts at associated borrow or waste sites), the NCDOT Division Engineer shall complete and return the enclosed "Certification of Completion Form" to notify the NCDWR when all work included in the 401 Certification has been completed. [15A NCAC 02H.0502(f)]

28. Native riparian vegetation (i.e., trees and shrubs native to your geographic region) must be reestablished in the riparian areas within the construction limits of the project by the end of the growing season following completion of construction. [15A NCAC 02B.0506(b)(2)]

29. 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.[15A NCAC 02H.0506(b)(3) and (c)(3)]

30. 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 [15A NCAC 02H.0506(b)(3) and (c)(3)]:

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.

31. Sediment and erosion control measures shall not be placed in wetlands or waters unless otherwise approved by this Certification. [15A NCAC 02H.0506(b)(3) and (c)(3)]

32. The Permittee shall ensure that the final design drawings adhere to the permit and to the permit drawings submitted for approval. [15A NCAC 02H .0507 (c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

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 DEQ as follows:

Mr. Sam M. Hayes, General Counsel
Department of Environmental Quality
1601 Mail Service Center

This letter completes the review of the Division of Water Resources under Section 401 of the Clean Water Act. If you have any questions, please contact Rob Ridings at 919-707-8786.

Sincerely,

S. Jay Zimmerman, Director
Division of Water Resources

Electronic copy only distribution:
Eric Alsmeyer, US Army Corps of Engineers, Raleigh Field Office
Chris Murray, Division 5 Environmental Officer
Chris Rivenbark, NC Department of Transportation
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# Water Quality Certification No. 3886

## GENERAL CERTIFICATION FOR PROJECTS ELIGIBLE FOR U.S. ARMY CORPS OF ENGINEERS NATIONWIDE PERMIT NUMBER 14 (LINEAR TRANSPORTATION PROJECTS) AND REGIONAL GENERAL PERMIT 198200031 (WORK ASSOCIATED WITH BRIDGE CONSTRUCTION, MAINTENANCE OR REPAIR CONDUCTED BY NCDOT OR OTHER GOVERNMENT AGENCIES) AND RIPARIAN AREA PROTECTION RULES (BUFFER RULES)

Water Quality Certification Number 3886 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 15A NCAC 02H .0500 and 15A NCAC 02B .0200 for the discharge of fill material to waters and adjacent wetland areas or to wetland areas that are not a part of the surface tributary system to interstate waters or navigable waters of the United States (as described in 33 CFR 330 Appendix A (B) (14) of the Corps of Engineers regulations (Nationwide Permit No. 14 and Regional General Permit 198200031) and for the Riparian Area Protection Rules (Buffer Rules) in 15A NCAC 02B .0200.

The State of North Carolina certifies that the specified category of activity will not violate applicable portions of Sections 301, 302, 303, 306 and 307 of the Public Laws 92-500 and 95-217 if conducted in accordance with the conditions hereinafter set forth.

* Any proposed fill or modification of wetlands and/or waters, including streams, under this General Certification requires application to, and written approval from the Division of Water Quality except for the single family lot exemption described below.

**Activities meeting any one (1) of the following thresholds or circumstances require *written approval* for a 401 Water Quality Certification from the Division of Water Quality (the "Division"):**

a) Any temporary or permanent impacts to wetlands, open waters and/or streams, including stream relocations, except for construction of a driveway to a single family lot as long as the driveway involves *less than 25 feet* of temporary and/or permanent stream channel impacts, including any in-stream stabilization needed for the crossing; or
b) Any impact associated with a high density project (as defined in Item (A)(iv) of the ***401 Stormwater Requirements***) that is not subject to either a state stormwater program (such as, but not limited to, Coastal Counties, HQW, ORW or state-implemented Phase II NPDES) or a certified community's stormwater program; or
c) Any impact associated with a Notice of Violation or an enforcement action for violation(s) of DWQ Wetland Rules (15A NCAC 02H .0500), Isolated Wetland Rules (15A NCAC 02H .1300), DWQ Surface Water or Wetland Standards, or Riparian Buffer Rules (15A NCAC 02B .0200); or
* d) Any impacts to streams and/or buffers in the Neuse, Tar-Pamlico, or Catawba River Basins or in the Randleman, Jordan or Goose Creek Watersheds (or any other basin or watershed with Riparian Area Protection Rules [Buffer Rules] in effect at the time of application) *unless* the activities are listed as "EXEMPT" from these rules or a Buffer Authorization Certificate is issued through N.C. Division of Coastal Management (DCM) delegation for "ALLOWABLE" activities.

* In accordance with North Carolina General Statute 143-215.3D(e), written approval for a 401 Water Quality General Certification must include the appropriate fee. If a project also requires a CAMA Permit, then one payment to both agencies shall be submitted and will be the higher of the two fees.

**Activities included in this General Certification that do not meet one of the thresholds listed above do not require written approval from the Division as long as they comply with**

**the Conditions of Certification listed below. If any of these Conditions cannot be met, then written approval from the Division is required.**

Conditions of Certification:

1. No Impacts Beyond those Authorized in the Written Approval or Beyond the Threshold of Use of this Certification

   No waste, spoil, solids, or fill of any kind shall occur in wetlands, waters, or riparian areas beyond the footprint of the impacts depicted in the Pre-Construction Notification, as authorized in the written approval from the Division or beyond the thresholds established for use of this Certification without written authorization, including incidental impacts. All construction activities, including the design, installation, operation, and maintenance of sediment and erosion control Best Management Practices shall be performed so that no violations of state water quality standards, statutes, or rules occur. Approved plans and specifications for this project are incorporated by reference and are enforceable parts of this permit.

2. Standard Erosion and Sediment Control Practices

   Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices and if applicable, comply with the specific conditions and requirements of the NPDES Construction Stormwater Permit issued to the site:

   a. Design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal or exceed the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*. The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.

   b. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*.

   c. Reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act and the Mining Act of 1971.

   d. Sufficient materials required for stabilization and/or repair of erosion control measures and stormwater routing and treatment shall be on site at all times.

   e. If the project occurs in waters or watersheds classified as Primary Nursery Areas (PNAs), SA, WS-I, WS-II, High Quality (HQW), or Outstanding Resource (ORW) waters, then the sedimentation and erosion control designs must comply with the requirements set forth in 15A NCAC 04B .0124, *Design Standards in Sensitive Watersheds*.

3. No Sediment and Erosion Control Measures in Wetlands or Waters

Sediment and erosion control measures shall not be placed in wetlands or waters. Exceptions to this condition require application submittal to and written approval by the Division. If placement of sediment and erosion control devices in wetlands and waters is unavoidable, then design and placement of temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands, stream beds, or banks, adjacent to or upstream and downstream of the above structures. All sediment and erosion control devices shall be removed and the natural grade restored within two (2) months of the date that the Division of Land Resources (DLR) or locally delegated program has released the specific area within the project.

4. Construction Stormwater Permit NCG010000

An NPDES Construction Stormwater Permit is required for construction projects that disturb one (1) or more acres of land. This Permit allows stormwater to be discharged during land disturbing construction activities as stipulated in the conditions of the permit. If your project is covered by this permit, full compliance with permit conditions including the erosion & sedimentation control plan, inspections and maintenance, self-monitoring, record keeping and reporting requirements is required. A copy of the general permit (NCG010000), inspection log sheets, and other information may be found at http://portal.ncdenr.org/web/wq/ws/su/npdesswf#tab-w

The North Carolina Department of Transportation (NCDOT) shall be required to be in full compliance with the conditions related to construction activities within the most recent version of their individual NPDES (NCS000250) stormwater permit.

5. Construction Moratoriums and Coordination

If activities must occur during periods of high biological activity (i.e. sea turtle nesting, fish spawning, or bird nesting), then biological monitoring may be required at the request of other state or federal agencies and coordinated with these activities.

All moratoriums on construction activities established by the NC Wildlife Resources Commission (WRC), US Fish and Wildlife Service (USFWS), NC Division of Marine Fisheries (DMF), or National Marine Fisheries Service (NMFS) to lessen impacts on trout, anadromous fish, larval/post-larval fishes and crustaceans, or other aquatic species of concern shall be implemented. Exceptions to this condition require written approval by the resource agency responsible for the given moratorium.

Work within the twenty-five (25) designated trout counties or identified state or federal endangered or threatened species habitat shall be coordinated with the appropriate WRC, USFWS, NMFS, and/or DMF personnel.

6. Work in the Dry

All work in or adjacent to stream waters shall be conducted so that the flowing stream does not come in contact with the disturbed area. Approved best management practices from the most current version of the NC Sediment and Erosion Control Manual, or the NC DOT Construction and Maintenance Activities Manual, such as sandbags, rock berms, cofferdams, and other diversion structures shall be used to minimize excavation in flowing water. Exceptions to this condition require application submittal to and written approval by the Division.

7. Riparian Area Protection (Buffer) Rules

   Activities located in the protected riparian areas (whether jurisdictional wetlands or not), within the Neuse, Tar-Pamlico, or Catawba River Basins or in the Randleman, Jordan, or Goose Creek Watersheds (or any other basin or watershed with buffer rules) shall be limited to "uses" identified within and constructed in accordance with 15A NCAC 02B .0233, .0259, .0243, .0250, .0267 and .0605, and shall be located, designed, constructed, and maintained to have minimal disturbance to protect water quality to the maximum extent practicable through the use of best management practices. All buffer rule requirements, including diffuse flow requirements, must be met.

8. If concrete is used during the construction, then all necessary measures shall be taken to prevent direct contact between uncured or curing concrete and waters of the state. Water that inadvertently contacts uncured concrete shall not be discharged to waters of the state due to the potential for elevated pH and possible aquatic life/ fish kills.

9. Bridge deck drains shall not discharge directly into the stream. Stormwater shall be directed across the bridge and pre-treated through site-appropriate means (grassed swales, pre-formed scour holes, vegetated buffers, etc.) before entering the stream. Please refer to the most current version of *Stormwater Best Management Practices*. Exceptions to this condition require written approval by the Division.

* 10. Compensatory Mitigation

   In accordance with 15A NCAC 02H .0506 (h), compensatory mitigation may be required for losses of equal to or greater than 150 linear feet of streams (intermittent and perennial) and/or equal to or greater than one (1) acre of wetlands. For linear public transportation projects, impacts equal to or exceeding 150 linear feet per stream shall require mitigation.

   Buffer mitigation may be required for any project with Buffer Rules in effect at the time of application for activities classified as "Allowable with Mitigation" or "Prohibited" within the Table of Uses.

   A determination of buffer, wetland, and stream mitigation requirements shall be made for any General Water Quality Certification for this Nationwide and/or Regional General Permit. Design and monitoring protocols shall follow the US Army Corps of Engineers Wilmington District *Stream Mitigation Guidelines* (April 2003) or its subsequent updates. Compensatory mitigation plans shall be submitted to the Division for written approval as required in those protocols. The mitigation plan must be implemented and/or constructed before any impacts occur on site. Alternatively, the Division will accept payment into an in-lieu fee program or a mitigation bank. In these cases, proof of payment shall be provided to the Division before any impacts occur on site.

11. Relocated stream designs should include the same dimensions, patterns, and profiles as the existing channel (or a stable reference reach if the existing channel is unstable), to the maximum extent practical. The new channel should be constructed in the dry and water shall not be turned into the new channel until the banks are stabilized. Vegetation used for bank stabilization shall be limited to native woody species, and should include establishment of a 30-foot wide wooded and an adjacent 20-foot wide vegetated buffer on both sides of the relocated channel to the maximum extent practical. A transitional phase incorporating appropriate erosion control matting materials and seedling establishment is allowable, however matting that incorporates plastic mesh and/or plastic twine shall not be used in wetlands, riparian buffers or floodplains as recommended by the North Carolina Sediment and Erosion Control Manual. Rip-rap, A-Jacks, concrete, gabions or other hard structures may be allowed if it is necessary to maintain the physical integrity of the stream; however, the applicant must provide written justification and any calculations used to determine the extent of rip-rap coverage. Please note that if the stream relocation is conducted as a stream restoration as defined in the US Army Corps of Engineers Wilmington District, April 2003 *Stream Mitigation Guidelines* (or its subsequent updates), the restored length may be used as compensatory mitigation for the impacts resulting from the relocation.

12. Stormwater Management Plan Requirements

    All applications shall address stormwater management throughout the entire project area per the 401 Stormwater Requirements, referenced herein as "**Attachment A**" at the end of this Certification.

13. Placement of Culverts and Other Structures in Waters and Wetlands

    Culverts required for this project shall be designed and installed in such a manner that the original stream profiles are not altered and allow for aquatic life movement during low flows. Existing stream dimensions (including the cross section dimensions, pattern, and longitudinal profile) must be maintained above and below locations of each culvert.

    Placement of culverts and other structures in waters and streams must be below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than or equal to 48 inches, to allow low flow passage of water and aquatic life.

    When topographic constraints indicate culvert slopes of greater than 5%, culvert burial is not required, provided that all alternative options for flattening the slope have been investigated and aquatic life movement/ connectivity has been provided when possible (rock ladders, crossvanes, etc). Notification to the Division including supporting documentation to include a location map of the culvert, culvert profile drawings, and slope calculations shall be provided to the Division 60 days prior to the installation of the culvert.

    When bedrock is present in culvert locations, culvert burial is not required provided that there is sufficient documentation of the presence of bedrock. Notification to the Division including supporting documentation such as, but not limited to, a location map of the culvert, geotechnical reports, photographs, etc shall be provided to the Division a minimum of 60 days prior to the installation of the culvert. If bedrock is discovered during construction, then the Division shall be notified by phone or email within 24 hours of discovery.

    If other site-specific topographic constraints preclude the ability to bury the culverts as described above and/or it can be demonstrated that burying the culvert would result in destabilization of the channel, then exceptions to this condition require application submittal to, and written approval by, the Division of Water Quality, regardless of the total impacts to streams or wetlands from the project.

Installation of culverts in wetlands must ensure continuity of water movement and be designed to adequately accommodate high water or flood conditions. Additionally, when roadways, causeways, or other fill projects are constructed across FEMA-designated floodways or wetlands, openings such as culverts or bridges must be provided to maintain the natural hydrology of the system as well as prevent constriction of the floodway that may result in destabilization of streams or wetlands.

The establishment of native, woody vegetation and other soft stream bank stabilization techniques must be used where practicable instead of riprap or other bank hardening methods.

14. All temporary fill and culverts shall be removed and the impacted area returned to natural conditions within 60 days of the determination that the temporary impact is no longer necessary. The impacted areas shall be restored to original grade, including each stream's original cross sectional dimensions, plan form pattern, and longitudinal bed and bed profile, and the various sites shall be stabilized with natural woody vegetation (except for the approved maintenance areas) and restored to prevent erosion.

15. All temporary pipes/ culverts/ riprap pads etc, shall be installed in all streams as outlined in the most recent edition of the *North Carolina Sediment and Erosion Control Planning and Design Manual* or the *North Carolina Surface Mining Manual* so as not to restrict stream flow or cause dis-equilibrium during use of this General Certification.

16. Any riprap required for proper culvert placement, stream stabilization, or restoration of temporarily disturbed areas shall be restricted to the area directly impacted by the approved construction activity. All rip-rap shall buried and/or "keyed in" such that the original stream elevation and streambank contours are restored and maintained. Placement of rip-rap or other approved materials shall not result in de-stabilization of the stream bed or banks upstream or downstream of the area.

17. Any rip-rap used for stream stabilization shall be of a size and density so as not to be able to be carried off by wave, current action, or stream flows and consist of clean rock or masonry material free of debris or toxic pollutants. Rip-rap shall not be installed in the streambed except in specific areas required for velocity control and to ensure structural integrity of bank stabilization measures.

18. A one-time application of fertilizer to re-establish vegetation is allowed in disturbed areas including riparian buffers, but is restricted to no closer than 10 feet from top of bank of streams. Any fertilizer application must comply with all other Federal, State and Local regulations.

19. If this Water Quality Certification is used to access building sites, then all lots owned by the applicant must be buildable without additional impacts to streams or wetlands. The applicant is required to provide evidence that the lots are buildable without requiring additional impacts to wetlands, waters, or buffers if required to do so in writing by the Division. For road construction purposes, this Certification shall only be utilized from natural high ground to natural high ground.

20. Deed notifications or similar mechanisms shall be placed on all retained jurisdictional wetlands, waters, and protective buffers within the project boundaries in order to assure compliance for future wetland, water, and buffer impact. These mechanisms shall be put in place at the time of recording of the property or of individual lots, whichever is appropriate. A sample deed notification can be downloaded from the 401/Wetlands Unit web site at http://portal.ncdenr.org/web/wq/swp/ws/401/certsandpermits/apply/forms. The text of the sample deed notification may be modified as appropriate to suit to a specific project. Documentation of deed notifications shall be provided to the Division upon request.

* 21. If an environmental document is required under the National or State Environmental Policy Act (NEPA or SEPA), then this General Certification is not valid until a Finding of No Significant Impact (FONSI) or Record of Decision (ROD) is issued by the State Clearinghouse.

22. In the twenty (20) coastal counties, the appropriate DWQ Regional Office must be contacted to determine if Coastal Stormwater Regulations will be required.

23. This General Certification does not relieve the applicant of the responsibility to obtain all other required Federal, State, or Local approvals.

24. The applicant/permittee and their authorized agents shall conduct all activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act), and any other appropriate requirements of State and Federal Law. If the Division determines that such standards or laws are not being met, including failure to sustain a designated or achieved use, or that State or Federal law is being violated, or that further conditions are necessary to assure compliance, then the Division may reevaluate and modify this General Water Quality Certification.

* 25. When written authorization is required for use of this certification, upon completion of all permitted impacts included within the approval and any subsequent modifications, the applicant shall be required to return the certificate of completion attached to the approval. One copy of the certificate shall be sent to the DWQ Central Office in Raleigh at 1650 Mail Service Center, Raleigh, NC, 27699-1650.

26. Additional site-specific conditions, including monitoring and/or modeling requirements, may be added to the written approval letter for projects proposed under this Water Quality Certification in order to ensure compliance with all applicable water quality and effluent standards.

27. This certification grants permission to the director, an authorized representative of the Director, or DENR staff, upon the presentation of proper credentials, to enter the property during normal business hours.

This General Certification shall expire on the same day as the expiration date of the corresponding Nationwide and/or Regional General Permit. The conditions in effect on the date of issuance of Certification for a specific project shall remain in effect for the life of the project, regardless of the expiration date of this Certification.

Non-compliance with or violation of the conditions herein set forth by a specific project may result in revocation of this General Certification for the project and may also result in criminal and/or civil penalties.

The Director of the North Carolina Division of Water Quality may require submission of a formal application for Individual Certification for any project in this category of activity if it is determined that the project is likely to have a significant adverse effect upon water quality, including state or federally listed endangered or threatened aquatic species, or degrade the waters so that existing uses of the wetland or downstream waters are precluded.

Public hearings may be held for specific applications or group of applications prior to a Certification decision if deemed in the public's best interest by the Director of the North Carolina Division of Water Quality.

Effective date: March 19, 2012

DIVISION OF WATER QUALITY

By

for

Charles Wakild, P.E.

Director

*History Note: Water Quality Certification (WQC) Number 3886 issued March 12, 2012 replaces WQC Number 3820 issued April 6, 2010; WQC Number 3627 issued March 2007; WQC Number 3404 issued March 2003; WQC Number 3375 issued March 18, 2002; WQC Number 3289 issued June 1, 2000; WQC Number 3103 issued February 11, 1997; WQC Number 2732 issued May 1, 1992; WQC Number 2666 issued January 21, 1992; WQC Number 2177 issued November 5, 1987. This WQC is rescinded when the Corps of Engineers reauthorizes any of the corresponding Nationwide and/or Regional General Permits or when deemed appropriate by the Director of the Division of Water Quality.*

**Attachment A: 401 Stormwater Requirements**

The requirements listed below shall be implemented in order to comply with Condition 12 of this General Certification. For the North Carolina Department of Transportation, compliance with NCDOT's Individual NPDES permit NCS000250 shall serve to satisfy the 401 and Isolated Wetland Stormwater Requirements.[1]

A. **Design and Implementation Requirements.** All projects, regardless of project area, amount of built-upon area or amount of jurisdictional impact, shall meet the following stormwater design requirements:

i. **Non-Erosive Discharge to Streams and Wetlands.** Stormwater conveyances that discharge to streams and wetlands must discharge at a non-erosive velocity prior to entering the stream or wetland during the peak flow from the ten-year storm.[2]

ii. **Vegetated Setbacks.** A 30-foot wide vegetated setback must be maintained adjacent to streams, rivers and tidal waters in areas that are not subject to a state Riparian Area Protection Rule or other more stringent vegetated setback requirements. The width of the setback shall be measured horizontally from the normal pool elevation of impounded structures, the top-of-bank of streams and rivers, and the mean high waterline of tidal waters, perpendicular to shoreline. Vegetated setback and filters required by state rules or local governments may be met concurrently with this requirement and may contain coastal, isolated or 404 jurisdictional wetlands. Non-jurisdictional portions of the vegetated setback may be cleared and graded, but must be planted with and maintained in grass or other vegetative or plant material.[3]

iii. **Construction and Operation.** The stormwater management plan must be constructed and operational before any permanent building or other structure is occupied or utilized at the site. The stormwater management plan, including drainage patterns, must be maintained in perpetuity.[4]

iv. **Coordination with Other Stormwater Programs.** Projects that are subject to another Division of Water Quality (DWQ) stormwater program, including (but not limited to) the 20 Coastal Counties, HQW, ORW or state-implemented Phase II NPDES, or a Certified Community's stormwater management program, must be constructed and maintained in compliance with the approved stormwater management plan.[5]

v. **Stormwater Design Requirements for Projects Not Covered Under Item (iv).** Projects that are not subject to another DWQ stormwater program or a Certified Community's stormwater program shall meet all of the following requirements:

a. **Low Density.** A site is low density if all the following requirements are met:

1. The development has a built upon area of twenty-four percent (24%) or less, considering both current and future development. When determining the amount of built upon area, coastal wetlands shall be included; however, ponds, lakes and rivers as specified in North Carolina's Schedule of Classifications shall be excluded. If a portion of project has a density greater than 24%, the higher density area must be located in an upland area and away from surface waters and drainageways to the maximum extent practicable.[6]

2. All stormwater runoff from the built upon areas is transported primarily via vegetated conveyances designed in accordance with the most recent version of the *NC DWQ Stormwater Best Management Practices Manual*. Alternative designs may be approved if the applicant can show that the design provides

equal or better water quality protection than the practices specified in the manual. The project must not include a stormwater collection system (such as piped conveyances) as defined in 15A NCAC 02B .0202(60).[7]

b. **High Density.** Projects that do not meet the Low Density requirements shall meet the following requirements:

1. Stormwater runoff from the entire site must be treated by structural stormwater controls (BMPs) that are designed to remove eighty-five percent (85%) of the average annual amount of Total Suspended Solids (TSS). Stormwater runoff that drains directly to Nutrient Sensitive Waters (NSW) must also be treated to remove thirty percent (30%) of Total Nitrogen (TN) and Total Phosphorus (TP).[8]

2. All BMPs must be designed in accordance with the version of the *NC DWQ Stormwater Best Management Practices Manual* that is in place on the date of stormwater management plan submittal. Alternative designs may be approved if the applicant can show that the design provides equal or better water quality protection than the practices specified in the manual.[9]

3. DWQ may add specific stormwater management requirements on a case-by-case basis in order to ensure that a proposed activity will not violate water quality standards.[10]

4. DWQ may approve Low Impact Developments (LIDs) that meet the guidance set forth in the *Low Impact Development: A Guidebook for North Carolina.*[11]

5. Proposed new development undertaken by a local government solely as a public road project shall follow the requirements of the NC DOT BMP Toolbox rather than Items (1)-(4) above.[12]

B. **Submittal Requirements.** The submittal requirements listed below apply only to projects that require written authorization as indicated in the applicable General Certification as well as projects that require an Isolated Wetlands Permit. **Any required documentation shall be sent to the Wetlands, Buffers and Stormwater Compliance and Permitting Unit at 1650 Mail Service Center, Raleigh, NC 27699-1650.**

i. **Projects that are Subject to Another DWQ Stormwater Program:** If the project is subject to another DWQ stormwater program, such as the 20 Coastal Counties, HQW, ORW or state-implemented Phase II NPDES, then the applicant shall submit a copy of the stormwater approval letter before any impacts occur on site.[13]

ii. **Projects that are Subject to a Certified Community's Stormwater Program.** If the project is subject to a certified local government's stormwater program, then the applicant shall submit one set of approved stormwater management plan details and calculations with documentation of the local government's approval before any impacts occur on site.[5]

iii. **Projects Not Covered Under Items (i) or (ii).** If the project is not subject to another DWQ Stormwater Program or a Certified Community's stormwater program, then it shall be reviewed and approved by the DWQ through the Water Quality Certification authorization process.

a. **Low Density.** For low density projects, the applicant shall submit two copies of the DWQ Low Density Supplement Form with all required items.[13]

b. **High Density.** For high density projects, the applicant shall submit two copies of a DWQ BMP Supplement Form and all required items at the specified scales for each BMP that is proposed.[13]

iv. **Phasing.** Stormwater management plans may be phased on a case-by-case basis, with the submittal of a final stormwater management plan per Items (i)-(iii) above required for the current phase and a conceptual stormwater management plan for the future phase(s). The stormwater management plan for each future phase must be approved by the appropriate entity before construction of that phase is commenced. The approved stormwater management plan for each future phase must be constructed and operational before any permanent building or other structure associated with that phase is occupied.[14]

v. **Stormwater Management Plan Modifications.** The stormwater management plan may not be modified without prior written authorization from the entity that approved the plan. If the project is within a Certified Community, then the applicant shall submit one set of approved stormwater management plan details and calculations with documentation of the local government's approval for record-keeping purposes. If the project is subject to DWQ review, then the applicant shall submit two copies of the appropriate Supplement Forms per Item (iii) above for any BMPs that have been modified for DWQ's review and approval.[15]

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[1] The stormwater requirement for 401 applications is codified in 15A NCAC 02H .0506(b)(5) and (c)(5).

[2] Non erosive discharge rates are required in SL 2008-211§2(b)(1). The 10-year design storm standard is codified in 15A NCAC 02H .1008(f)(2) and .1008(g)(1).

[3] 30-foot vegetated setbacks are required in SL 2006-246§9(d), SL 2008-211§2(b), 15A NCAC 02H .1006(2)(c) and .1007(1)(a).

[4] Construction and maintenance of the stormwater plan is necessary to satisfy 15A NCAC 02H .0506(b)(5).

[5] Conveys application procedure to streamline the permitting process and reduce any unnecessary duplication in the review of stormwater management plans.

[6] Low density built upon area thresholds are set in SL 2006-246§9(c) and SL 2008-211§2(b).

[7] The requirement for low density development to use vegetated conveyances is codified in SL 2006-246§9(c), SL 2008-211§2(b), 15A NCAC 02H .1006(2)(b) and .1007(1)(a). The Stormwater BMP Manual is also referenced in 15A NCAC 02B .0265(3)(a) and .0277(4)(e).

[8] 85% TSS removal is required in SL 2006-246§9(d), SL 2008-211§2(b), 15A NCAC 02H .1006(2)(c), 15A NCAC 02H .1007(1)(a). The 30% TN and TP removal requirements for NSW waters are set forth in 15A NCAC 02B .0232, 15A NCAC 02B .0257(a)(1), 15A NCAC 02B .0265(3)(a) and 15A NCAC 02B .0277(4).

[9] The Stormwater BMP Manual is also referenced in 15A NCAC 02B .0265(3)(a) and .0277(4)(e).

[10] The requirement for DWQ to ensure that water quality standards are protected before issuing a 401 certification is codified in 15A NCAC 02H .0506.

[11] The LID Toolbox is also referenced in 15A NCAC 02B .0277(4)(g).

[12] The term "public road project" is defined in15A NCAC 02B .0265(3)(a).

[13] Conveys application procedure to streamline the permitting process.

[14] Phased development is addressed as a "common plan of development" in 15A NCAC 02H .1003(3).

[15] Procedures for modifying stormwater plans are set forth in 15A NCAC 02H .1011.

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a) Any temporary or permanent impacts to wetlands, open waters and/or streams, including stream relocations, except for construction of a driveway to a single family lot as long as the driveway involves *less than 25 feet* of temporary and/or permanent stream channel impacts, including any in-stream stabilization needed for the crossing; or
b) Any impact associated with a high density project (as defined in Item (A)(iv) of the ***401 Stormwater Requirements***) that is not subject to either a state stormwater program (such as, but not limited to, Coastal Counties, HQW, ORW or state-implemented Phase II NPDES) or a certified community's stormwater program; or
c) Any impact associated with a Notice of Violation or an enforcement action for violation(s) of DWQ Wetland Rules (15A NCAC 02H .0500), Isolated Wetland Rules (15A NCAC 02H .1300), DWQ Surface Water or Wetland Standards, or Riparian Buffer Rules (15A NCAC 02B .0200); or
d) Any impacts to streams and/or buffers in the Neuse, Tar-Pamlico, or Catawba River Basins or in the Randleman, Jordan or Goose Creek Watersheds (or any other basin or watershed with Riparian Area Protection Rules [Buffer Rules] in effect at the time of application) *unless* the activities are listed as "EXEMPT" from these rules or a Buffer Authorization Certificate is issued through N.C. Division of Coastal Management (DCM) delegation for "ALLOWABLE" activities.

In accordance with North Carolina General Statute 143-215.3D(e), written approval for a 401 Water Quality General Certification must include the appropriate fee. If a project also requires a CAMA Permit, then one payment to both agencies shall be submitted and will be the higher of the two fees.

**Activities included in this General Certification that do not meet one of the thresholds listed above do not require written approval from the Division as long as they comply with**

CONTRACT: C203751

TIP PROJECT: B-5121 / B-5317

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| N.C. | B-5121/B-5317 | 1 | |

| STATE PROJ. NO. | F.A. PROJ. NO. | DESCRIPTION |
|---|---|---|
| 42263.1.1 | BRNHS-0070(119) | P.E. (B-5121) |
| 46031.1.1 | BRSTP-0070(149) | P.E. (B-5317) |
| 42263.2.1 | BRNHS-0070(119) | R/W (B-5121/B-5317) |
| 42263.2.1 | BRNHS-0070(119) | UTL (B-5121/B-5317) |
| 42263.3.1 | BRNHS-0070(119) | CONST (B-5121/B-5317) |

SEE SHEET 1A FOR INDEX OF SHEETS
SEE SHEET 1B FOR CONVENTIONAL PLAN SHEET SYMBOLS

VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

# WAKE COUNTY

**LOCATION: BRIDGE NO. 227 ON US-70/US-401/NC-50 (CAPITAL BOULEVARD) OVER PEACE STREET AND BRIDGE NO. 213 ON US-70/NC-50 (WADE AVENUE) OVER US 401 (CAPITAL BOULEVARD)**

**TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES, CULVERT, SIGNALS, AND SIGNING**

PERMIT DRAWING
SHEET 1 OF 13
REVISED 01-07-16

## WETLAND AND SURFACE WATER IMPACTS PERMIT

★ TRAFFIC SIGNAL

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II
THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE CITY OF RALEIGH
THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS LIMITED TO POINTS AS SHOWN ON THE PLANS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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**GRAPHIC SCALES**

50 25 0 50 100 — PLANS

50 25 0 50 100 — PROFILE (HORIZONTAL)

10 5 0 10 20 — PROFILE (VERTICAL)

**DESIGN DATA**

AADT 2016 = 58,083
AADT 2036 = 70,416
K = 10%
D = 55%
T = 5%*
V = 40 MPH
CLASSIFICATION:
URBAN ARTERIAL
* 1% TTST 4% DUAL
STATEWIDE TIER

**PROJECT LENGTH**

| | | |
|---|---|---|
| LENGTH ROADWAY TIP PROJECT B-5121/B-5317 | = | 0.794 MILES |
| LENGTH STRUCTURE TIP PROJECT B-5121/B-5317 | = | 0.026 MILES |
| TOTAL LENGTH TIP PROJECT B-5121/B-5317 | = | 0.820 MILES |

PLANS PREPARED FOR THE NCDOT BY: Kimley»Horn

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JUNE 30, 2015

LETTING DATE: JUNE 21, 2016

JEFFREY W. MOORE, P.E.
PROJECT ENGINEER

J. JASON PACE, P.E.
PROJECT DESIGN ENGINEER

REKHA PATEL, P.E.
PROJECT ENGINEER
NCDOT ROADWAY DESIGN
ENGINEERING COORDINATION SECTION

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

1/04/2016

REVISIONS

1/04/2016

P-50

SITE 3
SITE 1
SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP
END APPROACH SLAB -FLYOVER- STA.21+99 +/-
END BRIDGE -FLYOVER- STA. 21+74 +/-
-FLYOVER- WADE AVE
BEGIN APPROACH SLAB -FLYOVER- STA 18+99 +/-
BEGIN BRIDGE -FLYOVER- STA 19+24 +/-
CAPITAL BLVD -L- US-401 N
23 HENRY J VANPALA DB 3865 - PG 46 BM 2008 - PG 2034
24 HORCO AUTO SALES DB 14908 - PG 1234 BM 1959 - PG 262
26 LISTON E & SUSAN S MALPASS DB 7807 - PG 382 BM 2003 - PG 964
27 JOYNERS REAL ESTATE HOLDINGS V LLC DB 15087 - PG 2007 BM 1959 - PG 262
28 ISABEL HUFMEYER DB 7807 - PG 382 BM 2003 - PG 964
29 SUZANNE ABERNETHY WILLIAM R RUGGLES DB 13227 - PG 452 BM 1958 - PG 10
END CONSTRUCTION -FLYOVER- POT Sta.25+76.00
BEGIN CONSTRUCTION -Y8- POT Sta.10+82.00
BEGIN CONSTRUCTION -Y9- POT Sta.18+52.00
BEGIN CONSTRUCTION -Y2RPA- POT Sta. 16+57.00
MATCHLINE -L- STA 41+50 (SEE SHEET 6)
END STATE TIP PROJECT B-5121/B-5317
END CONSTRUCTION -L- POT Sta.53+06.00
NOTES:
1.BEGIN SPILL CURB -L- STA 42+30 (9' LT)
2.REMOVE AND REPLACE EXIST ASPHALT PAVEMENT (LS 5358 AND 67 ABC)
3.EXCAVATION OF EXIST BRIDGE FILL SEE GRADING DETAIL SHEET 2B-4 (STRUCTURAL PAY ITEM)
4.REMOVE CB AND EXIST 18" SYSTEM TO OUTFALL INCLUDING 18"
5.REMOVE AND REPLACE EXIST CONCRETE STREAM BANK TO TOE OF STREAM FOR PIPE INSTALLATION. EST 3 CY OF CONCRETE REMOVAL AND REPLACEMENT
6.REMOVE AND REPLACE EXIST CONCRETE STREAM BANK TO TOE OF STREAM FOR EXISTING BRIDGE BENT REMOVAL EST 17 CY OF CONCRETE REMOVAL AND REPLACEMENT
7.BEGIN SPILL CURB -L- STA 43+39 (9' LT)
8.BEGIN SPILL CURB -L- STA 43+39 (42 LT)
LEGEND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
STRUCTURE EXCAVATION
RADII DIMENSIONS ARE TO THE EDGE OF PAVEMENT UNLESS OTHERWISE NOTED
SEE SHEET 2B-1 FOR CURVE DATA
SEE SHEET 2B-3 FOR INTERSECTION DETAILS
SEE SHEET 2D-1 FOR DRAINAGE DETAILS
SEE SHEET 10 FOR -L- PROFILE
SEE SHEET 11 FOR -SBL- AND -NBL- PROFILES
SEE SHEET 13 FOR -FLYOVER- AND -Y2RPA- PROFILES
SEE SHEET 14 FOR -Y2RPB- AND -Y2LPC- PROFILES
SEE SHEET 15 FOR -Y8- AND -Y9- PROFILES
Kimley»Horn
P.O. BOX 33068 • RALEIGH, N.C. 27636-3068
PROJECT REFERENCE NO. B-5121 / B-5317
SHEET NO. 7
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
NAD 83/NSRS 2007
PERMIT DRAWING SHEET 3 OF 13
REVISED 01-07-16
REVISIONS
1/04/2016

Kimley»Horn
P.O. BOX 33068 • RALEIGH, N.C. 27636-3068

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| B-5121 / B-5317 | 26-4 |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 4 OF 13
REVISED 01-07-16

LEGEND

- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER

## SITE 1 IMPACT ENLARGEMENT

SCALE: 1" = 20'

REVISIONS

1/04/2016

P-52

Kimley»Horn
P.O. BOX 33068 • RALEIGH, N.C. 27636-3068

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| B-5121 / B-5317 | |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83/NSRS 2007

PERMIT DRAWING
SHEET 5 OF 13
REVISED 01-07-16

LEGEND

- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER

## SITE 1 IMPACT ENLARGEMENT

SCALE: 1" = 20'

REVISIONS

1/04/2016

P-53

Kimley»Horn
P.O. BOX 33068 • RALEIGH, N.C. 27636-3068

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| B-5121 / B-5317 | 8 |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83/NSRS 2007

PERMIT DRAWING
SHEET 6 OF 13

REVISED 01-07-16

REVISIONS

| | |
|---|---|
| (2) | WAKE COUNTY DB 12035 - PG 2740 BM 1960 - PG 241 |
| (11) | MARGIE MARIE FULLER DB 10559 - PG 1762 |
| (33) | HESTER & HESTER DB 918 - PG 1653 BM 1885 - PG 104 |
| (34) | MANN FAMILY PROPERTIES OF RALEIGH DB 1802 - PG 1658 |
| (35) | CHAUCER INVESTMENTS INC DB 13332 - PG 957 BM 1997 - PG 739 |
| (36) | EDWIN E FLYTHE, JR DB 3726 - PG 580 BM 1885 - PG 62 BM 1977 - PG 393 |
| (37) | RICHARD GARDNER DB 8613 - PG 2425 |
| (38) | MARGARET ALTMAN MANN DB 2989 - PG 318 |
| (39) | JAMES H ANDERSON CO DB 5940 - PG 209 BM 1993 - PG 1441 |
| (41) | ARCHIE LINWOOD KING SUCCESSOR TRUSTEE DB 5369 - PG 541 BM 1947 - PG 73 |

# SITE 2

| LEGEND | |
|---|---|
| | DENOTES IMPACTS IN SURFACE WATER |
| | DENOTES TEMPORARY IMPACTS IN SURFACE WATER |

NOTES:
1. REMOVE TOP OF EXISTING STONE WALL TO AN ELEVATION APPROXIMATELY 1' BELOW EXISTING PARKING LOT. REMOVE TOP OF WALL APPROXIMATELY 22' FROM EXISTING RCBC HEADWALL TO BEYOND THE PROPOSED SIDEWALK AND CHAIN LINK FENCE. USE FLOWABLE FILL BETWEEN EXISTING STONE WALL AND OUTSIDE OF PROPOSED RCBC. EST. 10 CY FLOWABLE FILL
2. REMOVE EXIST DI AND INSTALL TB25 ON TOP OF RCBC

★ TRAFFIC SIGNAL

RADII DIMENSIONS ARE TO THE EDGE OF PAVEMENT UNLESS OTHERWISE NOTED

SEE SHEET 2B-1 FOR CURVE DATA
SEE SHEETS 2B-2 AND 2B-3 FOR INTERSECTION DETAILS
SEE SHEET 11 FOR -Y1- PROFILE
SEE SHEET 14 FOR -Y5- PROFILE
SEE SHEET 15 FOR -Y6- AND -Y7- PROFILES

1/04/2016

P-54

Kimley»Horn
P.O. BOX 33068 • RALEIGH, N.C. 27636-7068

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| B-5121 / B-5317 | 8 |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83/NSRS 2007

PERMIT DRAWING
SHEET 7 OF 13
REVISED 01-07-16

| | |
|---|---|
| (2) | WAKE COUNTY DB 12835 - PG 2740 BM 1980 - PG 241 |
| (11) | MARGIE MARIE FULLER DB 10559 - PG 1762 |
| (33) | HESTER & HESTER DB 8181 - PG 1853 BM 1985 - PG 104 |
| (34) | MANN FAMILY PROPERTIES OF RALEIGH DB 11802 - PG 1658 |
| (35) | CHAUCER INVESTMENTS INC DB 13332 - PG 957 BM 1997 - PG 799 |
| (36) | EDWIN E FLYTHE, JR DB 3726 - PG 580 BM 1885 - PG 82 BM 1977 - PG 393 |
| (37) | RICHARD GARDNER DB 8613 - PG 2425 |
| (38) | MARGARET ALTMAN MANN DB 2989 - PG 318 |
| (39) | JAMES H ANDERSON CO DB 5940 - PG 289 BM 1993 - PG 1441 |
| (41) | ARCHIE LINWOOD KING SUCCESSOR TRUSTEE DB 5369 - PG 541 BM 1947 - PG 73 |

# SITE 2

**LEGEND**

- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NOTES:
1. REMOVE TOP OF EXISTING STONE WALL TO AN ELEVATION APPROXIMATELY 1' BELOW EXISTING PARKING LOT. REMOVE TOP OF WALL APPROXIMATELY 22' FROM EXISTING RCBC HEADWALL TO BEYOND THE PROPOSED SIDEWALK AND CHAIN LINK FENCE. USE FLOWABLE FILL BETWEEN EXISTING STONE WALL AND OUTSIDE OF PROPOSED RCBC. EST. 10 CY FLOWABLE FILL
2. REMOVE EXIST. GI AND INSTALL TB201 ON TOP OF RCBC

★ TRAFFIC SIGNAL

RADII DIMENSIONS ARE TO THE EDGE OF PAVEMENT UNLESS OTHERWISE NOTED

SEE SHEET 2B-1 FOR CURVE DATA
SEE SHEETS 2B-2 AND 2B-3 FOR INTERSECTION DETAILS
SEE SHEET 11 FOR -Y1- PROFILE
SEE SHEET 14 FOR -Y5- PROFILE
SEE SHEET 15 FOR -Y6- AND -Y7- PROFILES

REVISIONS

1/04/2016

P-55

Kimley»Horn
P.O. BOX 33068 • RALEIGH, N.C. 27636-3068

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| B-5121 / B-5317 | |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 8 OF 13
REVISED 01-07-16

LEGEND

- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SITE 2 IMPACT ENLARGEMENT
SCALE: 1" = 20'

REVISIONS

1/04/2016

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P.O. BOX 33068 • RALEIGH, N.C. 27636-3068

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| B-5121 / B-5311 | |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 9 OF 13
REVISED 01-07-16

REVISIONS

1/04/2016

P-57

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P.O. BOX 33068 • RALEIGH, N.C. 27636-3068

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| B-5121 / B-5317 | 2D-1 |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 10 OF 13

REVISED 01-07-16

# DRAINAGE DETAILS

## DETAIL 1
BERM 'V' DITCH
( Not to Scale)

FROM -Y1- STA. 20+65 TO STA. 21+50 (RT)
FROM -Y1RPC- STA. 16+65 TO STA. 18+33.19 (RT)
SEE SHEET 5

## DETAIL 2
FALSE SUMP
( Not to Scale)

-Y1RPD- 13+00 (LT)
SEE SHEET 5
-G1- 11+37 (RT)
SEE SHEETS 2B-4 AND 7

## DETAIL 3
RIP RAP AT EMBANKMENT
( Not to Scale)

FROM -L- STA 49+45 TO 51+80 (LT)
-Y8- STA 10+95 (LT)
SEE SHEETS 2B-4 AND 7

## DETAIL 4
LATERAL BASE GRASSED SWALE
( Not to Scale)

FROM -FLYOVER- STA 22+12 TO STA 23+70 (RT)
SEE SHEET 7

## DETAIL 5
CUT DITCH
( Not to Scale)

FROM -L- STA 51+00 TO STA 52+90 (RT)
SEE SHEET 7
FROM -Y1- STA 16+70 TO STA 17+27 (LT)
SEE SHEETS 5 AND 8

## DETAIL 6
TOE PROTECTION
( Not to Scale)

FROM -L- STA 47+50 TO STA 48+25 (RT)
SEE SHEET 7

## DETAIL 7
SPECIAL ROCK CHECK DAM
( Not to Scale)

FROM -FLYOVER- STA 22+12 TO STA 23+70 (RT)
SEE SHEET 7

## DETAIL 8
ROCK PLATING DETAIL
( Not to Scale)

FROM -FLYOVER- STA 21+68 TO STA 22+50 (RT)
SEE SHEET 7

## DETAIL 9
CUT DITCH
( Not to Scale)

FROM -G1- STA 10+25 TO STA 11+28 (RT)
SEE SHEET 7 AND SHEET 2B-4

REVISIONS

7/14/99

1/04/2016

P-58

Kimley»Horn
P.O. BOX 33068 • RALEIGH, N.C. 27636-3068

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| B-5121/B-5317 | 11 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

RIGHT-OF-WAY REV.
CONST. REV.

PERMIT DRAWING
SHEET 11 OF 13
REVISED 01-07-16

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

1/04/2016

P-59

Kimley»Horn
P.O. BOX 33068 • RALEIGH, N.C. 27636-7068

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| B-5121/B-5317 | 13 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PERMIT DRAWING
SHEET 12 OF 13
REVISED 01-07-16

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

P-60

## WETLAND PERMIT IMPACT SUMMARY

| | | | WETLAND IMPACTS | | | | | SURFACE WATER IMPACTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Site No. | Station (From/To) | Structure Size / Type | 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- 49+34.23 - 49+60.23 (LT) | 42" RCP | | | | | | | < 0.01 | | 26 | |
| 1 | -L- 49+96.40 - 50+50.94 (LT) | Embankment / End Bent Removal | | | | | | | < 0.01 | | 55 | |
| 1 | -L- 49+65.71 - 49+88.08 (LT) | Embankment / Bank Stabalization | | | | | | < 0.01 | < 0.01 | 12 | 10 | |
| 2 | -Y1- 14+85.18 - 15+15.94 (LT) | 2 @ 11'x7' RCBC | | | | | | | 0.02 | | 69 | |
| 3 | -Y8- 10+82.00 -10+94.87 (LT) | 24" Pipe / Embankment | | | | | | < 0.01 | < 0.01 | 9 | 11 | |
| TOTALS*: | | | | | | | | < 0.01 | 0.04 | 21 | 171 | 0 |

*Rounded totals are sum of actual impacts

NOTES:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY
B-5121 & B-5317

SHEET 13 of 13 1/7/2016

Revised 2013 10 24

P-61

TIP PROJECT: B-5121 / B-5317

CONTRACT:

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| N.C. | B-5121/B-5317 | 1 | |

| STATE PROJ. NO. | F.A. PROJ. NO. | DESCRIPTION |
|---|---|---|
| 42263.1.1 | BRNHS-0070(119) | P.E. (B-5121) |
| 46031.1.1 | BRSTP-0070(149) | P.E. (B-5317) |
| 42263.2.1 | BRNHS-0070(119) | R/W (B-5121/B-5317) |
| 42263.2.1 | BRNHS-0070(119) | UTL (B-5121/B-5317) |
| 42263.3.1 | BRNHS-0070(119) | CONST (B-5121/B-5317) |

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

SEE SHEET 1A FOR INDEX OF SHEETS
SEE SHEET 1B FOR CONVENTIONAL PLAN SHEET SYMBOLS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

# WAKE COUNTY

**LOCATION: BRIDGE NO. 227 ON US-70/US-401/NC-50 (CAPITAL BOULEVARD) OVER PEACE STREET AND BRIDGE NO. 213 ON US-70/NC-50 (WADE AVENUE) OVER US 401 (CAPITAL BOULEVARD)**

**TYPE OF WORK: GRADING, PAVING, DRAINAGE, SIGNING, SIGNALS, STRUCTURES, AND CULVERT**

## BUFFER IMPACTS PERMIT

BUFFER DRAWING SHEET 1 OF 7

THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS LIMITED TO POINTS AS SHOWN ON THE PLANS

**GRAPHIC SCALES**

50 25 0 50 100 — PLANS

50 25 0 50 100 — PROFILE (HORIZONTAL)

10 5 0 10 20 — PROFILE (VERTICAL)

**DESIGN DATA**

AADT 2016 = 58,083
AADT 2036 = 70,416
K = 10%
D = 55%
T = 5%*
V = 40 MPH

CLASSIFICATION:
URBAN ARTERIAL

* 1% TTST 4% DUAL
STATEWIDE TIER

**PROJECT LENGTH**

| | | |
|---|---|---|
| LENGTH ROADWAY TIP PROJECT B-5121/B-5317 | = | 0.786 MILES |
| LENGTH STRUCTURE TIP PROJECT B-5121/B-5317 | = | 0.026 MILES |
| TOTAL LENGTH TIP PROJECT B-5121/B-5317 | = | 0.812 MILES |

PLANS PREPARED FOR THE NCDOT BY: Kimley»Horn

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JUNE 30, 2015

LETTING DATE: JUNE 21, 2016

JEFFREY W. MOORE, P.E.
PROJECT ENGINEER

J. JASON PACE, P.E.
PROJECT DESIGN ENGINEER

REKHA PATEL, P.E.
PROJECT ENGINEER
NCDOT ROADWAY DESIGN ENGINEERING COORDINATION SECTION

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

10/8/2015

Kimley»Horn
P.O. BOX 33068 • RALEIGH, N.C. 27636-3068
PROJECT REFERENCE NO.
B-5121 / B-5317
SHEET NO.
7
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
NAD 83/NSRS 2007
SITE 1
SITE 2
SITE 3A
SITE 3B
BUFFER DRAWING SHEET 2 OF 7
REVISED 01-07-16
SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP
END APPROACH SLAB -FLYOVER- STA 21+99 +/-
END BRIDGE -FLYOVER- STA 21+74 +/-
-FLYOVER- WADE AVE
BEGIN APPROACH SLAB -FLYOVER- STA 18+99 +/-
BEGIN BRIDGE -FLYOVER- STA 19+24 +/-
23 HENRY J VANPALA DB 3865 - PG 46 BM 2008 - PG 2034
24 HOBCO AUTO SALES DB 14908 - PG 1234 BM 1959 - PG 262
26 LISTON E & SUSAN S MALPASS DB 7807 - PG 382 BM 2003 - PG 964
27 JOYNERS REAL ESTATE HOLDINGS V LLC DB 15087 - PG 2007 BM 1959 - PG 262
28 ISABEL HUFMEYER DB 7807 - PG 382 BM 2003 - PG 964
29 SUZANNE ABERNETHY WILLIAM R RUGGLES DB 13227 - PG 452 BM 1958 - PG 10
END CONSTRUCTION -FLYOVER- POT Sta. 25+76.00
-Y2RPB- PT Sta. 16+42.72 = -FLYOVER- POT Sta. 25+39.61 (11.50' LT)
-Y2RPA- PT Sta. 18+96.38 = -FLYOVER- POT Sta. 25+43.37 (11.50' RT)
-FLYOVER- PT Sta. 25+26.33
-Y9- POT Sta. 10+91.30 = -Y8- POT Sta. 10+00.00 Δ = 91°31'09.6"
BEGIN CONSTRUCTION -Y8- POT Sta. 10+82.00
-Y9- PC Sta. 15+91.30
-Y9- PT Sta. 17+18.30
-Y2RPB- PC Sta. 14+79.90
-Y9- POT Sta. 19+50.00 = -Y2RPB- POT Sta. 13+78.09 Δ = 109°52'30.1"
BEGIN CONSTRUCTION -Y9- POT Sta. 18+52.00
-Y2RPA- PC Sta. 16+76.10
BEGIN CONSTRUCTION -Y2RPA- POT Sta. 16+57.00
-Y8- POT Sta. 13+26.88 = -L- POT Sta. 41+82.23 Δ = 89°32'26.7"
-L- PC Sta. 44+35.25
-Y2RPB- PT Sta. 12+86.47 = -SBL- PC Sta. 10+00.00 = -L- POT Sta. 49+11.45 (20' LT)
-Y2RPB- PC Sta. 10+00.00 = -L- POC Sta. 47+14.03 (31' LT)
-FLYOVER- PRC Sta. 22+65.32
-SBL- POT Sta. 11+56.60 = -FLYOVER- POC Sta. 20+45.08 Δ = 110°20'31.0"
-L- POT Sta. 50+59.47 = -FLYOVER- POC Sta. 20+19.94 Δ = 111°30'59.0"
-NBL- POC Sta. 11+39.09 = -FLYOVER- POC Sta. 19+97.09 Δ = 113°09'17.8"
-SBL- N 21°55'46.2"E
-SBL- PC Sta. 13+27.46
-SBL- PT Sta. 14+20.66
-SBL- PC Sta. 15+78.99
-L- PC Sta. 54+38.96
-L- POT Sta. 41+51.5 (42' RT)
-FLYOVER- PC Sta. 10+00.00 = -L- POT Sta. 41+51.5 (42' RT)
-FLYOVER- PT Sta. 12+72.42
-Y2LPC- PC Sta. 10+00.00 = -L- POC Sta. 46+82.13 (42' RT)
-NBL- POT Sta. 10+00.00 = -L- POT Sta. 49+11.45 (120' RT)
-NBL- PC Sta. 10+58.07
-FLYOVER- PC Sta. 14+00.42
-Y2LPC- PCC Sta. 13+10.98 = -FLYOVER- POC Sta. 15+34.34
-FLYOVER- PCC Sta. 18+96.01
END STATE TIP PROJECT B-5121/B-5317
END CONSTRUCTION -L- POT Sta. 53+06.00
MATCHLINE -L- STA 41+50 (SEE SHEET 6)
CAPITAL BLVD (US-401)
N 24°08'40.0"E
S 57°04'05.1"W
N 83°
NOTES:
1.BEGIN SPILL CURB -L- STA 48+30 (9' LT)
2.REMOVE AND REPLACE EXIST ASPHALT PAVEMENT (12.5'SB AND 6' ABC)
3.EXCAVATION OF EXIST BRIDGE FILL SEE GRADING DETAIL,SHEET 2B-4 (STRUCTURAL PAY ITEM)
4.REMOVE CB AND EXIST 18" SYSTEM TO OUTFALL INCLUDING JB
5.REMOVE AND REPLACE EXIST CONCRETE STREAM BANK TO TOE OF STREAM FOR PIPE INSTALLATION, EST 3 CY OF CONCRETE REMOVAL AND REPLACEMENT
6.REMOVE AND REPLACE EXIST CONCRETE STREAM BANK TO TOE OF STREAM FOR EXISTING BRIDGE BENT REMOVAL EST 17 CY OF CONCRETE REMOVAL AND REPLACEMENT
7.BEGIN SPILL CURB -L- STA 43+39 (9' LT)
8.BEGIN SPILL CURB -L- STA 43+39 (42' LT)
LEGEND
MITIGABLE IMPACTS ZONE 1
MITIGABLE IMPACTS ZONE 2
ALLOWABLE IMPACTS ZONE 1
ALLOWABLE IMPACTS ZONE 2
STRUCTURE EXCAVATION
RADII DIMENSIONS ARE TO THE EDGE OF PAVEMENT UNLESS OTHERWISE NOTED
SEE SHEET 2B-1 FOR CURVE DATA
SEE SHEET 2B-3 FOR INTERSECTION DETAILS
SEE SHEET 2D-1 FOR DRAINAGE DETAILS
SEE SHEET 10 FOR -L- PROFILE
SEE SHEET 11 FOR -SBL- AND -NBL- PROFILES
SEE SHEET 13 FOR -FLYOVER- AND -Y2RPA- PROFILES
SEE SHEET 14 FOR -Y2RPB- AND -Y2LPC- PROFILES
SEE SHEET 15 FOR -Y8- AND -Y9- PROFILES
REVISIONS
1/04/2016

P-63

Kimley»Horn
P.O. BOX 33068 • RALEIGH, N.C. 27636-3068

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| B-5121 / B-5317 | |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83/NSRS 2007

BUFFER DRAWING
SHEET 3 OF 7
REVISED 01-07-16

LEGEND

- ALLOWABLE IMPACTS ZONE 1
- ALLOWABLE IMPACTS ZONE 2

## SITE 1 IMPACT ENLARGEMENT

SCALE: 1" = 20'

REVISIONS

1/04/2016

P-64

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| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| B-5121 / B-5317 | 2B-4 |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BUFFER DRAWING
SHEET 4 OF 7

LEGEND

- ALLOWABLE IMPACTS ZONE 1
- MITIGABLE IMPACTS ZONE 1
- ALLOWABLE IMPACTS ZONE 2
- MITIGABLE IMPACTS ZONE 2

## SITES 2, 3A, AND 3B IMPACT ENLARGEMENT

SCALE: 1" = 20'

REVISIONS

10/27/2015

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| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| B-5121 / B-5317 | 8 |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83/NSRS 2007

BUFFER DRAWING SHEET 5 OF 7

| | | | | | |
|---|---|---|---|---|---|
| (2) | WAKE COUNTY DB 12835 - PG 2740 BM 1960 - PG 241 | (35) | CHAUCER INVESTMENTS INC DB 13332 - PG 957 BM 1997 - PG 799 | (38) | MARGARET ALTMAN MANN DB 2989 - PG 318 |
| (11) | MARGE MARIE FULLER DB 10569 - PG 1762 | (36) | EDWIN E FLYTHE, JR DB 3726 - PG 580 BM 1985 - PG 82 BM 1977 - PG 393 | (39) | JAMES H ANDERSON CO DB 5940 - PG 289 BM 1993 - PG 1441 |
| (33) | HESTER & HESTER DB 8181 - PG 853 BM 1885 - PG 104 | (37) | RICHARD GARDNER DB 8613 - PG 2425 | (41) | ARCHIE LINWOOD KING SUCCESSOR TRUSTEE DB 5359 - PG 541 BM 1947 - PG 73 |
| (34) | MANN FAMILY PROPERTIES OF RALEIGH DB 11802 - PG 1658 | | | | |

# SITE 4

| LEGEND | |
|---|---|
| (hatched) | ALLOWABLE IMPACTS ZONE 1 |
| (hatched) | ALLOWABLE IMPACTS ZONE 2 |

NOTES:
1. REMOVE TOP OF EXISTING STONE WALL TO AN ELEVATION APPROXIMATELY 1' BELOW EXISTING PARKING LOT. REMOVE TOP OF WALL APPROXIMATELY 22' FROM EXISTING RCBC HEADWALL TO BEYOND THE PROPOSED SIDEWALK AND CHAIN LINK FENCE. USE FLOWABLE FILL BETWEEN EXISTING STONE WALL AND OUTSIDE OF PROPOSED RCBC. EST 10 CY FLOWABLE FILL
2. REMOVE EXIST DI AND INSTALL TB@SIGN TOP OF RCBC

★ TRAFFIC SIGNAL

RADII DIMENSIONS ARE TO THE EDGE OF PAVEMENT UNLESS OTHERWISE NOTED

SEE SHEET 2B-1 FOR CURVE DATA
SEE SHEETS 2B-2 AND 2B-3 FOR INTERSECTION DETAILS
SEE SHEET 11 FOR -Y1- PROFILE
SEE SHEET 14 FOR -Y5- PROFILE
SEE SHEET 15 FOR -Y6- AND -Y7- PROFILES

REVISIONS

10/9/2015

Kimley»Horn
P.O. BOX 33068 • RALEIGH, N.C. 27636-3068

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| B-5121 / B-5317 | |
| R/W SHEET NO | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BUFFER DRAWING
SHEET 6 OF 7

LEGEND

- ALLOWABLE IMPACTS ZONE 1
- ALLOWABLE IMPACTS ZONE 2

SITE 4 IMPACT ENLARGEMENT
SCALE: 1" = 20'

10/8/2015

SNORVER

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# BUFFER IMPACTS SUMMARY

| | | | IMPACT | | | | | | | | | BUFFER REPLACEMENT | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | TYPE | | | ALLOWABLE | | | MITIGABLE | | | | |
| SITE NO. | STRUCTURE SIZE / TYPE | STATION (FROM/TO) | ROAD CROSSING | BRIDGE | PARALLEL IMPACT | ZONE 1 ($ft^2$) | ZONE 2 ($ft^2$) | TOTAL ($ft^2$) | ZONE 1 ($ft^2$) | ZONE 2 ($ft^2$) | TOTAL ($ft^2$) | ZONE 1 ($ft^2$) | ZONE 2 ($ft^2$) |
| 1 | 24" RCP | -Y8- 11+02.00 - 11+12.23 (LT) | X | | | 136 | 0 | 136 | | | | | |
| 2 | Roadway | -Y2RPB- 11+27.41 - 13+31.69 (LT) | X | | | 1823 | 0 | 1823 | | | | | |
| 3A | Base Ditch, 18" Outfall Pipe, Greenway | -FLYOVER- 21+76.69 - 22+09.83 (RT) | X | | | 811 | 2501 | 3312 | | | | | |
| 3A | Bridge | -FLYOVER- 21+41.29 - 21+76.69 (RT) | | X | | 2711 | 87 | 2798 | | | | | |
| 3B | Roadway, Sanitary Gravity Sewer | -L- 49+22.20 - 53+72.74 (LT) | | | X | 4704 | 1603 | 6307 | 1282 | 734 | 2016 | | |
| 4 | 2 @ 11'x7' RCBC | -Y1- 14+92.51 - 15+46.70 (LT) | X | | | 3321 | 803 | 4124 | | | | | |
| | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | |
| **TOTAL:** | | | | | | 13506 | 4994 | 18500 | 1282 | 734 | 2016 | | |

Notes:

1. Site 1 replaces an existing stormwater discharge point with a new outfall pipe
2. Site 3B includes impacts due to the fill slope of the proposed Roadway (-L-), existing stormdrain pipe removal, proposed stormdrain pipe, access for existing bridge removal, proposed bridge bent, proposed sanitary sewer and proposed water line

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY
PROJECT: B-5121 / B-5317

10/29/2015
SHEET 7 of 7

Rev. May 2006

County : Wake

| 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 UTILITY COORDINATOR | Lump Sum | L.S. | |
| 0004 | 0001000000-E | 200 | CLEARING & GRUBBING .. ACRE(S) | Lump Sum | L.S. | |
| 0005 | 0008000000-E | 200 | SUPPLEMENTARY CLEARING & GRUBBING | 1 ACR | | |
| 0006 | 0022000000-E | 225 | UNCLASSIFIED EXCAVATION | 44,700 CY | | |
| 0007 | 0036000000-E | 225 | UNDERCUT EXCAVATION | 3,198 CY | | |
| 0008 | 0106000000-E | 230 | BORROW EXCAVATION | 32,000 CY | | |
| 0009 | 0134000000-E | 240 | DRAINAGE DITCH EXCAVATION | 240 CY | | |
| 0010 | 0141000000-E | 240 | BERM DITCH CONSTRUCTION | 260 LF | | |
| 0011 | 0156000000-E | 250 | REMOVAL OF EXISTING ASPHALT PAVEMENT | 13,900 SY | | |
| 0012 | 0163000000-E | 250 | REMOVAL OF EXISTING CONCRETE PAVEMENT | 36,900 SY | | |
| 0013 | 0177000000-E | 250 | BREAKING OF EXISTING ASPHALT PAVEMENT | 3,100 SY | | |
| 0014 | 0192000000-N | 260 | PROOF ROLLING | 10 HR | | |
| 0015 | 0195000000-E | 265 | SELECT GRANULAR MATERIAL | 4,400 CY | | |
| 0016 | 0196000000-E | 270 | GEOTEXTILE FOR SOIL STABILIZATION | 25,300 SY | | |
| 0017 | 0199000000-E | SP | TEMPORARY SHORING | 8,717 SF | | |
| 0018 | 0223000000-E | 275 | ROCK PLATING | 380 SY | | |
| 0019 | 0255000000-E | SP | GENERIC GRADING ITEM HAULING & DISPOSAL OF PETROLEUM CONTAMINTED SOIL | 500 TON | | |

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|---|---|---|---|---|---|---|
| 0020 | 0314000000-E | SP | SELECT MATERIAL, CLASS ***** (IV) | 70 TON | | |
| 0021 | 0318000000-E | 300 | FOUNDATION CONDITIONING MATE-RIAL, MINOR STRUCTURES | 2,550 TON | | |
| 0022 | 0320000000-E | 300 | FOUNDATION CONDITIONING GEO-TEXTILE | 8,350 SY | | |
| 0023 | 0342000000-E | 310 | **" SIDE DRAIN PIPE (42") | 76 LF | | |
| 0024 | 0342000000-E | 310 | **" SIDE DRAIN PIPE (60") | 48 LF | | |
| 0025 | 0342000000-E | 310 | **" SIDE DRAIN PIPE (8") | 12 LF | | |
| 0026 | 0343000000-E | 310 | 15" SIDE DRAIN PIPE | 712 LF | | |
| 0027 | 0344000000-E | 310 | 18" SIDE DRAIN PIPE | 76 LF | | |
| 0028 | 0345000000-E | 310 | 24" SIDE DRAIN PIPE | 56 LF | | |
| 0029 | 0348000000-E | 310 | **" SIDE DRAIN PIPE ELBOWS (15") | 2 EA | | |
| 0030 | 0354000000-E | 310 | ***" RC PIPE CULVERTS, CLASS ***** (15", V) | 596 LF | | |
| 0031 | 0354000000-E | 310 | ***" RC PIPE CULVERTS, CLASS ***** (18", V) | 800 LF | | |
| 0032 | 0354000000-E | 310 | ***" RC PIPE CULVERTS, CLASS ***** (24", V) | 176 LF | | |
| 0033 | 0448000000-E | 310 | ****" RC PIPE CULVERTS, CLASS IV (48") | 724 LF | | |
| 0034 | 0448000000-E | 310 | ****" RC PIPE CULVERTS, CLASS IV (54") | 128 LF | | |
| 0035 | 0448000000-E | 310 | ****" RC PIPE CULVERTS, CLASS IV (60") | 412 LF | | |

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|---|---|---|---|---|---|---|
| 0036 | 0448200000-E | 310 | 15" RC PIPE CULVERTS, CLASS IV | 4,040 LF | | |
| 0037 | 0448300000-E | 310 | 18" RC PIPE CULVERTS, CLASS IV | 2,800 LF | | |
| 0038 | 0448400000-E | 310 | 24" RC PIPE CULVERTS, CLASS IV | 948 LF | | |
| 0039 | 0448600000-E | 310 | 36" RC PIPE CULVERTS, CLASS IV | 252 LF | | |
| 0040 | 0448700000-E | 310 | 42" RC PIPE CULVERTS, CLASS IV | 396 LF | | |
| 0041 | 0542000000-E | 310 | **" PVC PIPE CULVERTS (8") | 8 LF | | |
| 0042 | 0582000000-E | 310 | 15" CS PIPE CULVERTS, 0.064" THICK | 60 LF | | |
| 0043 | 0588000000-E | 310 | 18" CS PIPE CULVERTS, 0.064" THICK | 60 LF | | |
| 0044 | 0636000000-E | 310 | **" CS PIPE ELBOWS, *****" THICK (15", 0.064") | 2 EA | | |
| 0045 | 0636000000-E | 310 | **" CS PIPE ELBOWS, *****" THICK (18", 0.064") | 2 EA | | |
| 0046 | 0973100000-E | 330 | **" WELDED STEEL PIPE, ****" THICK, GRADE B IN SOIL (42", 0.625") | 48 LF | | |
| 0047 | 0973100000-E | 330 | **" WELDED STEEL PIPE, ****" THICK, GRADE B IN SOIL (60", 0.875") | 50 LF | | |
| 0048 | 0973300000-E | 330 | **" WELDED STEEL PIPE, ****" THICK, GRADE B NOT IN SOIL (42", 0.625") | 48 LF | | |
| 0049 | 0973300000-E | 330 | **" WELDED STEEL PIPE, ****" THICK, GRADE B NOT IN SOIL (60", 0.875") | 50 LF | | |
| 0050 | 0986000000-E | SP | GENERIC PIPE ITEM 16" DUCTILE IRON PIPE, CLASS 250, SEALED | 208 LF | | |
| 0051 | 0986000000-E | SP | GENERIC PIPE ITEM 18" DUCTILE IRON PIPE, CLASS 250, SEALED | 52 LF | | |

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|---|---|---|---|---|---|---|
| 0052 | 0986000000-E | SP | GENERIC PIPE ITEM<br>24" DUCTILE IRON PIPE, CLASS 200, SEALED | 248<br>LF | | |
| 0053 | 0986000000-E | SP | GENERIC PIPE ITEM<br>36" DUCTILE IRON PIPE, CLASS 150, SEALED | 176<br>LF | | |
| 0054 | 0992000000-E | SP | GENERIC PIPE ITEM<br>BOOTS FOR SEALED DRAINAGE STRUCTURES | 16<br>EA | | |
| 0055 | 0995000000-E | 340 | PIPE REMOVAL | 3,128<br>LF | | |
| 0056 | 1000000000-E | 462 | 6" SLOPE PROTECTION | 57<br>SY | | |
| 0057 | 1011000000-N | 500 | FINE GRADING | Lump Sum | L.S. | |
| 0058 | 1099500000-E | 505 | SHALLOW UNDERCUT | 6,818<br>CY | | |
| 0059 | 1099700000-E | 505 | CLASS IV SUBGRADE STABILIZA-TION | 13,800<br>TON | | |
| 0060 | 1110000000-E | 510 | STABILIZER AGGREGATE | 500<br>TON | | |
| 0061 | 1115000000-E | SP | GEOTEXTILE FOR PAVEMENT STA-BILIZATION | 5,961<br>SY | | |
| 0062 | 1121000000-E | 520 | AGGREGATE BASE COURSE | 430<br>TON | | |
| 0063 | 1220000000-E | 545 | INCIDENTAL STONE BASE | 500<br>TON | | |
| 0064 | 1297000000-E | 607 | MILLING ASPHALT PAVEMENT, ***"<br>DEPTH<br>(1-1/2") | 2,250<br>SY | | |
| 0065 | 1308000000-E | 607 | MILLING ASPHALT PAVEMENT, ***"<br>TO ******"<br>(0" TO 1-1/2") | 1,170<br>SY | | |
| 0066 | 1330000000-E | 607 | INCIDENTAL MILLING | 2,580<br>SY | | |
| 0067 | 1489000000-E | 610 | ASPHALT CONC BASE COURSE, TYPE B25.0B | 5,380<br>TON | | |
| 0068 | 1491000000-E | 610 | ASPHALT CONC BASE COURSE, TYPE B25.0C | 12,660<br>TON | | |

County : Wake

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|---|---|---|---|---|---|---|
| 0069 | 1498000000-E | 610 | ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B | 3,910 TON | | |
| 0070 | 1503000000-E | 610 | ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C | 8,760 TON | | |
| 0071 | 1519000000-E | 610 | ASPHALT CONC SURFACE COURSE, TYPE S9.5B | 5,310 TON | | |
| 0072 | 1523000000-E | 610 | ASPHALT CONC SURFACE COURSE, TYPE S9.5C | 6,510 TON | | |
| 0073 | 1575000000-E | 620 | ASPHALT BINDER FOR PLANT MIX | 2,105 TON | | |
| 0074 | 1693000000-E | 654 | ASPHALT PLANT MIX, PAVEMENT REPAIR | 6,620 TON | | |
| 0075 | 2000000000-N | 806 | RIGHT OF WAY MARKERS | 87 EA | | |
| 0076 | 2253000000-E | 840 | PIPE COLLARS | 0.553 CY | | |
| 0077 | 2264000000-E | 840 | PIPE PLUGS | 0.065 CY | | |
| 0078 | 2275000000-E | SP | FLOWABLE FILL | 688 CY | | |
| 0079 | 2286000000-N | 840 | MASONRY DRAINAGE STRUCTURES | 183 EA | | |
| 0080 | 2297000000-E | 840 | MASONRY DRAINAGE STRUCTURES | 58.845 CY | | |
| 0081 | 2308000000-E | 840 | MASONRY DRAINAGE STRUCTURES | 85.8 LF | | |
| 0082 | 2364000000-N | 840 | FRAME WITH TWO GRATES, STD 840.16 | 14 EA | | |
| 0083 | 2366000000-N | 840 | FRAME WITH TWO GRATES, STD 840.24 | 2 EA | | |
| 0084 | 2367000000-N | 840 | FRAME WITH TWO GRATES, STD 840.29 | 30 EA | | |
| 0085 | 2374000000-N | 840 | FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E) | 17 EA | | |
| 0086 | 2374000000-N | 840 | FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F) | 66 EA | | |

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|---|---|---|---|---|---|---|
| 0087 | 2374000000-N | 840 | FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G) | 54 EA | | |
| 0088 | 2396000000-N | 840 | FRAME WITH COVER, STD 840.54 | 17 EA | | |
| 0089 | 2418000000-E | SP | FRAME WITH GRATES, DRIVEWAY DROP INLET | 168 LF | | |
| 0090 | 2451000000-N | 852 | CONCRETE TRANSITIONAL SECTION FOR DROP INLET | 10 EA | | |
| 0091 | 2473000000-N | SP | GENERIC DRAINAGE ITEM MASONRY DRAINAGE STRUCTURES (SEALED) | 8 EA | | |
| 0092 | 2484000000-E | SP | GENERIC DRAINAGE ITEM MASONRY DRAINAGE STRUCTURES (SEALED) | 3.2 LF | | |
| 0093 | 2535000000-E | 846 | **"X **" CONCRETE CURB (8" X 12") | 470 LF | | |
| 0094 | 2535000000-E | 846 | **"X **" CONCRETE CURB (8" X 18") | 1,420 LF | | |
| 0095 | 2549000000-E | 846 | 2'-6" CONCRETE CURB & GUTTER | 18,310 LF | | |
| 0096 | 2591000000-E | 848 | 4" CONCRETE SIDEWALK | 7,791 SY | | |
| 0097 | 2605000000-N | 848 | CONCRETE CURB RAMP | 71 EA | | |
| 0098 | 2612000000-E | 848 | 6" CONCRETE DRIVEWAY | 1,120 SY | | |
| 0099 | 2619000000-E | 850 | 4" CONCRETE PAVED DITCH | 95 SY | | |
| 0100 | 2655000000-E | 852 | 5" MONOLITHIC CONCRETE ISLANDS (KEYED IN) | 1,154 SY | | |
| 0101 | 2724000000-E | 857 | PRECAST REINFORCED CONCRETE BARRIER, SINGLE FACED | 631 LF | | |
| 0102 | 2753000000-E | 846 | GENERIC PAVING ITEM 2'-6" CONCRETE CURB & GUTTER (SPECIAL) | 8,100 LF | | |
| 0103 | 2800000000-N | 858 | ADJUSTMENT OF CATCH BASINS | 5 EA | | |

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|---|---|---|---|---|---|---|
| 0104 | 2830000000-N | 858 | ADJUSTMENT OF MANHOLES | 8 EA | | |
| 0105 | 2845000000-N | 858 | ADJUSTMENT OF METER BOXES OR VALVE BOXES | 2 EA | | |
| 0106 | 2893000000-N | 859 | CONVERT EXISTING CATCH BASIN TO JUNCTION BOX WITH MANHOLE | 1 EA | | |
| 0107 | 2965000000-N | 859 | CONVERT EXISTING JUNCTION BOX TO CATCH BASIN | 1 EA | | |
| 0108 | 2995000000-N | SP | GENERIC DRAINAGE ITEM CONVERT EXISTING JUNCTION BOX TO SLAB TOP JUNCTION BOX | 2 EA | | |
| 0109 | 3000000000-N | SP | IMPACT ATTENUATOR UNIT, TYPE 350 | 6 EA | | |
| 0110 | 3030000000-E | 862 | STEEL BM GUARDRAIL | 2,675 LF | | |
| 0111 | 3045000000-E | 862 | STEEL BM GUARDRAIL, SHOP CURVED | 25 LF | | |
| 0112 | 3105000000-N | 862 | STEEL BM GUARDRAIL TERMINAL SECTIONS | 2 EA | | |
| 0113 | 3150000000-N | 862 | ADDITIONAL GUARDRAIL POSTS | 15 EA | | |
| 0114 | 3195000000-N | 862 | GUARDRAIL ANCHOR UNITS, TYPE AT-1 | 1 EA | | |
| 0115 | 3215000000-N | 862 | GUARDRAIL ANCHOR UNITS, TYPE III | 10 EA | | |
| 0116 | 3270000000-N | SP | GUARDRAIL ANCHOR UNITS, TYPE 350 | 11 EA | | |
| 0117 | 3317000000-N | 862 | GUARDRAIL ANCHOR UNITS, TYPE B-77 | 6 EA | | |
| 0118 | 3360000000-E | 863 | REMOVE EXISTING GUARDRAIL | 1,027 LF | | |
| 0119 | 3380000000-E | 862 | TEMPORARY STEEL BM GUARDRAIL | 275 LF | | |
| 0120 | 3387000000-N | 862 | TEMPORARY GUARDRAIL ANCHOR UNITS, TYPE ********** (AT-1) | 1 EA | | |

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|---|---|---|---|---|---|---|
| 0121 | 3387000000-N | 862 | TEMPORARY GUARDRAIL ANCHOR UNITS, TYPE ********** (W-BEAM) | 1 EA | | |
| 0122 | 3389100000-N | SP | TEMPORARY GUARDRAIL ANCHOR UNITS, TYPE 350 | 2 EA | | |
| 0123 | 3524000000-E | SP | VINYL COATED CHAIN LINK FENCE, **" FABRIC (60") | 5,120 LF | | |
| 0124 | 3575000000-E | SP | GENERIC FENCING ITEM CHAIN LINK FENCE WITH BARBED WIRE, 96" FABRIC, VINYL COATED | 590 LF | | |
| 0126 | 3578000000-N | SP | GENERIC FENCING ITEM METAL LINE POST, 60" CHAIN LINK FENCE, VINYL COATED | 427 EA | | |
| 0127 | 3578000000-N | SP | GENERIC FENCING ITEM METAL LINE POST, 96" CHAIN LINK FENCE, VINYL COATED | 50 EA | | |
| 0128 | 3578000000-N | SP | GENERIC FENCING ITEM METAL TERMINAL POST, 60" CHAIN LINK FENCE, VINYL COATED | 36 EA | | |
| 0129 | 3578000000-N | SP | GENERIC FENCING ITEM METAL TERMINAL POST, 96" CHAIN LINK FENCE, VINYL COATED | 6 EA | | |
| 0130 | 3635000000-E | 876 | RIP RAP, CLASS II | 660 TON | | |
| 0131 | 3649000000-E | 876 | RIP RAP, CLASS B | 110 TON | | |
| 0132 | 3656000000-E | 876 | GEOTEXTILE FOR DRAINAGE | 3,465 SY | | |
| 0133 | 4048000000-E | 902 | REINFORCED CONCRETE SIGN FOUN-DATIONS | 4 CY | | |
| 0134 | 4054000000-E | 902 | PLAIN CONCRETE SIGN FOUNDA-TIONS | 1 CY | | |
| 0135 | 4057000000-E | SP | OVERHEAD FOOTING | 37 CY | | |
| 0136 | 4060000000-E | 903 | SUPPORTS, BREAKAWAY STEEL BEAM | 1,496 LB | | |
| 0137 | 4066000000-E | 903 | SUPPORTS, SIMPLE STEEL BEAM | 1,957 LB | | |

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|---|---|---|---|---|---|---|
| 0138 | 4072000000-E | 903 | SUPPORTS, 3-LB STEEL U-CHANNEL | 1,373 LF | | |
| 0139 | 4082100000-N | SP | SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (30+74 NBL) | Lump Sum | L.S. | |
| 0140 | 4082100000-N | SP | SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (40+28 NBL) | Lump Sum | L.S. | |
| 0141 | 4082100000-N | SP | SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (50+00 NBL) | Lump Sum | L.S. | |
| 0142 | 4096000000-N | 904 | SIGN ERECTION, TYPE D | 4 EA | | |
| 0143 | 4102000000-N | 904 | SIGN ERECTION, TYPE E | 60 EA | | |
| 0144 | 4108000000-N | 904 | SIGN ERECTION, TYPE F | 8 EA | | |
| 0145 | 4109000000-N | 904 | SIGN ERECTION, TYPE *** (OVERHEAD) (A) | 5 EA | | |
| 0146 | 4110000000-N | 904 | SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A) | 11 EA | | |
| 0147 | 4149000000-N | 907 | DISPOSAL OF SIGN SYSTEM, OVERHEAD | 1 EA | | |
| 0148 | 4152000000-N | 907 | DISPOSAL OF SIGN SYSTEM, STEEL BEAM | 2 EA | | |
| 0149 | 4155000000-N | 907 | DISPOSAL OF SIGN SYSTEM, U-CHANNEL | 58 EA | | |
| 0150 | 4234000000-N | 907 | DISPOSAL OF SIGN, A OR B (OVERHEAD) | 1 EA | | |
| 0151 | 4400000000-E | 1110 | WORK ZONE SIGNS (STATIONARY) | 3,970 SF | | |
| 0152 | 4405000000-E | 1110 | WORK ZONE SIGNS (PORTABLE) | 3,342 SF | | |
| 0153 | 4410000000-E | 1110 | WORK ZONE SIGNS (BARRICADE MOUNTED) | 416 SF | | |
| 0154 | 4415000000-N | 1115 | FLASHING ARROW BOARD | 6 EA | | |

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|---|---|---|---|---|---|---|
| 0155 | 4420000000-N | 1120 | PORTABLE CHANGEABLE MESSAGE SIGN | 14 EA | | |
| 0156 | 4430000000-N | 1130 | DRUMS | 635 EA | | |
| 0157 | 4435000000-N | 1135 | CONES | 93 EA | | |
| 0158 | 4445000000-E | 1145 | BARRICADES (TYPE III) | 736 LF | | |
| 0159 | 4450000000-N | 1150 | FLAGGER | 7,680 HR | | |
| 0160 | 4465000000-N | 1160 | TEMPORARY CRASH CUSHIONS | 6 EA | | |
| 0161 | 4470000000-N | 1160 | RESET TEMPORARY CRASH CUSHION | 4 EA | | |
| 0162 | 4480000000-N | 1165 | TMA | 6 EA | | |
| 0163 | 4485000000-E | 1170 | PORTABLE CONCRETE BARRIER | 4,550 LF | | |
| 0164 | 4490000000-E | 1170 | PORTABLE CONCRETE BARRIER (ANCHORED) | 135 LF | | |
| 0165 | 4500000000-E | 1170 | RESET PORTABLE CONCRETE BAR-RIER | 2,260 LF | | |
| 0166 | 4507000000-E | 1170 | WATER FILLED BARRIER | 4,377 LF | | |
| 0167 | 4508000000-E | 1170 | RESET WATER FILLED BARRIER | 33,884 LF | | |
| 0168 | 4510000000-N | SP | LAW ENFORCEMENT | 990 HR | | |
| 0169 | 4516000000-N | 1180 | SKINNY DRUM | 229 EA | | |
| 0170 | 4520000000-N | 1266 | TUBULAR MARKERS (FIXED) | 46 EA | | |
| 0171 | 4570000000-E | SP | TEMPORARY GLARE SCREEN | 1,580 LF | | |
| 0172 | 4589000000-N | SP | GENERIC TRAFFIC CONTROL ITEM PROTECTIVE CANOPY | Lump Sum | L.S. | |
| 0173 | 4650000000-N | 1251 | TEMPORARY RAISED PAVEMENT MARKERS | 2,082 EA | | |

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|---|---|---|---|---|---|---|
| 0174 | 4685000000-E | 1205 | THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS) | 29 LF | | |
| 0175 | 4686000000-E | 1205 | THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS) | 11,992 LF | | |
| 0176 | 4695000000-E | 1205 | THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS) | 2,303 LF | | |
| 0177 | 4697000000-E | 1205 | THERMOPLASTIC PAVEMENT MARKING LINES (8", 120 MILS) | 880 LF | | |
| 0178 | 4710000000-E | 1205 | THERMOPLASTIC PAVEMENT MARKING LINES (24", 120 MILS) | 4,485 LF | | |
| 0179 | 4721000000-E | 1205 | THERMOPLASTIC PAVEMENT MARKING CHARACTER (120 MILS) | 20 EA | | |
| 0180 | 4725000000-E | 1205 | THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS) | 90 EA | | |
| 0181 | 4770000000-E | 1205 | COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (II) | 709 LF | | |
| 0182 | 4770000000-E | 1205 | COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV) | 1,250 LF | | |
| 0183 | 4800000000-N | 1205 | COLD APPLIED PLASTIC PAVEMENT MARKING CHARACTER, TYPE ** (IV) | 8 EA | | |
| 0184 | 4805000000-N | 1205 | COLD APPLIED PLASTIC PAVEMENT MARKING SYMBOL, TYPE ** (IV) | 4 EA | | |
| 0185 | 4810000000-E | 1205 | PAINT PAVEMENT MARKING LINES (4") | 162,912 LF | | |
| 0186 | 4820000000-E | 1205 | PAINT PAVEMENT MARKING LINES (8") | 19,280 LF | | |
| 0187 | 4835000000-E | 1205 | PAINT PAVEMENT MARKING LINES (24") | 5,930 LF | | |
| 0188 | 4840000000-N | 1205 | PAINT PAVEMENT MARKING CHARAC-TER | 116 EA | | |
| 0189 | 4845000000-N | 1205 | PAINT PAVEMENT MARKING SYMBOL | 274 EA | | |

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|---|---|---|---|---|---|---|
| 0190 | 4850000000-E | 1205 | REMOVAL OF PAVEMENT MARKING LINES (4") | 35,060 LF | | |
| 0191 | 4860000000-E | 1205 | REMOVAL OF PAVEMENT MARKING LINES (8") | 3,170 LF | | |
| 0192 | 4870000000-E | 1205 | REMOVAL OF PAVEMENT MARKING LINES (24") | 50 LF | | |
| 0193 | 4875000000-N | 1205 | REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS | 65 EA | | |
| 0194 | 4900000000-N | 1251 | PERMANENT RAISED PAVEMENT MARKERS | 15 EA | | |
| 0195 | 4905000000-N | 1253 | SNOWPLOWABLE PAVEMENT MARKERS | 294 EA | | |
| 0196 | 5255000000-N | 1413 | PORTABLE LIGHTING | Lump Sum | L.S. | |
| 0197 | 5265000000-E | SP | GENERIC LIGHTING ITEM STREET LIGHTING CONDUIT IN-STALLATION (2" PVC) | 12,600 LF | | |
| 0198 | 5325800000-E | 1510 | 8" WATER LINE | 2,468 LF | | |
| 0199 | 5326200000-E | 1510 | 12" WATER LINE | 6,108 LF | | |
| 0200 | 5546000000-E | 1515 | 8" VALVE | 16 EA | | |
| 0201 | 5558000000-E | 1515 | 12" VALVE | 21 EA | | |
| 0202 | 5600000000-E | 1515 | **" BLOW OFF (12") | 4 EA | | |
| 0203 | 5606800000-E | 1515 | 8" BLOW OFF | 3 EA | | |
| 0204 | 5648000000-N | 1515 | RELOCATE WATER METER | 43 EA | | |
| 0205 | 5649000000-N | 1515 | RECONNECT WATER METER | 2 EA | | |
| 0206 | 5666000000-E | 1515 | FIRE HYDRANT | 4 EA | | |
| 0207 | 5672000000-N | 1515 | RELOCATE FIRE HYDRANT | 10 EA | | |

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|---|---|---|---|---|---|---|
| 0208 | 5691000000-E | 1520 | **" SANITARY GRAVITY SEWER (36") | 2,010 LF | | |
| 0209 | 5691300000-E | 1520 | 8" SANITARY GRAVITY SEWER | 2,423 LF | | |
| 0210 | 5691500000-E | 1520 | 12" SANITARY GRAVITY SEWER | 2,051 LF | | |
| 0211 | 5691700000-E | 1520 | 18" SANITARY GRAVITY SEWER | 24 LF | | |
| 0212 | 5768000000-N | 1520 | SANITARY SEWER CLEAN-OUT | 47 EA | | |
| 0213 | 5775000000-E | 1525 | 4' DIA UTILITY MANHOLE | 25 EA | | |
| 0214 | 5776000000-E | 1525 | 5' DIA UTILITY MANHOLE | 2 EA | | |
| 0215 | 5777000000-E | 1525 | 6' DIA UTILITY MANHOLE | 12 EA | | |
| 0216 | 5778000000-E | 1525 | 8' DIA UTILITY MANHOLE | 3 EA | | |
| 0217 | 5781000000-E | 1525 | UTILITY MANHOLE WALL, 4' DIA | 51 LF | | |
| 0218 | 5782000000-E | 1525 | UTILITY MANHOLE WALL, 5' DIA | 17 LF | | |
| 0219 | 5783000000-E | 1525 | UTILITY MANHOLE WALL, 6' DIA | 98 LF | | |
| 0220 | 5784000000-E | 1525 | UTILITY MANHOLE WALL, 8' DIA | 24 LF | | |
| 0221 | 5800000000-E | 1530 | ABANDON 6" UTILITY PIPE | 336 LF | | |
| 0222 | 5801000000-E | 1530 | ABANDON 8" UTILITY PIPE | 4,588 LF | | |
| 0223 | 5804000000-E | 1530 | ABANDON 12" UTILITY PIPE | 6,150 LF | | |
| 0224 | 5813000000-E | 1530 | ABANDON 24" UTILITY PIPE | 1,411 LF | | |
| 0225 | 5816000000-N | 1530 | ABANDON UTILITY MANHOLE | 15 EA | | |
| 0226 | 5828000000-N | 1530 | REMOVE UTILITY MANHOLE | 4 EA | | |
| 0227 | 5835700000-E | 1540 | 16" ENCASEMENT PIPE | 600 LF | | |
| 0228 | 5836000000-E | 1540 | 24" ENCASEMENT PIPE | 740 LF | | |

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|---|---|---|---|---|---|---|
| 0229 | 5871900000-E | 1550 | TRENCHLESS INSTALLATION OF 16" IN SOIL | 285 LF | | |
| 0230 | 5871910000-E | 1550 | TRENCHLESS INSTALLATION OF 16" NOT IN SOIL | 285 LF | | |
| 0231 | 5872200000-E | 1550 | TRENCHLESS INSTALLATION OF 24" IN SOIL | 265 LF | | |
| 0232 | 5872210000-E | 1550 | TRENCHLESS INSTALLATION OF 24" NOT IN SOIL | 265 LF | | |
| 0233 | 5882000000-N | SP | GENERIC UTILITY ITEM 12" INSERTION VALVE ASSEMBLY | 5 EA | | |
| 0234 | 5882000000-N | SP | GENERIC UTILITY ITEM 2" AIR RELEASE VALVE | 1 EA | | |
| 0235 | 6000000000-E | 1605 | TEMPORARY SILT FENCE | 25,000 LF | | |
| 0236 | 6006000000-E | 1610 | STONE FOR EROSION CONTROL, CLASS A | 400 TON | | |
| 0237 | 6009000000-E | 1610 | STONE FOR EROSION CONTROL, CLASS B | 70 TON | | |
| 0238 | 6012000000-E | 1610 | SEDIMENT CONTROL STONE | 2,300 TON | | |
| 0239 | 6015000000-E | 1615 | TEMPORARY MULCHING | 24 ACR | | |
| 0240 | 6018000000-E | 1620 | SEED FOR TEMPORARY SEEDING | 1,200 LB | | |
| 0241 | 6021000000-E | 1620 | FERTILIZER FOR TEMPORARY SEED-ING | 7 TON | | |
| 0242 | 6024000000-E | 1622 | TEMPORARY SLOPE DRAINS | 200 LF | | |
| 0243 | 6029000000-E | SP | SAFETY FENCE | 200 LF | | |
| 0244 | 6030000000-E | 1630 | SILT EXCAVATION | 1,290 CY | | |
| 0245 | 6036000000-E | 1631 | MATTING FOR EROSION CONTROL | 15,000 SY | | |
| 0246 | 6037000000-E | SP | COIR FIBER MAT | 100 SY | | |

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|---|---|---|---|---|---|---|
| 0247 | 6042000000-E | 1632 | 1/4" HARDWARE CLOTH | 10,000 LF | | |
| 0248 | 6045000000-E | SP | **" TEMPORARY PIPE (24") | 400 LF | | |
| 0249 | 6070000000-N | 1639 | SPECIAL STILLING BASINS | 4 EA | | |
| 0250 | 6071020000-E | SP | POLYACRYLAMIDE (PAM) | 10 LB | | |
| 0251 | 6071030000-E | 1640 | COIR FIBER BAFFLE | 225 LF | | |
| 0252 | 6071050000-E | SP | **" SKIMMER (2") | 1 EA | | |
| 0253 | 6084000000-E | 1660 | SEEDING & MULCHING | 18 ACR | | |
| 0254 | 6087000000-E | 1660 | MOWING | 15 ACR | | |
| 0255 | 6090000000-E | 1661 | SEED FOR REPAIR SEEDING | 250 LB | | |
| 0256 | 6093000000-E | 1661 | FERTILIZER FOR REPAIR SEEDING | 0.75 TON | | |
| 0257 | 6096000000-E | 1662 | SEED FOR SUPPLEMENTAL SEEDING | 375 LB | | |
| 0258 | 6108000000-E | 1665 | FERTILIZER TOPDRESSING | 11.25 TON | | |
| 0259 | 6111000000-E | SP | IMPERVIOUS DIKE | 55 LF | | |
| 0260 | 6114500000-N | 1667 | SPECIALIZED HAND MOWING | 40 MHR | | |
| 0261 | 6117000000-N | SP | RESPONSE FOR EROSION CONTROL | 50 EA | | |
| 0262 | 6132000000-N | SP | GENERIC EROSION CONTROL ITEM CONCRETE WASHOUT STRUCTURE | 8 EA | | |
| 0263 | 7048500000-E | 1705 | PEDESTRIAN SIGNAL HEAD (16", 1 SECTION W/COUNTDOWN) | 20 EA | | |
| 0264 | 7060000000-E | 1705 | SIGNAL CABLE | 6,625 LF | | |
| 0265 | 7108000000-E | 1705 | VEHICLE SIGNAL HEAD (12", 1 SECTION) | 4 EA | | |

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|---|---|---|---|---|---|---|
| 0266 | 7120000000-E | 1705 | VEHICLE SIGNAL HEAD (12", 3 SECTION) | 23 EA | | |
| 0267 | 7132000000-E | 1705 | VEHICLE SIGNAL HEAD (12", 4 SECTION) | 1 EA | | |
| 0268 | 7144000000-E | 1705 | VEHICLE SIGNAL HEAD (12", 5 SECTION) | 3 EA | | |
| 0269 | 7252000000-E | 1710 | MESSENGER CABLE (1/4") | 500 LF | | |
| 0270 | 7279000000-E | 1715 | TRACER WIRE | 1,800 LF | | |
| 0271 | 7288000000-E | 1715 | PAVED TRENCHING (**********) (1, 2") | 25 LF | | |
| 0272 | 7300000000-E | 1715 | UNPAVED TRENCHING (**********) (1, 2") | 800 LF | | |
| 0273 | 7300000000-E | 1715 | UNPAVED TRENCHING (**********) (2, 2") | 225 LF | | |
| 0274 | 7300100000-E | 1715 | UNPAVED TRENCHING FOR TEMP-ORARY LEAD-IN | 350 LF | | |
| 0275 | 7301000000-E | 1715 | DIRECTIONAL DRILL (**********) (1, 2") | 675 LF | | |
| 0276 | 7301000000-E | 1715 | DIRECTIONAL DRILL (**********) (2, 2") | 1,725 LF | | |
| 0277 | 7301000000-E | 1715 | DIRECTIONAL DRILL (**********) (3, 2") | 50 LF | | |
| 0278 | 7324000000-N | 1716 | JUNCTION BOX (STANDARD SIZE) | 31 EA | | |
| 0279 | 7348000000-N | 1716 | JUNCTION BOX (OVER-SIZED, HEA-VY DUTY) | 8 EA | | |
| 0280 | 7360000000-N | 1720 | WOOD POLE | 2 EA | | |
| 0281 | 7372000000-N | 1721 | GUY ASSEMBLY | 5 EA | | |
| 0282 | 7430000000-N | 1722 | HEAT SHRINK TUBING RETROFIT KIT | 1 EA | | |

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|---|---|---|---|---|---|---|
| 0283 | 7432000000-E | 1722 | 2" RISER WITH HEAT SHRINK TUBING | 4 EA | | |
| 0284 | 7444000000-E | 1725 | INDUCTIVE LOOP SAWCUT | 4,025 LF | | |
| 0285 | 7456000000-E | 1726 | LEAD-IN CABLE (**********) (14-2) | 5,425 LF | | |
| 0286 | 7516000000-E | 1730 | COMMUNICATIONS CABLE (**FIBER) (12) | 1,200 LF | | |
| 0287 | 7516000000-E | 1730 | COMMUNICATIONS CABLE (**FIBER) (48) | 2,100 LF | | |
| 0288 | 7540000000-N | 1731 | SPLICE ENCLOSURE | 3 EA | | |
| 0289 | 7541000000-N | 1731 | MODIFY SPLICE ENCLOSURE | 3 EA | | |
| 0290 | 7552000000-N | 1731 | INTERCONNECT CENTER | 3 EA | | |
| 0291 | 7566000000-N | 1733 | DELINEATOR MARKER | 5 EA | | |
| 0292 | 7575160000-E | 1734 | REMOVE EXISTING COMMUNICATIONS CABLE | 1,400 LF | | |
| 0293 | 7575180000-N | 1735 | CABLE TRANSFER | 1 EA | | |
| 0294 | 7588000000-N | SP | METAL POLE WITH SINGLE MAST ARM | 5 EA | | |
| 0295 | 7590000000-N | SP | METAL POLE WITH DUAL MAST ARM | 3 EA | | |
| 0296 | 7613000000-N | SP | SOIL TEST | 8 EA | | |
| 0297 | 7614100000-E | SP | DRILLED PIER FOUNDATION | 48 CY | | |
| 0298 | 7631000000-N | SP | MAST ARM WITH METAL POLE DE-SIGN | 8 EA | | |
| 0299 | 7636000000-N | 1745 | SIGN FOR SIGNALS | 12 EA | | |
| 0300 | 7642100000-N | 1743 | TYPE I POST WITH FOUNDATION | 1 EA | | |
| 0301 | 7642200000-N | 1743 | TYPE II PEDESTAL WITH FOUND-ATION | 14 EA | | |

County : Wake

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|---|---|---|---|---|---|---|
| 0302 | 7642300000-N | 1743 | TYPE III PEDESTAL WITH FOUND-ATION | 2 EA | | |
| 0303 | 7648000000-N | 1746 | RELOCATE EXISTING SIGN | 4 EA | | |
| 0304 | 7684000000-N | 1750 | SIGNAL CABINET FOUNDATION | 3 EA | | |
| 0305 | 7756000000-N | 1751 | CONTROLLER WITH CABINET (TYPE 2070L, BASE MOUNTED) | 3 EA | | |
| 0306 | 7780000000-N | 1751 | DETECTOR CARD (TYPE 2070L) | 14 EA | | |
| 0307 | 7901000000-N | 1753 | CABINET BASE EXTENDER | 3 EA | | |
| 0308 | 7960000000-N | SP | METAL POLE FOUNDATION REMOVAL | 3 EA | | |
| 0309 | 7972000000-N | SP | METAL POLE REMOVAL | 3 EA | | |
| 0310 | 7980000000-N | SP | GENERIC SIGNAL ITEM 900MHZ SPREAD SPECTRUM ETHER-NET RADIO | 2 EA | | |
| 0311 | 7980000000-N | SP | GENERIC SIGNAL ITEM ETHRNET EDGE SWITCH | 3 EA | | |
| 0312 | 7980000000-N | SP | GENERIC SIGNAL ITEM RELOCATE FLASHER CABINET/SOLAR ASSEMBLY/RADIO ASSEMBLY | 1 EA | | |
| 0355 | 2190000000-N | 828 | TEMPORARY STEEL PLATE COVERS FOR MASONRY DRAINAGE STRUCTURE | 25 EA | | |
| 0356 | 2542000000-E | 846 | 1'-6" CONCRETE CURB & GUTTER | 592 LF | | |
| 0357 | 2738000000-E | SP | GENERIC PAVING ITEM CONCRETE PAVER SIDEWALK | 391 SY | | |
| 0358 | 2738000000-E | SP | GENERIC PAVING ITEM CONCRETE PAVER MEDIAN ISLAND | 297 SY | | |
| 0359 | 2738000000-E | SP | GENERIC PAVING ITEM CONCRETE SIDEWALK (CAPITAL CITY GRID) | 2,645 SY | | |
| 0360 | 3575000000-E | SP | GENERIC FENCING ITEM ORNAMENTAL FENCE | 54 LF | | |

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|---|---|---|---|---|---|---|
| 0361 | 6645000000-N | SP | GENERIC PLANTING ITEM<br>TREE WELL SYSTEM | 31<br>EA | | |
| 0362 | 0000910000-N | SP | GENERIC MISCELLANEOUS ITEM<br>EXPLORATORY EXCAVATION - STANDARD | 600<br>HR | | |
| 0363 | 0000910000-N | SP | GENERIC MISCELLANEOUS ITEM<br>EXPLORATORY EXCAVATION - VACUUM | 150<br>HR | | |
| 0364 | 5120000000-N | 1407 | ELECTRIC SERVICE POLE **** ********<br>(30', CLASS 4) | 3<br>EA | | |
| 0365 | 5125000000-E | 1407 | ELECTRIC SERVICE LATERAL **********<br>(3, #1/0 USE) | 45<br>LF | | |
| 0366 | 5270000000-N | SP | GENERIC LIGHTING ITEM<br>LIGHT CONTROL SYSTEM, TYPE RW, 120/240V | 3<br>EA | | |
| 0367 | 5155000000-E | 1409 | ELECTRICAL DUCT, TYPE BD, SIZE *****<br>(2") | 370<br>LF | | |
| 0368 | 5160000000-E | 1409 | ELECTRICAL DUCT, TYPE JA, SIZE *****<br>(4") | 150<br>LF | | |
| 0369 | 5170000000-E | 1410 | ** #8 W/G FEEDER CIRCUIT<br>(2) | 320<br>LF | | |
| 0370 | 5205000000-E | 1410 | ** #8 W/G FEEDER CIRCUIT IN *****" CONDUIT<br>(2, 1-1/2") | 2,930<br>LF | | |
| 0371 | 5270000000-N | SP | GENERIC LIGHTING ITEM<br>ELECTRICAL JUNCTION BOXES TYPE PC18 | 2<br>EA | | |
| 0372 | 5270000000-N | SP | GENERIC LIGHTING ITEM<br>ELECTRICAL JUNCTION BOXES TYPE PC30 | 2<br>EA | | |
| 0373 | 5252000000-N | 1412 | UNDERPASS LUMINARIES *********<br>(TYPE WM) | 8<br>EA | | |
| 0374 | 5260000000-N | SP | GENERIC LIGHTING ITEM<br>ELECTRICAL CONDUIT SYSTEM AT PEACE ST | Lump Sum | L.S. | |

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|---|---|---|---|---|---|---|
| 0375 | 5270000000-N | SP | GENERIC LIGHTING ITEM SPOTLIGHT LUMINAIRE | 8 EA | | |
| 0376 | 5270000000-N | SP | GENERIC LIGHTING ITEM AESTHETIC LIGHTING LUMINAIRE | 169 EA | | |
| 0377 | 5260000000-N | SP | GENERIC LIGHTING ITEM AESTHETIC LIGHTING SYSTEM AT BRIDGE OVER PEACE ST | Lump Sum | L.S. | |
| 0378 | 5260000000-N | SP | GENERIC LIGHTING ITEM AESTHETIC LIGHTING SYSTEM AT WADE AVE FLYOVER | Lump Sum | L.S. | |
| | | | **CULVERT ITEMS** | | | |
| 0313 | 8056000000-N | 402 | REMOVAL OF EXISTING STRUCTURE AT STATION ********** (15+13.11-Y1-) | Lump Sum | L.S. | |
| 0314 | 8126000000-N | 414 | CULVERT EXCAVATION, STA ****** (15+13.11-Y1-) | Lump Sum | L.S. | |
| 0315 | 8133000000-E | 414 | FOUNDATION CONDITIONING MATER-IAL, BOX CULVERT | 258 TON | | |
| 0316 | 8196000000-E | 420 | CLASS A CONCRETE (CULVERT) | 331.2 CY | | |
| 0317 | 8245000000-E | 425 | REINFORCING STEEL (CULVERT) | 49,779 LB | | |
| | | | **WALL ITEMS** | | | |
| 0318 | 8801000000-E | SP | MSE RETAINING WALL NO **** (2) | 4,230 SF | | |
| 0319 | 8801000000-E | SP | MSE RETAINING WALL NO **** (3) | 4,150 SF | | |
| 0320 | 8801000000-E | SP | MSE RETAINING WALL NO **** (4) | 3,305 SF | | |

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|---|---|---|---|---|---|---|
| 0321 | 8801000000-E | SP | MSE RETAINING WALL NO ****<br>(5) | 2,535<br>SF | | |
| | | | ******* BEGIN SCHEDULE IA *******<br>******* ( 2 ALTERNATES ) ******* | | | |
| 0322<br>IA1 | 8801000000-E | SP | MSE RETAINING WALL NO ****<br>(1) | 3,910<br>SF | | |
| | | | *** OR *** | | | |
| 0323<br>IA2 | 8802014000-E | SP | SOLDIER PILE RETAINING WALLS | 3,595<br>SF | | |
| | | | ***** END SCHEDULE IA ***** | | | |
| | | | **STRUCTURE ITEMS** | | | |
| 0324 | 8035000000-N | 402 | REMOVAL OF EXISTING STRUCTURE AT STATION **********<br>(20+19.94 -FLYOVER-) | Lump Sum | L.S. | |
| 0325 | 8035000000-N | 402 | REMOVAL OF EXISTING STRUCTURE AT STATION **********<br>(22+06.91-L-) | Lump Sum | L.S. | |
| 0326 | 8096000000-E | 450 | PILE EXCAVATION IN SOIL | 191<br>LF | | |
| 0327 | 8097000000-E | 450 | PILE EXCAVATION NOT IN SOIL | 76<br>LF | | |
| 0328 | 8105540000-E | 411 | 3'-6" DIA DRILLED PIERS IN SOIL | 112<br>LF | | |
| 0329 | 8105640000-E | 411 | 3'-6" DIA DRILLED PIERS NOT IN SOIL | 70<br>LF | | |
| 0330 | 8112730000-N | 450 | PDA TESTING | 2<br>EA | | |
| 0331 | 8113000000-N | 411 | SID INSPECTIONS | 2<br>EA | | |
| 0332 | 8115000000-N | 411 | CSL TESTING | 2<br>EA | | |
| 0333 | 8147000000-E | 420 | REINFORCED CONCRETE DECK SLAB | 14,218<br>SF | | |
| 0334 | 8154000000-E | 420 | REINFORCED CONCRETE DECK SLAB (SAND LIGHTWEIGHT CONC) | 16,350<br>SF | | |

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|---|---|---|---|---|---|---|
| 0335 | 8161000000-E | 420 | GROOVING BRIDGE FLOORS | 31,190 SF | | |
| 0336 | 8182000000-E | 420 | CLASS A CONCRETE (BRIDGE) | 441.5 CY | | |
| 0337 | 8210000000-N | 422 | BRIDGE APPROACH SLABS, STATION ********** (20+19.94-FLYOVER-) | Lump Sum | L.S. | |
| 0338 | 8210000000-N | 422 | BRIDGE APPROACH SLABS, STATION ********** (22+06.91-L-) | Lump Sum | L.S. | |
| 0339 | 8217000000-E | 425 | REINFORCING STEEL (BRIDGE) | 68,480 LB | | |
| 0340 | 8238000000-E | 425 | SPIRAL COLUMN REINFORCING STEEL (BRIDGE) | 6,384 LB | | |
| 0341 | 8277000000-E | 430 | MODIFIED 72" PRESTRESSED CONC GIRDERS | 1,840.71 LF | | |
| 0342 | 8280000000-E | 440 | APPROX ..... LBS STRUCTURAL STEEL | 652,000 LS | | |
| 0343 | 8364000000-E | 450 | HP12X53 STEEL PILES | 2,135 LF | | |
| 0344 | 8391000000-N | 450 | STEEL PILE POINTS | 50 EA | | |
| 0345 | 8517000000-E | 460 | 1'-**"X *****" CONCRETE PARA-PET (1'-4" X 3'-6") | 182.71 LF | | |
| 0346 | 8522000000-E | 460 | GENERIC STRUCTURE ITEM DECORATIVE CONCRETE PARAPET | 775.24 LF | | |
| 0347 | 8531000000-E | 462 | 4" SLOPE PROTECTION | 210 SY | | |
| 0348 | 8654000000-N | SP | DISC BEARINGS | Lump Sum | L.S. | |
| 0349 | 8657000000-N | 430 | ELASTOMERIC BEARINGS | Lump Sum | L.S. | |
| 0350 | 8706000000-N | SP | EXPANSION JOINT SEALS | Lump Sum | L.S. | |
| 0351 | 8860000000-N | SP | GENERIC STRUCTURE ITEM APPLICATION OF BRIDGE COATING | Lump Sum | L.S. | |
| 0352 | 8860000000-N | SP | GENERIC STRUCTURE ITEM ASBESTOS ASSESSMENT | Lump Sum | L.S. | |

County : Wake

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|---|---|---|---|---|---|---|
| 0353 | 8867000000-E | SP | GENERIC STRUCTURE ITEM<br>CONC PARAPET WITH MOMENT SLAB | 367.62<br>LF | | |
| 0354 | 8892000000-E | SP | GENERIC STRUCTURE ITEM<br>PRECAST CONCRETE PANELS | 383<br>SF | | |
| 0379 | 8867000000-E | SP | GENERIC STRUCTURE ITEM<br>ARCHITECTURAL METAL FASCIA | 718.75<br>LF | | |

# Vendor 1 of 4: ZACHRY CONSTRUCTION CORPORATION (9105)
# Call Order 001 (Proposal: C203751)

## Bid Information

**Proposal County:** WAKE

**Vendor Address:** 2330 North Loop 1604 West
San Antonio , Texas , 78248-4512

**Signature Check:** Samuel_White_9105

**Time Bid Received:** July 19, 2016 01:57 PM

**Amendment Count:** 2

**Bid Checksum:** B36CEAE1

**Bid Total:** $36,902,396.26

**Items Total:** $36,902,396.26

**Time Total:** $0.00

**Bidding Errors:**

Section Error : Section Error: section 0003 only parti
Item Error : item option group IA has too many choices
DBE Warning : DBE Warning: DBE Commitment Goal not met

DBE GOAL SET: 12.0%
DBE GOAL OBT: 10.4%

# Vendor 1 of 4: ZACHRY CONSTRUCTION CORPORATION (9105)
# Call Order 001 (Proposal: C203751)

## Bid Bond Information

| | | | |
|---|---|---|---|
| **Projects:** | | **Bond Maximum:** | |
| **Counties:** | | **State of Incorporation:** | |
| **Bond ID:** | SNC16833293 | **Agency Execution Date:** | 7/12/2016 9 |
| **Paid by Check:** | No | **Surety Name:** | surety2000 |
| **Bond Percent:** | 5% | **Bond Agency Name:** | Zurich American Insurance Company |

Bidder 1 of 4

Vendor 9105's Bid Information for Call 001, Letting L160719, 07/19/16

Zachry Construction Corporation (9105)
Call Order 001 (Proposal ID C203751)

LIST OF DBE PARTICIPANTS

| VENDOR NUMBER | DBE NAME / ADDRESS | WORK CODE TYPE OF WORK | CERT TYPE | AMOUNT | |
|---|---|---|---|---|---|
| 9210 MB | AUSTIN TRUCKING LLC<br>P.O. BOX 606 , CLAYTON, NC 27528 | | Sub | 189,999.98 | COMMITTED |
| 4761 | TRAFFIC CONTROL SAFETY SERVICES<br>POST OFFICE BOX 24511 , WINSTON-SALEM, NC 27114 | | Sub | 148,946.50 | |
| 4247 WB | SEAL BROTHERS CONTRACTING LLC<br>131 W. CLEVE STREET , MOUNT AIRY, NC 27030 | | Sub | 84,986.06 | COMMITTED |
| 4898 | BULLINGTON CONSTRUCTION INC<br>417 FOXGLOVE LANE , INDIAN TRAIL, NC 28079 | | Sub | 87,523.64 | |
| 11572 MB | CRUZ BROTHERS CONCRETE, INC.<br>1572 PAYNE ROAD/LOT 75 LOT 75 , GRAHAM, NC 27253 | | Sub | 1,068,329.37 | COMMITTED |
| 4898 | BULLINGTON CONSTRUCTION INC<br>417 FOXGLOVE LANE , INDIAN TRAIL, NC 28079 | | Sub | 189,473.30 | |
| 12552 WB | ASPHALT SERVICES ON DEMAND INC<br>959 SHORT JOURNEY ROAD , SMITHFIELD, NC 27577 | | Sub | 88,327.00 | COMMITTED |
| 4880 WB | TRICOR CONSTRUCTION INC<br>625 POPLAR STREET , SPARTANBURG, SC 29302 | | Sub | 981,339.23 | COMMITTED |
| 4761 WB | TRAFFIC CONTROL SAFETY SERVICES<br>POST OFFICE BOX 24511 , WINSTON-SALEM, NC 27114 | | Sub | 191,822.20 | COMMITTED |
| 7294 MB | STRATCON CONTRACTING CORP<br>OLD WILLIAMS ROAD , RALEIGH, NC 27610 | | Sub | 583,727.00 | COMMITTED |
| 5188 MB | VISTABUTION, LLC<br>1407 GAYLORD DR , RALEIGH, NC 27612-2652 | | Sub | 656,689.07 | COMMITTED |
| | | | TOTAL: | $4,081,690.05 | |

~~11.06%~~ 10.4%

Vendor 9105's Bid Information for Call 001, Letting L160719, 07/19/16

Zachry Construction Corporation (9105)
Call Order 001 (Proposal ID C203751)

Miscelleneous Data Info - Contractor Responses:
==========

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 acknowleges 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

Bidder 1 of 4

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: SNC16833293
Surety Registry Agency: surety2000
Verified?: Yes
Surety Agency: Zurich American Insurance Company
Bond Execution Date: 7/12/2016 9
Bond Amount: $1,845,119.81 (Five Percent of Bid)

Contract ID: C203751 Project(s): BRNHS-0070(119)
Letting Date: 07-19-16 Call Order: 001
Bidder: 9105 - Zachry Construction Corporation

| Line No. | Item Description | Approx. Quantity and Units | Unit Price Dollars | Unit Price Cts | Bid Amount Dollars | Bid Amount Ct |
|---|---|---|---|---|---|---|
| Section 0001 | ROADWAY ITEMS - NPAR (CITY OF RALEIGH) | | | | | |
| | Alt Group | | | | | |
| 0001 | 0000100000-N MOBILIZATION | LUMP | LUMP | | 1,800,000.00 | |
| 0002 | 0000400000-N CONSTRUCTION SURVEYING | LUMP | LUMP | | 898,220.37 | |
| 0003 | 0000900000-N GENERIC MISCELLANEOUS ITEM UTILITY COORDINATOR | LUMP | LUMP | | 598,441.99 | |
| 0004 | 0001000000-E CLEARING & GRUBBING .. ACRE(S) | LUMP | LUMP | | 2,000,000.00 | |
| 0005 | 0008000000-E SUPPLEMENTARY CLEARING & GRUB-BING | 1.000 ACR | 10,000.00000 | | 10,000.00 | |
| 0006 | 0022000000-E UNCLASSIFIED EXCAVATION | 44,700.000 CY | 15.00000 | | 670,500.00 | |
| 0007 | 0036000000-E UNDERCUT EXCAVATION | 3,198.000 CY | 22.50000 | | 71,955.00 | |
| 0008 | 0106000000-E BORROW EXCAVATION | 32,000.000 CY | 40.00000 | | 1,280,000.00 | |
| 0009 | 0134000000-E DRAINAGE DITCH EXCAVATION | 240.000 CY | 35.00000 | | 8,400.00 | |
| 0010 | 0141000000-E BERM DITCH CONSTRUCTION | 260.000 LF | 6.00000 | | 1,560.00 | |
| 0011 | 0156000000-E REMOVAL OF EXISTING ASPHALT PAVEMENT | 13,900.000 SY | 5.00000 | | 69,500.00 | |

Contract ID: C203751 Project(s): BRNHS-0070(119)
Letting Date: 07-19-16 Call Order: 001
Bidder: 9105 - Zachry Construction Corporation

| Line No. | Item Description | Approx. Quantity and Units | Unit Price Dollars | Unit Price Cts | Bid Amount Dollars | Bid Amount Ct |
|---|---|---|---|---|---|---|
| 0012 | 0163000000-E REMOVAL OF EXISTING CONCRETE PAVEMENT | 36,900.000 SY | 15.00 | 00 | 553,500.00 | |
| 0013 | 0177000000-E BREAKING OF EXISTING ASPHALT PAVEMENT | 3,100.000 SY | 7.00 | 00 | 21,700.00 | |
| 0014 | 0192000000-N PROOF ROLLING | 10.000 HR | 1,000.00 | 00 | 10,000.00 | |
| 0015 | 0195000000-E SELECT GRANULAR MATERIAL | 4,400.000 CY | 30.00 | 00 | 132,000.00 | |
| 0016 | 0196000000-E GEOTEXTILE FOR SOIL STABILIZA-TION | 25,300.000 SY | 1.80 | 00 | 45,540.00 | |
| 0017 | 0199000000-E TEMPORARY SHORING | 8,717.000 SF | 30.00 | 00 | 261,510.00 | |
| 0018 | 0223000000-E ROCK PLATING | 380.000 SY | 65.00 | 00 | 24,700.00 | |
| 0019 | 0255000000-E GENERIC GRADING ITEM HAULING & DISPOSAL OF PETROLE- UM CONTAMINTED SOIL | 500.000 TON | 100.00 | 00 | 50,000.00 | |
| 0020 | 0314000000-E SELECT MATERIAL, CLASS ***** (IV) | 70.000 TON | 55.00 | 00 | 3,850.00 | |
| 0021 | 0318000000-E FOUNDATION CONDITIONING MATE- RIAL, MINOR STRUCTURES | 2,550.000 TON | 24.00 | 00 | 61,200.00 | |
| 0022 | 0320000000-E FOUNDATION CONDITIONING GEO- TEXTILE | 8,350.000 SY | 1.10 | 00 | 9,185.00 | |

Contract ID: C203751 Project(s): BRNHS-0070(119)
Letting Date: 07-19-16 Call Order: 001
Bidder: 9105 - Zachry Construction Corporation

| Line No. | Item Description | Approx. Quantity and Units | Unit Price Dollars | Unit Price Cts | Bid Amount Dollars | Bid Amount Ct |
|---|---|---|---|---|---|---|
| 0023 | 0342000000-E **" SIDE DRAIN PIPE (42") | 76.000 LF | 355.00000 | | 26,980.00 | |
| 0024 | 0342000000-E **" SIDE DRAIN PIPE (60") | 48.000 LF | 475.00000 | | 22,800.00 | |
| 0025 | 0342000000-E **" SIDE DRAIN PIPE (8") | 12.000 LF | 175.00000 | | 2,100.00 | |
| 0026 | 0343000000-E 15" SIDE DRAIN PIPE | 712.000 LF | 115.00000 | | 81,880.00 | |
| 0027 | 0344000000-E 18" SIDE DRAIN PIPE | 76.000 LF | 215.00000 | | 16,340.00 | |
| 0028 | 0345000000-E 24" SIDE DRAIN PIPE | 56.000 LF | 220.00000 | | 12,320.00 | |
| 0029 | 0348000000-E **" SIDE DRAIN PIPE ELBOWS (15") | 2.000 EA | 250.00000 | | 500.00 | |
| 0030 | 0354000000-E ***" RC PIPE CULVERTS, CLASS ***** (15", V) | 596.000 LF | 90.00000 | | 53,640.00 | |
| 0031 | 0354000000-E ***" RC PIPE CULVERTS, CLASS ***** (18", V) | 800.000 LF | 120.00000 | | 96,000.00 | |
| 0032 | 0354000000-E ***" RC PIPE CULVERTS, CLASS ***** (24", V) | 176.000 LF | 110.00000 | | 19,360.00 | |
| 0033 | 0448000000-E ****" RC PIPE CULVERTS, CLASS IV (48") | 724.000 LF | 255.00000 | | 184,620.00 | |
| 0034 | 0448000000-E ****" RC PIPE CULVERTS, CLASS IV (54") | 128.000 LF | 315.00000 | | 40,320.00 | |

Contract ID: C203751 Project(s): BRNHS-0070(119)
Letting Date: 07-19-16 Call Order: 001
Bidder: 9105 - Zachry Construction Corporation

| Line No. | Item Description | Approx. Quantity and Units | Unit Price Dollars | Unit Price Cts | Bid Amount Dollars | Bid Amount Ct |
|---|---|---|---|---|---|---|
| 0035 | 0448000000-E **** RC PIPE CULVERTS, CLASS IV (60") | 412.000 LF | 410.00000 | | 168,920.00 | |
| 0036 | 0448200000-E 15" RC PIPE CULVERTS, CLASS IV | 4,040.000 LF | 80.00000 | | 323,200.00 | |
| 0037 | 0448300000-E 18" RC PIPE CULVERTS, CLASS IV | 2,800.000 LF | 96.00000 | | 268,800.00 | |
| 0038 | 0448400000-E 24" RC PIPE CULVERTS, CLASS IV | 948.000 LF | 125.00000 | | 118,500.00 | |
| 0039 | 0448600000-E 36" RC PIPE CULVERTS, CLASS IV | 252.000 LF | 170.00000 | | 42,840.00 | |
| 0040 | 0448700000-E 42" RC PIPE CULVERTS, CLASS IV | 396.000 LF | 200.00000 | | 79,200.00 | |
| 0041 | 0542000000-E **" PVC PIPE CULVERTS (8") | 8.000 LF | 190.00000 | | 1,520.00 | |
| 0042 | 0582000000-E 15" CS PIPE CULVERTS, 0.064" THICK | 60.000 LF | 145.00000 | | 8,700.00 | |
| 0043 | 0588000000-E 18" CS PIPE CULVERTS, 0.064" THICK | 60.000 LF | 200.00000 | | 12,000.00 | |
| 0044 | 0636000000-E **" CS PIPE ELBOWS, *****" THICK (15", 0.064") | 2.000 EA | 255.00000 | | 510.00 | |
| 0045 | 0636000000-E **" CS PIPE ELBOWS, *****" THICK (18", 0.064") | 2.000 EA | 285.00000 | | 570.00 | |

Contract ID: C203751 Project(s): BRNHS-0070(119)
Letting Date: 07-19-16 Call Order: 001
Bidder: 9105 - Zachry Construction Corporation

| Line No. | Item Description | Approx. Quantity and Units | Unit Price Dollars | Unit Price Cts | Bid Amount Dollars | Bid Amount Ct |
|---|---|---|---|---|---|---|
| 0046 | 0973100000-E **" WELDED STEEL PIPE, ****" THICK, GRADE B IN SOIL (42", 0.625") | 48.000 LF | 549.00000 | | 26,352.00 | |
| 0047 | 0973100000-E **" WELDED STEEL PIPE, ****" THICK, GRADE B IN SOIL (60", 0.875") | 50.000 LF | 999.00000 | | 49,950.00 | |
| 0048 | 0973300000-E **" WELDED STEEL PIPE, ****" THICK, GRADE B NOT IN SOIL (42", 0.625") | 48.000 LF | 999.00000 | | 47,952.00 | |
| 0049 | 0973300000-E **" WELDED STEEL PIPE, ****" THICK, GRADE B NOT IN SOIL (60", 0.875") | 50.000 LF | 1,905.00000 | | 95,250.00 | |
| 0050 | 0986000000-E GENERIC PIPE ITEM 16" DUCTILE IRON PIPE, CLASS 250, SEALED | 208.000 LF | 195.00000 | | 40,560.00 | |
| 0051 | 0986000000-E GENERIC PIPE ITEM 18" DUCTILE IRON PIPE, CLASS 250, SEALED | 52.000 LF | 260.00000 | | 13,520.00 | |
| 0052 | 0986000000-E GENERIC PIPE ITEM 24" DUCTILE IRON PIPE, CLASS 200, SEALED | 248.000 LF | 210.00000 | | 52,080.00 | |
| 0053 | 0986000000-E GENERIC PIPE ITEM 36" DUCTILE IRON PIPE, CLASS 150, SEALED | 176.000 LF | 560.00000 | | 98,560.00 | |
| 0054 | 0992000000-E GENERIC PIPE ITEM BOOTS FOR SEALED DRAINAGE STRUCTURES | 16.000 EA | 750.00000 | | 12,000.00 | |

Contract ID: C203751 Project(s): BRNHS-0070(119)
Letting Date: 07-19-16 Call Order: 001
Bidder: 9105 - Zachry Construction Corporation

| Line No. | Item Description | Approx. Quantity and Units | Unit Price Dollars | Unit Price Cts | Bid Amount Dollars | Bid Amount Ct |
|---|---|---|---|---|---|---|
| 0055 | 0995000000-E PIPE REMOVAL | 3,128.000 LF | 31.00000 | | 96,968.00 | |
| 0056 | 1000000000-E 6" SLOPE PROTECTION | 57.000 SY | 150.00000 | | 8,550.00 | |
| 0057 | 1011000000-N FINE GRADING | LUMP | LUMP | | 750,000.00 | |
| 0058 | 1099500000-E SHALLOW UNDERCUT | 6,818.000 CY | 12.00000 | | 81,816.00 | |
| 0059 | 1099700000-E CLASS IV SUBGRADE STABILIZA- TION | 13,800.000 TON | 15.00000 | | 207,000.00 | |
| 0060 | 1110000000-E STABILIZER AGGREGATE | 500.000 TON | 40.00000 | | 20,000.00 | |
| 0061 | 1115000000-E GEOTEXTILE FOR PAVEMENT STA- BILIZATION | 5,961.000 SY | 8.00000 | | 47,688.00 | |
| 0062 | 1121000000-E AGGREGATE BASE COURSE | 430.000 TON | 40.00000 | | 17,200.00 | |
| 0063 | 1220000000-E INCIDENTAL STONE BASE | 500.000 TON | 60.00000 | | 30,000.00 | |
| 0064 | 1297000000-E MILLING ASPHALT PAVEMENT, ***"DEPTH (1-1/2") | 2,250.000 SY | 7.00000 | | 15,750.00 | |
| 0065 | 1308000000-E MILLING ASPHALT PAVEMENT, ***"TO ******" (0" TO 1-1/2") | 1,170.000 SY | 11.00000 | | 12,870.00 | |
| 0066 | 1330000000-E INCIDENTAL MILLING | 2,580.000 SY | 8.61000 | | 22,213.80 | |

Contract ID: C203751 Project(s): BRNHS-0070(119)
Letting Date: 07-19-16 Call Order: 001
Bidder: 9105 - Zachry Construction Corporation

| Line No. | Item Description | Approx. Quantity and Units | Unit Price Dollars | Unit Price Cts | Bid Amount Dollars | Bid Amount Ct |
|---|---|---|---|---|---|---|
| 0067 | 1489000000-E ASPHALT CONC BASE COURSE, TYPE B25.0B | 5,380.000 TON | 69.94000 | | 376,277.20 | |
| 0068 | 1491000000-E ASPHALT CONC BASE COURSE, TYPE B25.0C | 12,660.000 TON | 67.55000 | | 855,183.00 | |
| 0069 | 1498000000-E ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B | 3,910.000 TON | 72.64000 | | 284,022.40 | |
| 0070 | 1503000000-E ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C | 8,760.000 TON | 73.54000 | | 644,210.40 | |
| 0071 | 1519000000-E ASPHALT CONC SURFACE COURSE, TYPE S9.5B | 5,310.000 TON | 77.84000 | | 413,330.40 | |
| 0072 | 1523000000-E ASPHALT CONC SURFACE COURSE, TYPE S9.5C | 6,510.000 TON | 77.04000 | | 501,530.40 | |
| 0073 | 1575000000-E ASPHALT BINDER FOR PLANT MIX | 2,105.000 TON | 375.08000 | | 789,543.40 | |
| 0074 | 1693000000-E ASPHALT PLANT MIX, PAVEMENT REPAIR | 6,620.000 TON | 136.00000 | | 900,320.00 | |
| 0075 | 2000000000-N RIGHT OF WAY MARKERS | 87.000 EA | 431.38000 | | 37,530.06 | |
| 0076 | 2253000000-E PIPE COLLARS | 0.553 CY | 1,550.00000 | | 857.15 | |
| 0077 | 2264000000-E PIPE PLUGS | 0.065 CY | 6,500.00000 | | 422.50 | |
| 0078 | 2275000000-E FLOWABLE FILL | 688.000 CY | 250.00000 | | 172,000.00 | |

Contract ID: C203751 Project(s): BRNHS-0070(119)
Letting Date: 07-19-16 Call Order: 001
Bidder: 9105 - Zachry Construction Corporation

| Line No. | Item Description | Approx. Quantity and Units | Unit Price Dollars | Unit Price Cts | Bid Amount Dollars | Bid Amount Ct |
|---|---|---|---|---|---|---|
| 0079 | 2286000000-N MASONRY DRAINAGE STRUCTURES | 183.000 EA | 3,765.00000 | | 688,995.00 | |
| 0080 | 2297000000-E MASONRY DRAINAGE STRUCTURES | 58.845 CY | 1,385.00000 | | 81,500.33 | |
| 0081 | 2308000000-E MASONRY DRAINAGE STRUCTURES | 85.800 LF | 165.00000 | | 14,157.00 | |
| 0082 | 2364000000-N FRAME WITH TWO GRATES, STD 840.16 | 14.000 EA | 665.00000 | | 9,310.00 | |
| 0083 | 2366000000-N FRAME WITH TWO GRATES, STD 840.24 | 2.000 EA | 700.00000 | | 1,400.00 | |
| 0084 | 2367000000-N FRAME WITH TWO GRATES, STD 840.29 | 30.000 EA | 675.00000 | | 20,250.00 | |
| 0085 | 2374000000-N FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E) | 17.000 EA | 725.00000 | | 12,325.00 | |
| 0086 | 2374000000-N FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F) | 66.000 EA | 745.00000 | | 49,170.00 | |
| 0087 | 2374000000-N FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G) | 54.000 EA | 745.00000 | | 40,230.00 | |
| 0088 | 2396000000-N FRAME WITH COVER, STD 840.54 | 17.000 EA | 550.00000 | | 9,350.00 | |
| 0089 | 2418000000-E FRAME WITH GRATES, DRIVEWAY DROP INLET | 168.000 LF | 405.00000 | | 68,040.00 | |
| 0090 | 2451000000-N CONCRETE TRANSITIONAL SECTION FOR DROP INLET | 10.000 EA | 990.00000 | | 9,900.00 | |

Contract ID: C203751 Project(s): BRNHS-0070(119)
Letting Date: 07-19-16 Call Order: 001
Bidder: 9105 - Zachry Construction Corporation

| Line No. | Item Description | Approx. Quantity and Units | Unit Price Dollars | Unit Price Cts | Bid Amount Dollars | Bid Amount Ct |
|---|---|---|---|---|---|---|
| 0091 | 2473000000-N GENERIC DRAINAGE ITEM MASONRY DRAINAGE STRUCTURES (SEALED) | 8.000 EA | 4,730.00000 | | 37,840.00 | |
| 0092 | 2484000000-E GENERIC DRAINAGE ITEM MASONRY DRAINAGE STRUCTURES (SEALED) | 3.200 LF | 165.00000 | | 528.00 | |
| 0093 | 2535000000-E **"X **" CONCRETE CURB (8" X 12") | 470.000 LF | 14.08000 | | 6,617.60 | |
| 0094 | 2535000000-E **"X **" CONCRETE CURB (8" X 18") | 1,420.000 LF | 21.93000 | | 31,140.60 | |
| 0095 | 2549000000-E 2'-6" CONCRETE CURB & GUTTER | 18,310.000 LF | 17.26000 | | 316,030.60 | |
| 0096 | 2591000000-E 4" CONCRETE SIDEWALK | 7,791.000 SY | 55.00000 | | 428,505.00 | |
| 0097 | 2605000000-N CONCRETE CURB RAMP | 71.000 EA | 1,198.50000 | | 85,093.50 | |
| 0098 | 2612000000-E 6" CONCRETE DRIVEWAY | 1,120.000 SY | 50.49000 | | 56,548.80 | |
| 0099 | 2619000000-E 4" CONCRETE PAVED DITCH | 95.000 SY | 82.62000 | | 7,848.90 | |
| 0100 | 2655000000-E 5" MONOLITHIC CONCRETE ISLANDS(KEYED IN) | 1,154.000 SY | 85.00000 | | 98,090.00 | |
| 0101 | 2724000000-E PRECAST REINFORCED CONCRETE BARRIER, SINGLE FACED | 631.000 LF | 150.00000 | | 94,650.00 | |

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| Line No. | Item Description | Approx. Quantity and Units | Unit Price Dollars | Unit Price Cts | Bid Amount Dollars | Bid Amount Ct |
|---|---|---|---|---|---|---|
| 0102 | 2753000000-E GENERIC PAVING ITEM 2'-6" CONCRETE CURB & GUTTER (SPECIAL) | 8,100.000 LF | 19.07000 | | 154,467.00 | |
| 0103 | 2800000000-N ADJUSTMENT OF CATCH BASINS | 5.000 EA | 1,510.00000 | | 7,550.00 | |
| 0104 | 2830000000-N ADJUSTMENT OF MANHOLES | 8.000 EA | 1,510.00000 | | 12,080.00 | |
| 0105 | 2845000000-N ADJUSTMENT OF METER BOXES OR VALVE BOXES | 2.000 EA | 725.00000 | | 1,450.00 | |
| 0106 | 2893000000-N CONVERT EXISTING CATCH BASIN TO JUNCTION BOX WITH MANHOLE | 1.000 EA | 2,450.00000 | | 2,450.00 | |
| 0107 | 2965000000-N CONVERT EXISTING JUNCTION BOX TO CATCH BASIN | 1.000 EA | 3,380.00000 | | 3,380.00 | |
| 0108 | 2995000000-N GENERIC DRAINAGE ITEM CONVERT EXISTING JUNCTION BOX TO SLAB TOP JUNCTION BOX | 2.000 EA | 2,450.00000 | | 4,900.00 | |
| 0109 | 3000000000-N IMPACT ATTENUATOR UNIT, TYPE 350 | 6.000 EA | 15,225.00000 | | 91,350.00 | |
| 0110 | 3030000000-E STEEL BM GUARDRAIL | 2,675.000 LF | 15.99000 | | 42,773.25 | |
| 0111 | 3045000000-E STEEL BM GUARDRAIL, SHOP CURVED | 25.000 LF | 18.27000 | | 456.75 | |
| 0112 | 3105000000-N STEEL BM GUARDRAIL TERMINAL SECTIONS | 2.000 EA | 126.88000 | | 253.76 | |

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|---|---|---|---|---|---|---|
| 0113 | 3150000000-N ADDITIONAL GUARDRAIL POSTS | 15.000 EA | 60.90000 | | 913.50 | |
| 0114 | 3195000000-N GUARDRAIL ANCHOR UNITS, TYPE AT-1 | 1.000 EA | 558.25000 | | 558.25 | |
| 0115 | 3215000000-N GUARDRAIL ANCHOR UNITS, TYPE III | 10.000 EA | 1,522.50000 | | 15,225.00 | |
| 0116 | 3270000000-N GUARDRAIL ANCHOR UNITS, TYPE 350 | 11.000 EA | 1,928.50000 | | 21,213.50 | |
| 0117 | 3317000000-N GUARDRAIL ANCHOR UNITS, TYPE B-77 | 6.000 EA | 1,522.50000 | | 9,135.00 | |
| 0118 | 3360000000-E REMOVE EXISTING GUARDRAIL | 1,027.000 LF | 1.02000 | | 1,047.54 | |
| 0119 | 3380000000-E TEMPORARY STEEL BM GUARDRAIL | 275.000 LF | 8.12000 | | 2,233.00 | |
| 0120 | 3387000000-N TEMPORARY GUARDRAIL ANCHOR UNITS, TYPE ********** (AT-1) | 1.000 EA | 253.75000 | | 253.75 | |
| 0121 | 3387000000-N TEMPORARY GUARDRAIL ANCHOR UNITS, TYPE ********** (W-BEAM) | 1.000 EA | 1,827.00000 | | 1,827.00 | |
| 0122 | 3389100000-N TEMPORARY GUARDRAIL ANCHOR UNITS, TYPE 350 | 2.000 EA | 1,116.50000 | | 2,233.00 | |
| 0123 | 3524000000-E VINYL COATED CHAIN LINK FENCE,**" FABRIC (60") | 5,120.000 LF | 8.63000 | | 44,185.60 | |

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|---|---|---|---|---|---|---|
| 0124 | 3575000000-E GENERIC FENCING ITEM CHAIN LINK FENCE WITH BARBED WIRE, 96" FABRIC, VINYL COATED | 590.000 LF | 17.76000 | | 10,478.40 | |
| 0126 | 3578000000-N GENERIC FENCING ITEM METAL LINE POST, 60" CHAIN LINK FENCE, VINYL COATED | 427.000 EA | 52.78000 | | 22,537.06 | |
| 0127 | 3578000000-N GENERIC FENCING ITEM METAL LINE POST, 96" CHAIN LINK FENCE, VINYL COATED | 50.000 EA | 91.35000 | | 4,567.50 | |
| 0128 | 3578000000-N GENERIC FENCING ITEM METAL TERMINAL POST, 60" CHAIN LINK FENCE, VINYL COATED | 36.000 EA | 121.80000 | | 4,384.80 | |
| 0129 | 3578000000-N GENERIC FENCING ITEM METAL TERMINAL POST, 96" CHAIN LINK FENCE, VINYL COATED | 6.000 EA | 228.38000 | | 1,370.28 | |
| 0130 | 3635000000-E RIP RAP, CLASS II | 660.000 TON | 65.00000 | | 42,900.00 | |
| 0131 | 3649000000-E RIP RAP, CLASS B | 110.000 TON | 120.00000 | | 13,200.00 | |
| 0132 | 3656000000-E GEOTEXTILE FOR DRAINAGE | 3,465.000 SY | 1.00000 | | 3,465.00 | |
| 0133 | 4048000000-E REINFORCED CONCRETE SIGN FOUN-DATIONS | 4.000 CY | 927.00000 | | 3,708.00 | |
| 0134 | 4054000000-E PLAIN CONCRETE SIGN FOUNDA-TIONS | 1.000 CY | 10.30000 | | 10.30 | |

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|---|---|---|---|---|---|---|
| 0135 | 4057000000-E OVERHEAD FOOTING | 37.000 CY | 1,236.00000 | | 45,732.00 | |
| 0136 | 4060000000-E SUPPORTS, BREAKAWAY STEEL BEAM | 1,496.000 LB | 5.15000 | | 7,704.40 | |
| 0137 | 4066000000-E SUPPORTS, SIMPLE STEEL BEAM | 1,957.000 LB | 4.12000 | | 8,062.84 | |
| 0138 | 4072000000-E SUPPORTS, 3-LB STEEL U-CHANNEL | 1,373.000 LF | 6.18000 | | 8,485.14 | |
| 0139 | 4082100000-N SUPPORTS, OVERHEAD SIGN STRUC-TURE AT STA ****** (30+74 NBL) | LUMP | LUMP | | 29,870.00 | |
| 0140 | 4082100000-N SUPPORTS, OVERHEAD SIGN STRUC-TURE AT STA ****** (40+28 NBL) | LUMP | LUMP | | 40,170.00 | |
| 0141 | 4082100000-N SUPPORTS, OVERHEAD SIGN STRUC-TURE AT STA ****** (50+00 NBL) | LUMP | LUMP | | 19,570.00 | |
| 0142 | 4096000000-N SIGN ERECTION, TYPE D | 4.000 EA | 87.55000 | | 350.20 | |
| 0143 | 4102000000-N SIGN ERECTION, TYPE E | 60.000 EA | 56.65000 | | 3,399.00 | |
| 0144 | 4108000000-N SIGN ERECTION, TYPE F | 8.000 EA | 87.55000 | | 700.40 | |
| 0145 | 4109000000-N SIGN ERECTION, TYPE *** (OVER-HEAD) (A) | 5.000 EA | 978.50000 | | 4,892.50 | |
| 0146 | 4110000000-N SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A) | 11.000 EA | 437.75000 | | 4,815.25 | |

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|---|---|---|---|---|---|---|
| 0147 | 4149000000-N DISPOSAL OF SIGN SYSTEM, OVER-HEAD | 1.000 EA | 2,961.40000 | | 2,961.40 | |
| 0148 | 4152000000-N DISPOSAL OF SIGN SYSTEM, STEELBEAM | 2.000 EA | 515.00000 | | 1,030.00 | |
| 0149 | 4155000000-N DISPOSAL OF SIGN SYSTEM, U- CHANNEL | 58.000 EA | 1.03000 | | 59.74 | |
| 0150 | 4234000000-N DISPOSAL OF SIGN, A OR B (OVERHEAD) | 1.000 EA | 1.03000 | | 1.03 | |
| 0151 | 4400000000-E WORK ZONE SIGNS (STATIONARY) | 3,970.000 SF | 5.00000 | | 19,850.00 | |
| 0152 | 4405000000-E WORK ZONE SIGNS (PORTABLE) | 3,342.000 SF | 12.00000 | | 40,104.00 | |
| 0153 | 4410000000-E WORK ZONE SIGNS (BARRICADE MOUNTED) | 416.000 SF | 8.50000 | | 3,536.00 | |
| 0154 | 4415000000-N FLASHING ARROW BOARD | 6.000 EA | 2,000.00000 | | 12,000.00 | |
| 0155 | 4420000000-N PORTABLE CHANGEABLE MESSAGE SIGN | 14.000 EA | 5,000.00000 | | 70,000.00 | |
| 0156 | 4430000000-N DRUMS | 635.000 EA | 65.00000 | | 41,275.00 | |
| 0157 | 4435000000-N CONES | 93.000 EA | 24.00000 | | 2,232.00 | |
| 0158 | 4445000000-E BARRICADES (TYPE III) | 736.000 LF | 22.50000 | | 16,560.00 | |

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|---|---|---|---|---|---|---|
| 0159 | 4450000000-N FLAGGER | 7,680.000 HR | 18.00000 | | 138,240.00 | |
| 0160 | 4465000000-N TEMPORARY CRASH CUSHIONS | 6.000 EA | 3,500.00000 | | 21,000.00 | |
| 0161 | 4470000000-N RESET TEMPORARY CRASH CUSHION | 4.000 EA | 1,600.00000 | | 6,400.00 | |
| 0162 | 4480000000-N TMA | 6.000 EA | 10,000.00000 | | 60,000.00 | |
| 0163 | 4485000000-E PORTABLE CONCRETE BARRIER | 4,550.000 LF | 17.33000 | | 78,851.50 | |
| 0164 | 4490000000-E PORTABLE CONCRETE BARRIER (ANCHORED) | 135.000 LF | 25.00000 | | 3,375.00 | |
| 0165 | 4500000000-E RESET PORTABLE CONCRETE BARRIER | 2,260.000 LF | 3.50000 | | 7,910.00 | |
| 0166 | 4507000000-E WATER FILLED BARRIER | 4,377.000 LF | 72.37000 | | 316,763.49 | |
| 0167 | 4508000000-E RESET WATER FILLED BARRIER | 33,884.000 LF | 3.51000 | | 118,932.84 | |
| 0168 | 4510000000-N LAW ENFORCEMENT | 990.000 HR | 40.00000 | | 39,600.00 | |
| 0169 | 4516000000-N SKINNY DRUM | 229.000 EA | 27.22000 | | 6,233.38 | |
| 0170 | 4520000000-N TUBULAR MARKERS (FIXED) | 46.000 EA | 65.00000 | | 2,990.00 | |

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|---|---|---|---|---|---|---|
| 0171 | 4570000000-E TEMPORARY GLARE SCREEN | 1,580.000 LF | 11.00000 | | 17,380.00 | |
| 0172 | 4589000000-N GENERIC TRAFFIC CONTROL ITEM PROTECTIVE CANOPY | LUMP | LUMP | | 31,643.25 | |
| 0173 | 4650000000-N TEMPORARY RAISED PAVEMENT MARKERS | 2,082.000 EA | 6.50000 | | 13,533.00 | |
| 0174 | 4685000000-E THERMOPLASTIC PAVEMENT MARKINGLINES (4", 90 MILS) | 29.000 LF | 4.00000 | | 116.00 | |
| 0175 | 4686000000-E THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS) | 11,992.000 LF | 5.00000 | | 59,960.00 | |
| 0176 | 4695000000-E THERMOPLASTIC PAVEMENT MARKINGLINES (8", 90 MILS) | 2,303.000 LF | 6.27000 | | 14,439.81 | |
| 0177 | 4697000000-E THERMOPLASTIC PAVEMENT MARKINGLINES (8", 120 MILS) | 880.000 LF | 5.70000 | | 5,016.00 | |
| 0178 | 4710000000-E THERMOPLASTIC PAVEMENT MARKINGLINES (24", 120 MILS) | 4,485.000 LF | 10.00000 | | 44,850.00 | |
| 0179 | 4721000000-E THERMOPLASTIC PAVEMENT MARKINGCHARACTER (120 MILS) | 20.000 EA | 100.00000 | | 2,000.00 | |
| 0180 | 4725000000-E THERMOPLASTIC PAVEMENT MARKINGSYMBOL (90 MILS) | 90.000 EA | 150.00000 | | 13,500.00 | |
| 0181 | 4770000000-E COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (II) | 709.000 LF | 1.75000 | | 1,240.75 | |

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|---|---|---|---|---|---|---|
| 0182 | 4770000000-E COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV) | 1,250.000 LF | 2.50000 | | 3,125.00 | |
| 0183 | 4800000000-N COLD APPLIED PLASTIC PAVEMENT MARKING CHARACTER, TYPE ** (IV) | 8.000 EA | 100.00000 | | 800.00 | |
| 0184 | 4805000000-N COLD APPLIED PLASTIC PAVEMENT MARKING SYMBOL, TYPE ** (IV) | 4.000 EA | 200.00000 | | 800.00 | |
| 0185 | 4810000000-E PAINT PAVEMENT MARKING LINES (4") | 162,912.000 LF | 0.20000 | | 32,582.40 | |
| 0186 | 4820000000-E PAINT PAVEMENT MARKING LINES (8") | 19,280.000 LF | 1.00000 | | 19,280.00 | |
| 0187 | 4835000000-E PAINT PAVEMENT MARKING LINES (24") | 5,930.000 LF | 3.00000 | | 17,790.00 | |
| 0188 | 4840000000-N PAINT PAVEMENT MARKING CHARAC-TER | 116.000 EA | 25.00000 | | 2,900.00 | |
| 0189 | 4845000000-N PAINT PAVEMENT MARKING SYMBOL | 274.000 EA | 25.00000 | | 6,850.00 | |
| 0190 | 4850000000-E REMOVAL OF PAVEMENT MARKING LINES (4") | 35,060.000 LF | 0.60000 | | 21,036.00 | |
| 0191 | 4860000000-E REMOVAL OF PAVEMENT MARKING LINES (8") | 3,170.000 LF | 1.50000 | | 4,755.00 | |
| 0192 | 4870000000-E REMOVAL OF PAVEMENT MARKING LINES (24") | 50.000 LF | 190.20000 | | 9,510.00 | |

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|---|---|---|---|---|---|---|
| 0193 | 4875000000-N REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS | 65.000 EA | 25.00000 | | 1,625.00 | |
| 0194 | 4900000000-N PERMANENT RAISED PAVEMENT MARKERS | 15.000 EA | 6.50000 | | 97.50 | |
| 0195 | 4905000000-N SNOWPLOWABLE PAVEMENT MARKERS | 294.000 EA | 50.00000 | | 14,700.00 | |
| 0196 | 5255000000-N PORTABLE LIGHTING | LUMP | LUMP | | 500,000.00 | |
| 0197 | 5265000000-E GENERIC LIGHTING ITEM STREET LIGHTING CONDUIT INSTALLATION (2" PVC) | 12,600.000 LF | 2.89000 | | 36,414.00 | |
| 0198 | 5325800000-E 8" WATER LINE | 2,468.000 LF | 120.00000 | | 296,160.00 | |
| 0199 | 5326200000-E 12" WATER LINE | 6,108.000 LF | 200.00000 | | 1,221,600.00 | |
| 0200 | 5546000000-E 8" VALVE | 16.000 EA | 2,761.00000 | | 44,176.00 | |
| 0201 | 5558000000-E 12" VALVE | 21.000 EA | 3,973.00000 | | 83,433.00 | |
| 0202 | 5600000000-E **" BLOW OFF (12") | 4.000 EA | 4,520.00000 | | 18,080.00 | |
| 0203 | 5606800000-E 8" BLOW OFF | 3.000 EA | 10,550.00000 | | 31,650.00 | |

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|---|---|---|---|---|---|---|
| 0204 | 5648000000-N RELOCATE WATER METER | 43.000 EA | 1,385.00000 | | 59,555.00 | |
| 0205 | 5649000000-N RECONNECT WATER METER | 2.000 EA | 2,111.00000 | | 4,222.00 | |
| 0206 | 5666000000-E FIRE HYDRANT | 4.000 EA | 10,500.00000 | | 42,000.00 | |
| 0207 | 5672000000-N RELOCATE FIRE HYDRANT | 10.000 EA | 12,135.00000 | | 121,350.00 | |
| 0208 | 5691000000-E **" SANITARY GRAVITY SEWER (36") | 2,010.000 LF | 600.00000 | | 1,206,000.00 | |
| 0209 | 5691300000-E 8" SANITARY GRAVITY SEWER | 2,423.000 LF | 176.00000 | | 426,448.00 | |
| 0210 | 5691500000-E 12" SANITARY GRAVITY SEWER | 2,051.000 LF | 246.00000 | | 504,546.00 | |
| 0211 | 5691700000-E 18" SANITARY GRAVITY SEWER | 24.000 LF | 415.00000 | | 9,960.00 | |
| 0212 | 5768000000-N SANITARY SEWER CLEAN-OUT | 47.000 EA | 1,360.00000 | | 63,920.00 | |
| 0213 | 5775000000-E 4' DIA UTILITY MANHOLE | 25.000 EA | 8,000.00000 | | 200,000.00 | |
| 0214 | 5776000000-E 5' DIA UTILITY MANHOLE | 2.000 EA | 9,000.00000 | | 18,000.00 | |
| 0215 | 5777000000-E 6' DIA UTILITY MANHOLE | 12.000 EA | 7,000.00000 | | 84,000.00 | |

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|---|---|---|---|---|---|---|
| 0216 | 5778000000-E 8' DIA UTILITY MANHOLE | 3.000 EA | 12,030.00000 | | 36,090.00 | |
| 0217 | 5781000000-E UTILITY MANHOLE WALL, 4' DIA | 51.000 LF | 120.00000 | | 6,120.00 | |
| 0218 | 5782000000-E UTILITY MANHOLE WALL, 5' DIA | 17.000 LF | 195.00000 | | 3,315.00 | |
| 0219 | 5783000000-E UTILITY MANHOLE WALL, 6' DIA | 98.000 LF | 280.00000 | | 27,440.00 | |
| 0220 | 5784000000-E UTILITY MANHOLE WALL, 8' DIA | 24.000 LF | 525.00000 | | 12,600.00 | |
| 0221 | 5800000000-E ABANDON 6" UTILITY PIPE | 336.000 LF | 15.00000 | | 5,040.00 | |
| 0222 | 5801000000-E ABANDON 8" UTILITY PIPE | 4,588.000 LF | 10.00000 | | 45,880.00 | |
| 0223 | 5804000000-E ABANDON 12" UTILITY PIPE | 6,150.000 LF | 15.00000 | | 92,250.00 | |
| 0224 | 5813000000-E ABANDON 24" UTILITY PIPE | 1,411.000 LF | 34.00000 | | 47,974.00 | |
| 0225 | 5816000000-N ABANDON UTILITY MANHOLE | 15.000 EA | 1,200.00000 | | 18,000.00 | |
| 0226 | 5828000000-N REMOVE UTILITY MANHOLE | 4.000 EA | 1,200.00000 | | 4,800.00 | |
| 0227 | 5835700000-E 16" ENCASEMENT PIPE | 600.000 LF | 215.00000 | | 129,000.00 | |

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|---|---|---|---|---|---|---|
| 0228 | 5836000000-E 24" ENCASEMENT PIPE | 740.000 LF | 90.00000 | | 66,600.00 | |
| 0229 | 5871900000-E TRENCHLESS INSTALLATION OF 16"IN SOIL | 285.000 LF | 89.00000 | | 25,365.00 | |
| 0230 | 5871910000-E TRENCHLESS INSTALLATION OF 16"NOT IN SOIL | 285.000 LF | 219.00000 | | 62,415.00 | |
| 0231 | 5872200000-E TRENCHLESS INSTALLATION OF 24"IN SOIL | 265.000 LF | 799.00000 | | 211,735.00 | |
| 0232 | 5872210000-E TRENCHLESS INSTALLATION OF 24"NOT IN SOIL | 265.000 LF | 229.00000 | | 60,685.00 | |
| 0233 | 5882000000-N GENERIC UTILITY ITEM 12" INSERTION VALVE ASSEMBLY | 5.000 EA | 899.00000 | | 4,495.00 | |
| 0234 | 5882000000-N GENERIC UTILITY ITEM 2" AIR RELEASE VALVE | 1.000 EA | 12,875.00000 | | 12,875.00 | |
| 0235 | 6000000000-E TEMPORARY SILT FENCE | 25,000.000 LF | 1.88000 | | 47,000.00 | |
| 0236 | 6006000000-E STONE FOR EROSION CONTROL, CLASS A | 400.000 TON | 110.00000 | | 44,000.00 | |
| 0237 | 6009000000-E STONE FOR EROSION CONTROL, CLASS B | 70.000 TON | 110.00000 | | 7,700.00 | |
| 0238 | 6012000000-E SEDIMENT CONTROL STONE | 2,300.000 TON | 30.00000 | | 69,000.00 | |
| 0239 | 6015000000-E TEMPORARY MULCHING | 24.000 ACR | 816.00000 | | 19,584.00 | |

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|---|---|---|---|---|---|---|
| 0240 | 6018000000-E SEED FOR TEMPORARY SEEDING | 1,200.000 LB | 4.08000 | | 4,896.00 | |
| 0241 | 6021000000-E FERTILIZER FOR TEMPORARY SEED-ING | 7.000 TON | 1,122.00000 | | 7,854.00 | |
| 0242 | 6024000000-E TEMPORARY SLOPE DRAINS | 200.000 LF | 20.00000 | | 4,000.00 | |
| 0243 | 6029000000-E SAFETY FENCE | 200.000 LF | 2.28000 | | 456.00 | |
| 0244 | 6030000000-E SILT EXCAVATION | 1,290.000 CY | 6.00000 | | 7,740.00 | |
| 0245 | 6036000000-E MATTING FOR EROSION CONTROL | 15,000.000 SY | 1.79000 | | 26,850.00 | |
| 0246 | 6037000000-E COIR FIBER MAT | 100.000 SY | 5.69000 | | 569.00 | |
| 0247 | 6042000000-E 1/4" HARDWARE CLOTH | 10,000.000 LF | 2.00000 | | 20,000.00 | |
| 0248 | 6045000000-E **" TEMPORARY PIPE (24") | 400.000 LF | 27.73000 | | 11,092.00 | |
| 0249 | 6070000000-N SPECIAL STILLING BASINS | 4.000 EA | 352.96000 | | 1,411.84 | |
| 0250 | 6071020000-E POLYACRYLAMIDE (PAM) | 10.000 LB | 19.00000 | | 190.00 | |
| 0251 | 6071030000-E COIR FIBER BAFFLE | 225.000 LF | 8.00000 | | 1,800.00 | |

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|---|---|---|---|---|---|---|
| 0252 | 6071050000-E **" SKIMMER (2") | 1.000 EA | 900.00000 | | 900.00 | |
| 0253 | 6084000000-E SEEDING & MULCHING | 18.000 ACR | 1,734.00000 | | 31,212.00 | |
| 0254 | 6087000000-E MOWING | 15.000 ACR | 204.00000 | | 3,060.00 | |
| 0255 | 6090000000-E SEED FOR REPAIR SEEDING | 250.000 LB | 6.12000 | | 1,530.00 | |
| 0256 | 6093000000-E FERTILIZER FOR REPAIR SEEDING | 0.750 TON | 1,734.00000 | | 1,300.50 | |
| 0257 | 6096000000-E SEED FOR SUPPLEMENTAL SEEDING | 375.000 LB | 5.10000 | | 1,912.50 | |
| 0258 | 6108000000-E FERTILIZER TOPDRESSING | 11.250 TON | 1,530.00000 | | 17,212.50 | |
| 0259 | 6111000000-E IMPERVIOUS DIKE | 55.000 LF | 251.87000 | | 13,852.85 | |
| 0260 | 6114500000-N SPECIALIZED HAND MOWING | 40.000 MHR | 91.80000 | | 3,672.00 | |
| 0261 | 6117000000-N RESPONSE FOR EROSION CONTROL | 50.000 EA | 204.00000 | | 10,200.00 | |
| 0262 | 6132000000-N GENERIC EROSION CONTROL ITEM CONCRETE WASHOUT STRUCTURE | 8.000 EA | 4,500.00000 | | 36,000.00 | |

Contract ID: C203751 Project(s): BRNHS-0070(119)
Letting Date: 07-19-16 Call Order: 001
Bidder: 9105 - Zachry Construction Corporation

| Line No. | Item Description | Approx. Quantity and Units | Unit Price Dollars | Unit Price Cts | Bid Amount Dollars | Bid Amount Ct |
|---|---|---|---|---|---|---|
| 0263 | 7048500000-E PEDESTRIAN SIGNAL HEAD (16", 1SECTION W/COUNTDOWN) | 20.000 EA | 873.12000 | | 17,462.40 | |
| 0264 | 7060000000-E SIGNAL CABLE | 6,625.000 LF | 2.09000 | | 13,846.25 | |
| 0265 | 7108000000-E VEHICLE SIGNAL HEAD (12", 1 SECTION) | 4.000 EA | 542.23000 | | 2,168.92 | |
| 0266 | 7120000000-E VEHICLE SIGNAL HEAD (12", 3 SECTION) | 23.000 EA | 1,004.70000 | | 23,108.10 | |
| 0267 | 7132000000-E VEHICLE SIGNAL HEAD (12", 4 SECTION) | 1.000 EA | 1,454.61000 | | 1,454.61 | |
| 0268 | 7144000000-E VEHICLE SIGNAL HEAD (12", 5 SECTION) | 3.000 EA | 1,449.44000 | | 4,348.32 | |
| 0269 | 7252000000-E MESSENGER CABLE (1/4") | 500.000 LF | 2.37000 | | 1,185.00 | |
| 0270 | 7279000000-E TRACER WIRE | 1,800.000 LF | 0.77000 | | 1,386.00 | |
| 0271 | 7288000000-E PAVED TRENCHING (**********) (1, 2") | 25.000 LF | 26.00000 | | 650.00 | |
| 0272 | 7300000000-E UNPAVED TRENCHING (**********) (1, 2") | 800.000 LF | 5.23000 | | 4,184.00 | |
| 0273 | 7300000000-E UNPAVED TRENCHING (**********) (2, 2") | 225.000 LF | 6.63000 | | 1,491.75 | |
| 0274 | 7300100000-E UNPAVED TRENCHING FOR TEMP-ORARY LEAD-IN | 350.000 LF | 4.77000 | | 1,669.50 | |

Contract ID: C203751 Project(s): BRNHS-0070(119)
Letting Date: 07-19-16 Call Order: 001
Bidder: 9105 - Zachry Construction Corporation

| Line No. | Item Description | Approx. Quantity and Units | Unit Price Dollars | Unit Price Cts | Bid Amount Dollars | Bid Amount Ct |
|---|---|---|---|---|---|---|
| 0275 | 7301000000-E DIRECTIONAL DRILL (**********) (1, 2") | 675.000 LF | 16.90000 | | 11,407.50 | |
| 0276 | 7301000000-E DIRECTIONAL DRILL (**********) (2, 2") | 1,725.000 LF | 19.12000 | | 32,982.00 | |
| 0277 | 7301000000-E DIRECTIONAL DRILL (**********) (3, 2") | 50.000 LF | 21.49000 | | 1,074.50 | |
| 0278 | 7324000000-N JUNCTION BOX (STANDARD SIZE) | 31.000 EA | 464.53000 | | 14,400.43 | |
| 0279 | 7348000000-N JUNCTION BOX (OVER-SIZED, HEA-VY DUTY) | 8.000 EA | 725.09000 | | 5,800.72 | |
| 0280 | 7360000000-N WOOD POLE | 2.000 EA | 1,027.60000 | | 2,055.20 | |
| 0281 | 7372000000-N GUY ASSEMBLY | 5.000 EA | 519.19000 | | 2,595.95 | |
| 0282 | 7430000000-N HEAT SHRINK TUBING RETROFIT KIT | 1.000 EA | 98.82000 | | 98.82 | |
| 0283 | 7432000000-E 2" RISER WITH HEAT SHRINK TUBING | 4.000 EA | 541.64000 | | 2,166.56 | |
| 0284 | 7444000000-E INDUCTIVE LOOP SAWCUT | 4,025.000 LF | 5.15000 | | 20,728.75 | |
| 0285 | 7456000000-E LEAD-IN CABLE (**********) (14-2) | 5,425.000 LF | 1.54000 | | 8,354.50 | |
| 0286 | 7516000000-E COMMUNICATIONS CABLE (**FIBER) (12) | 1,200.000 LF | 1.68000 | | 2,016.00 | |

Contract ID: C203751 Project(s): BRNHS-0070(119)
Letting Date: 07-19-16 Call Order: 001
Bidder: 9105 - Zachry Construction Corporation

| Line No. | Item Description | Approx. Quantity and Units | Unit Price Dollars | Unit Price Cts | Bid Amount Dollars | Bid Amount Ct |
|---|---|---|---|---|---|---|
| 0287 | 7516000000-E COMMUNICATIONS CABLE (**FIBER) (48) | 2,100.000 LF | 1.90000 | | 3,990.00 | |
| 0288 | 7540000000-N SPLICE ENCLOSURE | 3.000 EA | 1,680.19000 | | 5,040.57 | |
| 0289 | 7541000000-N MODIFY SPLICE ENCLOSURE | 3.000 EA | 1,130.24000 | | 3,390.72 | |
| 0290 | 7552000000-N INTERCONNECT CENTER | 3.000 EA | 1,464.45000 | | 4,393.35 | |
| 0291 | 7566000000-N DELINEATOR MARKER | 5.000 EA | 130.34000 | | 651.70 | |
| 0292 | 7575160000-E REMOVE EXISTING COMMUNICATIONSCABLE | 1,400.000 LF | 1.26000 | | 1,764.00 | |
| 0293 | 7575180000-N CABLE TRANSFER | 1.000 EA | 344.01000 | | 344.01 | |
| 0294 | 7588000000-N METAL POLE WITH SINGLE MAST ARM | 5.000 EA | 11,642.35000 | | 58,211.75 | |
| 0295 | 7590000000-N METAL POLE WITH DUAL MAST ARM | 3.000 EA | 16,098.21000 | | 48,294.63 | |
| 0296 | 7613000000-N SOIL TEST | 8.000 EA | 767.58000 | | 6,140.64 | |
| 0297 | 7614100000-E DRILLED PIER FOUNDATION | 48.000 CY | 910.21000 | | 43,690.08 | |
| 0298 | 7631000000-N MAST ARM WITH METAL POLE DE- SIGN | 8.000 EA | 34.39000 | | 275.12 | |

Contract ID: C203751 Project(s): BRNHS-0070(119)
Letting Date: 07-19-16 Call Order: 001
Bidder: 9105 - Zachry Construction Corporation

| Line No. | Item Description | Approx. Quantity and Units | Unit Price Dollars | Unit Price Cts | Bid Amount Dollars | Bid Amount Ct |
|---|---|---|---|---|---|---|
| 0299 | 7636000000-N SIGN FOR SIGNALS | 12.000 EA | 460.01000 | | 5,520.12 | |
| 0300 | 7642100000-N TYPE I POST WITH FOUNDATION | 1.000 EA | 1,090.50000 | | 1,090.50 | |
| 0301 | 7642200000-N TYPE II PEDESTAL WITH FOUND-ATION | 14.000 EA | 1,767.40000 | | 24,743.60 | |
| 0302 | 7642300000-N TYPE III PEDESTAL WITH FOUND-ATION | 2.000 EA | 3,818.54000 | | 7,637.08 | |
| 0303 | 7648000000-N RELOCATE EXISTING SIGN | 4.000 EA | 180.59000 | | 722.36 | |
| 0304 | 7684000000-N SIGNAL CABINET FOUNDATION | 3.000 EA | 1,175.60000 | | 3,526.80 | |
| 0305 | 7756000000-N CONTROLLER WITH CABINET (TYPE 2070L, BASE MOUNTED) | 3.000 EA | 13,215.37000 | | 39,646.11 | |
| 0306 | 7780000000-N DETECTOR CARD (TYPE 2070L) | 14.000 EA | 102.69000 | | 1,437.66 | |
| 0307 | 7901000000-N CABINET BASE EXTENDER | 3.000 EA | 606.42000 | | 1,819.26 | |
| 0308 | 7960000000-N METAL POLE FOUNDATION REMOVAL | 3.000 EA | 1,088.38000 | | 3,265.14 | |
| 0309 | 7972000000-N METAL POLE REMOVAL | 3.000 EA | 339.51000 | | 1,018.53 | |
| 0310 | 7980000000-N GENERIC SIGNAL ITEM 900MHZ SPREAD SPECTRUM ETHER- NET RADIO | 2.000 EA | 3,409.45000 | | 6,818.90 | |

Contract ID: C203751 Project(s): BRNHS-0070(119)
Letting Date: 07-19-16 Call Order: 001
Bidder: 9105 - Zachry Construction Corporation

| Line No. | Item Description | Approx. Quantity and Units | Unit Price Dollars | Unit Price Cts | Bid Amount Dollars | Bid Amount Ct |
|---|---|---|---|---|---|---|
| 0311 | 7980000000-N GENERIC SIGNAL ITEM ETHRNET EDGE SWITCH | 3.000 EA | 2,515.25000 | | 7,545.75 | |
| 0312 | 7980000000-N GENERIC SIGNAL ITEM RELOCATE FLASHER CABINET/SOLAR ASSEMBLY/RADIO ASSEMBLY | 1.000 EA | 3,029.25000 | | 3,029.25 | |
| 0355 | 2190000000-N TEMPORARY STEEL PLATE COVERS FOR MASONRY DRAINAGE STRUCTURE | 25.000 EA | 745.00000 | | 18,625.00 | |
| 0356 | 2542000000-E 1'-6" CONCRETE CURB & GUTTER | 592.000 LF | 14.28000 | | 8,453.76 | |
| 0357 | 2738000000-E GENERIC PAVING ITEM CONCRETE PAVER SIDEWALK | 391.000 SY | 85.00000 | | 33,235.00 | |
| 0358 | 2738000000-E GENERIC PAVING ITEM CONCRETE PAVER MEDIAN ISLAND | 297.000 SY | 59.67000 | | 17,721.99 | |
| 0359 | 2738000000-E GENERIC PAVING ITEM CONCRETE SIDEWALK (CAPITAL CITY GRID) | 2,645.000 SY | 85.00000 | | 224,825.00 | |
| 0360 | 3575000000-E GENERIC FENCING ITEM ORNAMENTAL FENCE | 54.000 LF | 50.00000 | | 2,700.00 | |
| 0361 | 6645000000-N GENERIC PLANTING ITEM TREE WELL SYSTEM | 31.000 EA | 8,000.00000 | | 248,000.00 | |
| 0362 | 0000910000-N GENERIC MISCELLANEOUS ITEM EXPLORATORY EXCAVATION - STANDARD | 600.000 HR | 250.00000 | | 150,000.00 | |

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| Line No. | Item Description | Approx. Quantity and Units | Unit Price Dollars | Unit Price Cts | Bid Amount Dollars | Bid Amount Ct |
|---|---|---|---|---|---|---|
| 0363 | 0000910000-N GENERIC MISCELLANEOUS ITEM EXPLORATORY EXCAVATION - VACUUM | 150.000 HR | 500.00000 | | 75,000.00 | |
| 0364 | 5120000000-N ELECTRIC SERVICE POLE ********** (30', CLASS 4) | 3.000 EA | 190.00000 | | 570.00 | |
| 0365 | 5125000000-E ELECTRIC SERVICE LATERAL ********** (3, #1/0 USE) | 45.000 LF | 26.00000 | | 1,170.00 | |
| 0366 | 5270000000-N GENERIC LIGHTING ITEM LIGHT CONTROL SYSTEM, TYPE RW,120/240V | 3.000 EA | 4,500.00000 | | 13,500.00 | |
| 0367 | 5155000000-E ELECTRICAL DUCT, TYPE BD, SIZE ***** (2") | 370.000 LF | 6.32000 | | 2,338.40 | |
| 0368 | 5160000000-E ELECTRICAL DUCT, TYPE JA, SIZE ***** (4") | 150.000 LF | 16.50000 | | 2,475.00 | |
| 0369 | 5170000000-E ** #8 W/G FEEDER CIRCUIT (2) | 320.000 LF | 3.24000 | | 1,036.80 | |
| 0370 | 5205000000-E ** #8 W/G FEEDER CIRCUIT IN *****" CONDUIT (2, 1-1/2") | 2,930.000 LF | 4.15000 | | 12,159.50 | |
| 0371 | 5270000000-N GENERIC LIGHTING ITEM ELECTRICAL JUNCTION BOXES TYPEPC18 | 2.000 EA | 1,100.00000 | | 2,200.00 | |
| 0372 | 5270000000-N GENERIC LIGHTING ITEM ELECTRICAL JUNCTION BOXES TYPEPC30 | 2.000 EA | 1,100.00000 | | 2,200.00 | |

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| Line No. | Item Description | Approx. Quantity and Units | Unit Price Dollars | Unit Price Cts | Bid Amount Dollars | Bid Amount Ct |
|---|---|---|---|---|---|---|
| 0373 | 5252000000-N UNDERPASS LUMINARIES ********* (TYPE WM) | 8.000 EA | 600.00000 | | 4,800.00 | |
| 0374 | 5260000000-N GENERIC LIGHTING ITEM ELECTRICAL CONDUIT SYSTEM AT PEACE ST | LUMP | LUMP | | 8,000.00 | |
| 0375 | 5270000000-N GENERIC LIGHTING ITEM SPOTLIGHT LUMINAIRE | 8.000 EA | 1,200.00000 | | 9,600.00 | |
| 0376 | 5270000000-N GENERIC LIGHTING ITEM AESTHETIC LIGHTING LUMINAIRE | 169.000 EA | 1,037.00000 | | 175,253.00 | |
| 0377 | 5260000000-N GENERIC LIGHTING ITEM AESTHETIC LIGHTING SYSTEM AT BRIDGE OVER PEACE ST | LUMP | LUMP | | 9,000.00 | |
| 0378 | 5260000000-N GENERIC LIGHTING ITEM AESTHETIC LIGHTING SYSTEM AT WADE AVE FLYOVER | LUMP | LUMP | | 9,000.00 | |
| | Section 0001 Total | | | | 28,833,848.51 | |

Section 0002 CULVERT ITEMS

Alt Group

| | | | | | | |
|---|---|---|---|---|---|---|
| 0313 | 8056000000-N REMOVAL OF EXISTING STRUCTURE AT STATION ********** (15+13.11-Y1-) | LUMP | LUMP | | 58,762.92 | |
| 0314 | 8126000000-N CULVERT EXCAVATION, STA ****** (15+13.11-Y1-) | LUMP | LUMP | | 4,561.76 | |
| 0315 | 8133000000-E FOUNDATION CONDITIONING MATER-IAL, BOX CULVERT | 258.000 TON | 28.76000 | | 7,420.08 | |

Contract ID: C203751 Project(s): BRNHS-0070(119)
Letting Date: 07-19-16 Call Order: 001
Bidder: 9105 - Zachry Construction Corporation

| Line No. | Item Description | Approx. Quantity and Units | Unit Price Dollars | Unit Price Cts | Bid Amount Dollars | Bid Amount Ct |
|---|---|---|---|---|---|---|
| 0316 | 8196000000-E CLASS A CONCRETE (CULVERT) | 331.200 CY | 549.87000 | | 182,116.94 | |
| 0317 | 8245000000-E REINFORCING STEEL (CULVERT) | 49,779.000 LB | 0.90000 | | 44,801.10 | |
| | Section 0002 Total | | | | 297,662.80 | |

Section 0003 WALL ITEMS

Alt Group

| Line No. | Item Description | Approx. Quantity and Units | Unit Price Dollars | Unit Price Cts | Bid Amount Dollars | Bid Amount Ct |
|---|---|---|---|---|---|---|
| 0318 | 8801000000-E MSE RETAINING WALL NO **** (2) | 4,230.000 SF | 75.00000 | | 317,250.00 | |
| 0319 | 8801000000-E MSE RETAINING WALL NO **** (3) | 4,150.000 SF | 75.00000 | | 311,250.00 | |
| 0320 | 8801000000-E MSE RETAINING WALL NO **** (4) | 3,305.000 SF | 75.00000 | | 247,875.00 | |
| 0321 | 8801000000-E MSE RETAINING WALL NO **** (5) | 2,535.000 SF | 75.00000 | | 190,125.00 | |
| 0322 IA1 | 8801000000-E MSE RETAINING WALL NO **** (1) | 3,910.000 SF | 75.00000 | | 293,250.00 | |
| 0323 IA2 | 8802014000-E SOLDIER PILE RETAINING WALLS | 3,595.000 SF | 0.00000 | | 0.00 | |
| | Section 0003 Total | | | | 1,359,750.00 | |

Section 0004 STRUCTURE ITEMS

Alt Group

Contract ID: C203751 Project(s): BRNHS-0070(119)
Letting Date: 07-19-16 Call Order: 001
Bidder: 9105 - Zachry Construction Corporation

| Line No. | Item Description | Approx. Quantity and Units | Unit Price Dollars | Unit Price Cts | Bid Amount Dollars | Bid Amount Ct |
|---|---|---|---|---|---|---|
| 0324 | 8035000000-N REMOVAL OF EXISTING STRUCTURE AT STATION ********** (20+19.94 -FLYOVER-) | LUMP | LUMP | | 150,000.00 | |
| 0325 | 8035000000-N REMOVAL OF EXISTING STRUCTURE AT STATION ********** (22+06.91-L-) | LUMP | LUMP | | 119,000.00 | |
| 0326 | 8096000000-E PILE EXCAVATION IN SOIL | 191.000 LF | 297.10000 | | 56,746.10 | |
| 0327 | 8097000000-E PILE EXCAVATION NOT IN SOIL | 76.000 LF | 266.64000 | | 20,264.64 | |
| 0328 | 8105540000-E 3'-6" DIA DRILLED PIERS IN SOIL | 112.000 LF | 637.14000 | | 71,359.68 | |
| 0329 | 8105640000-E 3'-6" DIA DRILLED PIERS NOT IN SOIL | 70.000 LF | 1,527.65000 | | 106,935.50 | |
| 0330 | 8112730000-N PDA TESTING | 2.000 EA | 4,027.35000 | | 8,054.70 | |
| 0331 | 8113000000-N SID INSPECTIONS | 2.000 EA | 2,000.00000 | | 4,000.00 | |
| 0332 | 8115000000-N CSL TESTING | 2.000 EA | 2,000.00000 | | 4,000.00 | |
| 0333 | 8147000000-E REINFORCED CONCRETE DECK SLAB | 14,218.000 SF | 28.89000 | | 410,758.02 | |
| 0334 | 8154000000-E REINFORCED CONCRETE DECK SLAB (SAND LIGHTWEIGHT CONC) | 16,350.000 SF | 20.66000 | | 337,791.00 | |

Contract ID: C203751 Project(s): BRNHS-0070(119)
Letting Date: 07-19-16 Call Order: 001
Bidder: 9105 - Zachry Construction Corporation

| Line No. | Item Description | Approx. Quantity and Units | Unit Price Dollars | Unit Price Cts | Bid Amount Dollars | Bid Amount Ct |
|---|---|---|---|---|---|---|
| 0335 | 8161000000-E GROOVING BRIDGE FLOORS | 31,190.000 SF | 0.49000 | | 15,283.10 | |
| 0336 | 8182000000-E CLASS A CONCRETE (BRIDGE) | 441.500 CY | 900.00000 | | 397,350.00 | |
| 0337 | 8210000000-N BRIDGE APPROACH SLABS, STATION********** (20+19.94-FLYOVER-) | LUMP | LUMP | | 79,000.00 | |
| 0338 | 8210000000-N BRIDGE APPROACH SLABS, STATION********** (22+06.91-L-) | LUMP | LUMP | | 160,000.00 | |
| 0339 | 8217000000-E REINFORCING STEEL (BRIDGE) | 68,480.000 LB | 1.45000 | | 99,296.00 | |
| 0340 | 8238000000-E SPIRAL COLUMN REINFORCING STEEL (BRIDGE) | 6,384.000 LB | 2.60000 | | 16,598.40 | |
| 0341 | 8277000000-E MODIFIED 72" PRESTRESSED CONC GIRDERS | 1,840.710 LF | 350.00000 | | 644,248.50 | |
| 0342 | 8280000000-E APPROX ..... LBS STRUCTURALSTEEL | LUMP | LUMP | | 1,800,000.00 | |
| 0343 | 8364000000-E HP12X53 STEEL PILES | 2,135.000 LF | 85.00000 | | 181,475.00 | |
| 0344 | 8391000000-N STEEL PILE POINTS | 50.000 EA | 150.00000 | | 7,500.00 | |
| 0345 | 8517000000-E 1'-**"X *****" CONCRETE PARA- PET (1'-4" X 3'-6") | 182.710 LF | 170.00000 | | 31,060.70 | |

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Bidder: 9105 - Zachry Construction Corporation

| Line No. | Item Description | Approx. Quantity and Units | Unit Price Dollars | Unit Price Cts | Bid Amount Dollars | Bid Amount Ct |
|---|---|---|---|---|---|---|
| 0346 | 8522000000-E GENERIC STRUCTURE ITEM DECORATIVE CONCRETE PARAPET | 775.240 LF | 300.00000 | | 232,572.00 | |
| 0347 | 8531000000-E 4" SLOPE PROTECTION | 210.000 SY | 75.00000 | | 15,750.00 | |
| 0348 | 8654000000-N DISC BEARINGS | LUMP | LUMP | | 135,000.00 | |
| 0349 | 8657000000-N ELASTOMERIC BEARINGS | LUMP | LUMP | | 63,000.00 | |
| 0350 | 8706000000-N EXPANSION JOINT SEALS | LUMP | LUMP | | 200,000.00 | |
| 0351 | 8860000000-N GENERIC STRUCTURE ITEM APPLICATION OF BRIDGE COATING | LUMP | LUMP | | 300,847.98 | |
| 0352 | 8860000000-N GENERIC STRUCTURE ITEM ASBESTOS ASSESSMENT | LUMP | LUMP | | 669.50 | |
| 0353 | 8867000000-E GENERIC STRUCTURE ITEM CONC PARAPET WITH MOMENT SLAB | 367.620 LF | 675.00000 | | 248,143.50 | |
| 0354 | 8892000000-E GENERIC STRUCTURE ITEM PRECAST CONCRETE PANELS | 383.000 SF | 50.00000 | | 19,150.00 | |
| 0379 | 8867000000-E GENERIC STRUCTURE ITEM ARCHITECTURAL METAL FASCIA | 718.750 LF | 661.26000 | | 475,280.63 | |
| | Section 0004 Total | | | | 6,411,134.95 | |
| | Bid Total | | | | 36,902,396.26 | |

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 acknowleges 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.

PROPOSAL: C203751
LETTING: L160719 CALL: 001
VENDOR: 9105 Zachry Construction Corporation

| LINE NO. | ITEM NO. | ITEM DESC. | UNIT TYPE | SUBCONTRACTOR QUANTITY | SUBCONTRACTOR UNIT PRICE | EXTENDED AMOUNT |
|---|---|---|---|---|---|---|
| DBE SUBCONTRACTOR: 9210 AUSTIN TRUCKING LLC | | | | | | |
| Will Use Quote: Yes | | | | | | |
| 0067 | 1489000000-E | ASP CONC BAS | TON | 357.449 | 69.94000 | 25000.00 |
| 0068 | 1491000000-E | ASP CONC BAS | TON | 888.231 | 67.55000 | 60000.00 |
| 0069 | 1498000000-E | ASP CONC INT | TON | 206.498 | 72.64000 | 15000.01 |
| 0070 | 1503000000-E | ASP CONC INT | TON | 475.931 | 73.54000 | 34999.97 |
| 0071 | 1519000000-E | ASP CONC SUR | TON | 321.172 | 77.84000 | 25000.00 |
| 0072 | 1523000000-E | ASP CONC SUR | TON | 389.408 | 77.04000 | 30000.00 |
| | | DBE COMMITMENT TOTAL FOR SUBCONTRACTOR: | | | | 189,999.98 |
| | | DBE COMMITMENT TOTAL FOR VENDOR (SubContractor ) | | | | 189,999 |
| DBE SUBCONTRACTOR: 4761 TRAFFIC CONTROL SAFETY SERVICES, INC. | | | | | | |
| Will Use Quote: Yes | | | | | | |
| 0158 | 4445000000-E | BARRICADES ( | LF | 736.000 | 15.00000 | 11040.00 |
| 0160 | 4465000000-N | TEMPORARY CR | EA | 6.000 | 3500.00000 | 21000.00 |
| 0161 | 4470000000-N | RESET CRASH | EA | 4.000 | 1600.00000 | 6400.00 |
| 0163 | 4485000000-E | PORT CONC BA | LF | 4550.000 | 17.33000 | 78851.50 |
| 0164 | 4490000000-E | PORT CONC BA | LF | 135.000 | 25.00000 | 3375.00 |
| 0165 | 4500000000-E | RESET PORT C | LF | 2260.000 | 3.50000 | 7910.00 |
| 0170 | 4520000000-N | TUBULAR MARK | EA | 46.000 | 65.00000 | 2990.00 |
| 0171 | 4570000000-E | TEMPORARY GL | LF | 1580.000 | 11.00000 | 17380.00 |
| | | DBE COMMITMENT TOTAL FOR SUBCONTRACTOR: | | | | 148,946.50 |
| | | DBE COMMITMENT TOTAL FOR VENDOR (SubContractor ) | | | | 148,946 |
| DBE SUBCONTRACTOR: 4247 SEAL BROTHERS CONTRACTING LLC | | | | | | |
| Will Use Quote: Yes | | | | | | |
| 0235 | 6000000000-E | TEMPORARY SI | LF | 25000.000 | 1.88000 | 47000.00 |
| 0243 | 6029000000-E | SAFETY FENCE | LF | 200.000 | 2.28000 | 456.00 |
| 0075 | 2000000000-N | RIGHT OF WAY | EA | 87.000 | 431.38000 | 37530.06 |
| | | DBE COMMITMENT TOTAL FOR SUBCONTRACTOR: | | | | 84,986.06 |
| | | DBE COMMITMENT TOTAL FOR VENDOR (SubContractor ) | | | | 84,986. |
| DBE SUBCONTRACTOR: 4898 BULLINGTON CONSTRUCTION INC | | | | | | |
| Will Use Quote: Yes | | | | | | |
| 0123 | 3524000000-E | CL FEN **" F | LF | 5120.000 | 8.63000 | 44185.60 |
| 0124 | 3575000000-E | GENERIC FENC | LF | 590.000 | 17.76000 | 10478.40 |
| 0126 | 3578000000-N | GENERIC FENC | EA | 427.000 | 52.78000 | 22537.06 |
| 0127 | 3578000000-N | GENERIC FENC | EA | 50.000 | 91.35000 | 4567.50 |
| 0128 | 3578000000-N | GENERIC FENC | EA | 36.000 | 121.80000 | 4384.80 |
| 0129 | 3578000000-N | GENERIC FENC | EA | 6.000 | 228.38000 | 1370.28 |

| LINE NO. | ITEM NO. | ITEM DESC. | UNIT TYPE | SUBCONTRACTOR QUANTITY | SUBCONTRACTOR UNIT PRICE | EXTENDED AMOUNT |
|---|---|---|---|---|---|---|
| | | | | | | 87,523.64 |
| | | DBE COMMITMENT TOTAL FOR SUBCONTRACTOR: | | | | |
| | | DBE COMMITMENT TOTAL FOR VENDOR (SubContractor ) | | | | 87,523. |

DBE SUBCONTRACTOR: 11572 CRUZ BROTHERS CONCRETE, INC.
Will Use Quote: Yes

| | | | | | | |
|---|---|---|---|---|---|---|
| 0093 | 2535000000-E | **"X**" CONC | LF | 470.000 | 14.08000 | 6617.60 |
| 0094 | 2535000000-E | **"X**" CONC | LF | 1420.000 | 21.93000 | 31140.60 |
| 0095 | 2549000000-E | 2'-6" CONC C | LF | 18310.000 | 17.26000 | 316030.60 |
| 0096 | 2591000000-E | 4" CONCRETE | SY | 7791.000 | 35.34000 | 275333.94 |
| 0097 | 2605000000-N | CONCRETE CUR | EA | 71.000 | 1198.50000 | 85093.50 |
| 0098 | 2612000000-E | 6" CONCRETE | SY | 1120.000 | 50.49000 | 56548.80 |
| 0099 | 2619000000-E | 4" CONCRETE | SY | 95.000 | 82.62000 | 7848.90 |
| 0100 | 2655000000-E | 5" MONO CONC | SY | 1154.000 | 59.67000 | 68859.18 |
| 0090 | 2451000000-N | CONC TRANS S | EA | 10.000 | 703.80000 | 7038.00 |
| 0001 | 0000100000-N | MOBILIZATION | LS | 0.020 | 2205449.91000 | 44880.00 |
| 0356 | 2542000000-E | 1'-6" CONC C | LF | 592.000 | 14.28000 | 8453.76 |
| 0102 | 2753000000-E | GENERIC PAVI | LF | 8100.000 | 19.07000 | 154467.00 |
| 0056 | 1000000000-E | 6" SLOPE PRO | SY | 57.000 | 105.57000 | 6017.49 |
| | | DBE COMMITMENT TOTAL FOR SUBCONTRACTOR: | | | | 1,068,329.37 |
| | | DBE COMMITMENT TOTAL FOR VENDOR (SubContractor ) | | | | 1,068,3 |

DBE SUBCONTRACTOR: 4898 BULLINGTON CONSTRUCTION INC
Will Use Quote: No

| | | | | | | |
|---|---|---|---|---|---|---|
| 0109 | 3000000000-N | IMPACT ATTEN | EA | 6.000 | 15225.00000 | 91350.00 |
| 0110 | 3030000000-E | STL BM GUARD | LF | 2675.000 | 15.99000 | 42773.25 |
| 0111 | 3045000000-E | SBGR SHOP CU | LF | 25.000 | 18.27000 | 456.75 |
| 0112 | 3105000000-N | SBGR TERM SE | EA | 2.000 | 126.88000 | 253.76 |
| 0113 | 3150000000-N | ADDIT GUARDR | EA | 15.000 | 60.90000 | 913.50 |
| 0114 | 3195000000-N | GR ANCHOR TY | EA | 1.000 | 558.25000 | 558.25 |
| 0115 | 3215000000-N | GR ANCHOR TY | EA | 10.000 | 1522.50000 | 15225.00 |
| 0116 | 3270000000-N | GR ANCHOR TY | EA | 11.000 | 1928.50000 | 21213.50 |
| 0117 | 3317000000-N | GR ANCHOR TY | EA | 6.000 | 1522.50000 | 9135.00 |
| 0118 | 3360000000-E | REMOVE EXIST | LF | 1027.000 | 1.02000 | 1047.54 |
| 0119 | 3380000000-E | TEMP STL BM | LF | 275.000 | 8.12000 | 2233.00 |
| 0120 | 3387000000-N | TEMP GDRL AN | EA | 1.000 | 253.75000 | 253.75 |
| 0121 | 3387000000-N | TEMP GDRL AN | EA | 1.000 | 1827.00000 | 1827.00 |
| 0122 | 3389100000-N | TEMP GDRL AN | EA | 2.000 | 1116.50000 | 2233.00 |
| 0123 | 3524000000-E | CL FEN **" F | LF | 0.000 | 8.63000 | 0.00 |
| 0124 | 3575000000-E | GENERIC FENC | LF | 0.000 | 17.76000 | 0.00 |
| 0126 | 3578000000-N | GENERIC FENC | EA | 0.000 | 52.78000 | 0.00 |
| 0127 | 3578000000-N | GENERIC FENC | EA | 0.000 | 91.35000 | 0.00 |
| 0128 | 3578000000-N | GENERIC FENC | EA | 0.000 | 121.80000 | 0.00 |
| 0129 | 3578000000-N | GENERIC FENC | EA | 0.000 | 228.38000 | 0.00 |
| | | DBE COMMITMENT TOTAL FOR SUBCONTRACTOR: | | | | 189,473.30 |
| | | DBE COMMITMENT TOTAL FOR VENDOR (SubContractor ) | | | | 189,473 |

| LINE NO. | ITEM NO. | ITEM DESC. | UNIT TYPE | SUBCONTRACTOR QUANTITY | SUBCONTRACTOR UNIT PRICE | EXTENDED AMOUNT |
|---|---|---|---|---|---|---|
| DBE SUBCONTRACTOR: 12552 ASPHALT SERVICES ON DEMAND INC | | | | | | |
| Will Use Quote: Yes | | | | | | |
| 0011 | 0156000000-E | REMOVAL OF E | SY | 13900.000 | 2.00000 | 27800.00 |
| 0012 | 0163000000-E | REMOVAL OF E | SY | 36900.000 | 1.07000 | 39483.00 |
| 0063 | 1220000000-E | INCIDENTAL S | TON | 500.000 | 1.75000 | 875.00 |
| 0064 | 1297000000-E | MILL ASP PVM | SY | 2250.000 | 1.95000 | 4387.50 |
| 0065 | 1308000000-E | MILLN ASPHAL | SY | 1170.000 | 1.95000 | 2281.50 |
| 0001 | 0000100000-N | MOBILIZATION | LS | 1.000 | 13500.00000 | 13500.00 |
| | | DBE COMMITMENT TOTAL FOR SUBCONTRACTOR: | | | | 88,327.00 |
| | | DBE COMMITMENT TOTAL FOR VENDOR (SubContractor ) | | | | 88,327. |
| DBE SUBCONTRACTOR: 4880 TRICOR CONSTRUCTION INC | | | | | | |
| Will Use Quote: Yes | | | | | | |
| 0001 | 0000100000-N | MOBILIZATION | LS | 1.000 | 36036.83000 | 36036.83 |
| 0318 | 8801000000-E | MSE RETAIN W | SF | 4230.000 | 51.23000 | 216702.90 |
| 0319 | 8801000000-E | MSE RETAIN W | SF | 4150.000 | 51.07000 | 211940.50 |
| 0320 | 8801000000-E | MSE RETAIN W | SF | 3305.000 | 52.45000 | 173347.25 |
| 0321 | 8801000000-E | MSE RETAIN W | SF | 2535.000 | 54.73000 | 138740.55 |
| 0322 | 8801000000-E | MSE RETAIN W | SF | 3910.000 | 52.32000 | 204571.20 |
| | | DBE COMMITMENT TOTAL FOR SUBCONTRACTOR: | | | | 981,339.23 |
| | | DBE COMMITMENT TOTAL FOR VENDOR (SubContractor ) | | | | 981,339 |
| DBE SUBCONTRACTOR: 4761 TRAFFIC CONTROL SAFETY SERVICES, INC. | | | | | | |
| Will Use Quote: Yes | | | | | | |
| 0001 | 0000100000-N | MOBILIZATION | LS | 1.000 | 10300.00000 | 10300.00 |
| 0147 | 4149000000-N | DISPOSE SIGN | EA | 1.000 | 2961.40000 | 2961.40 |
| 0148 | 4152000000-N | DISPOSE SIGN | EA | 2.000 | 515.00000 | 1030.00 |
| 0149 | 4155000000-N | DISPOSE SIGN | EA | 58.000 | 1.03000 | 59.74 |
| 0135 | 4057000000-E | OVERHEAD FOO | CY | 37.000 | 1236.00000 | 45732.00 |
| 0134 | 4054000000-E | PLN CONC FOU | CY | 1.000 | 10.30000 | 10.30 |
| 0133 | 4048000000-E | REINF CONC F | CY | 4.000 | 927.00000 | 3708.00 |
| 0146 | 4110000000-N | SIGN ERECTIO | EA | 11.000 | 437.75000 | 4815.25 |
| 0142 | 4096000000-N | SIGN ERECTIO | EA | 4.000 | 87.55000 | 350.20 |
| 0143 | 4102000000-N | SIGN ERECTIO | EA | 60.000 | 56.65000 | 3399.00 |
| 0144 | 4108000000-N | SIGN ERECTIO | EA | 8.000 | 87.55000 | 700.40 |
| 0138 | 4072000000-E | SUPPORT, 3-L | LF | 1373.000 | 6.18000 | 8485.14 |
| 0136 | 4060000000-E | SUPPORT, BRE | LB | 1496.000 | 5.15000 | 7704.40 |
| 0137 | 4066000000-E | SUPPORTS, SI | LB | 1957.000 | 4.12000 | 8062.84 |
| 0139 | 4082100000-N | SUPPORT, OVR | LS | 1.000 | 29870.00000 | 29870.00 |
| 0140 | 4082100000-N | SUPPORT, OVR | LS | 1.000 | 40170.00000 | 40170.00 |
| 0141 | 4082100000-N | SUPPORT, OVR | LS | 1.000 | 19570.00000 | 19570.00 |
| 0145 | 4109000000-N | SIGN ERECTIO | EA | 5.000 | 978.50000 | 4892.50 |
| 0150 | 4234000000-N | DISPOSE SIGN | EA | 1.000 | 1.03000 | 1.03 |

| LINE NO. | ITEM NO. | ITEM DESC. | UNIT TYPE | SUBCONTRACTOR QUANTITY | SUBCONTRACTOR UNIT PRICE | EXTENDED AMOUNT |
|---|---|---|---|---|---|---|
| | | | | | | 191,822.20 |
| | | DBE COMMITMENT TOTAL FOR SUBCONTRACTOR: | | | | |
| | | DBE COMMITMENT TOTAL FOR VENDOR (SubContractor ) | | | | 191,822 |

DBE SUBCONTRACTOR: 7294 STRATCON CONTRACTING CORP
Will Use Quote: Yes

| | | | | | | |
|---|---|---|---|---|---|---|
| 0006 | 0022000000-E | UNCLASSIFIED | CY | 44700.000 | 3.00000 | 134100.00 |
| 0007 | 0036000000-E | UNDERCUT EXC | CY | 3198.000 | 6.00000 | 19188.00 |
| 0008 | 0106000000-E | BORROW EXCAV | CY | 32000.000 | 7.00000 | 224000.00 |
| 0012 | 0163000000-E | REMOVAL OF E | SY | 36900.000 | 2.20000 | 81180.00 |
| 0015 | 0195000000-E | SELECT GRANU | CY | 4400.000 | 6.00000 | 26400.00 |
| 0059 | 1099700000-E | CLASS IV SUB | TON | 13800.000 | 4.65000 | 64170.00 |
| 0060 | 1110000000-E | STABILIZER A | TON | 500.000 | 4.65000 | 2325.00 |
| 0062 | 1121000000-E | AGGREGATE BA | TON | 430.000 | 4.65000 | 1999.50 |
| 0130 | 3635000000-E | RIP RAP, CLA | TON | 660.000 | 5.85000 | 3861.00 |
| 0131 | 3649000000-E | RIP RAP, CLA | TON | 110.000 | 5.25000 | 577.50 |
| 0236 | 6006000000-E | EROS CONTRL | TON | 400.000 | 4.95000 | 1980.00 |
| 0237 | 6009000000-E | EROS CONTRL | TON | 70.000 | 5.25000 | 367.50 |
| 0238 | 6012000000-E | SEDIMENT CON | TON | 2300.000 | 4.65000 | 10695.00 |
| 0021 | 0318000000-E | FND CONDIT M | TON | 2550.000 | 4.65000 | 11857.50 |
| 0018 | 0223000000-E | ROCK PLATING | SY | 380.000 | 2.70000 | 1026.00 |
| | | DBE COMMITMENT TOTAL FOR SUBCONTRACTOR: | | | | 583,727.00 |
| | | DBE COMMITMENT TOTAL FOR VENDOR (SubContractor ) | | | | 583,727 |

DBE SUBCONTRACTOR: 5188 VISTABUTION, LLC
Will Use Quote: Yes

| | | | | | | |
|---|---|---|---|---|---|---|
| 0004 | 0001000000-E | CLEARING & G | LS | 1.000 | 656689.07000 | 656689.07 |
| | | DBE COMMITMENT TOTAL FOR SUBCONTRACTOR: | | | | 656,689.07 |
| | | DBE COMMITMENT TOTAL FOR VENDOR (SubContractor ) | | | | 656,689 |

TOTAL DBE COMMITMENT FOR VENDOR: Entered: 11.06% or 4081690.05
Required: 12.00% or 4428287.55
<GOAL NOT MET>

THIS PROPOSAL CONTAINS THE FOLLOWING ERRORS/WARNINGS (IF ANY)

Section Error : Section Error: section 0003 only partially bid
Item Error : item option group IA has too many choices bid
DBE Warning : DBE Warning: DBE Commitment Goal not met

This Bid contains 2 amendment files

| | | |
|---|---|---|
| 00001 | 06-09-16 | ADD, DELETE & MODIFY ITEMS |
| 00002 | 07-05-16 | TRAFFIC CONTROL QUANTITY MODIFICATIONS |

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 C203751

| Line # | ItemNumber | Sec # | Description | Quantity Unit | Unit Bid Price | Amount Bid |
|---|---|---|---|---|---|---|
| | | | **ROADWAY ITEMS** | | | |
| 0001 | 0000100000-N | 800 | MOBILIZATION | Lump Sum LS | 1,800,000.00 | 1,800,000.00 |
| 0002 | 0000400000-N | 801 | CONSTRUCTION SURVEYING | Lump Sum LS | 898,220.37 | 898,220.37 |
| 0003 | 0000900000-N | SP | GENERIC MISCELLANEOUS ITEM UTILITY COORDINATOR | Lump Sum LS | 598,441.99 | 598,441.99 |
| 0004 | 0001000000-E | 200 | CLEARING & GRUBBING .. ACRE(S) | Lump Sum LS | 2,000,000.00 | 2,000,000.00 |
| 0005 | 0008000000-E | 200 | SUPPLEMENTARY CLEARING & GRUB-BING | 1 ACR | 10,000.00 | 10,000.00 |
| 0006 | 0022000000-E | 225 | UNCLASSIFIED EXCAVATION | 44,700 CY | 15.00 | 670,500.00 |
| 0007 | 0036000000-E | 225 | UNDERCUT EXCAVATION | 3,198 CY | 22.50 | 71,955.00 |
| 0008 | 0106000000-E | 230 | BORROW EXCAVATION | 32,000 CY | 40.00 | 1,280,000.00 |
| 0009 | 0134000000-E | 240 | DRAINAGE DITCH EXCAVATION | 240 CY | 35.00 | 8,400.00 |
| 0010 | 0141000000-E | 240 | BERM DITCH CONSTRUCTION | 260 LF | 6.00 | 1,560.00 |
| 0011 | 0156000000-E | 250 | REMOVAL OF EXISTING ASPHALT PAVEMENT | 13,900 SY | 5.00 | 69,500.00 |
| 0012 | 0163000000-E | 250 | REMOVAL OF EXISTING CONCRETE PAVEMENT | 36,900 SY | 15.00 | 553,500.00 |
| 0013 | 0177000000-E | 250 | BREAKING OF EXISTING ASPHALT PAVEMENT | 3,100 SY | 7.00 | 21,700.00 |
| 0014 | 0192000000-N | 260 | PROOF ROLLING | 10 HR | 1,000.00 | 10,000.00 |
| 0015 | 0195000000-E | 265 | SELECT GRANULAR MATERIAL | 4,400 CY | 30.00 | 132,000.00 |
| 0016 | 0196000000-E | 270 | GEOTEXTILE FOR SOIL STABILIZA-TION | 25,300 SY | 1.80 | 45,540.00 |
| 0017 | 0199000000-E | SP | TEMPORARY SHORING | 8,717 SF | 30.00 | 261,510.00 |
| 0018 | 0223000000-E | 275 | ROCK PLATING | 380 SY | 65.00 | 24,700.00 |
| 0019 | 0255000000-E | SP | GENERIC GRADING ITEM HAULING & DISPOSAL OF PETROLE-UM CONTAMINTED SOIL | 500 TON | 100.00 | 50,000.00 |

Contract Item Sheets For C203751

| Line # | ItemNumber | Sec # | Description | Quantity Unit | Unit Bid Price | Amount Bid |
|---|---|---|---|---|---|---|
| 0020 | 0314000000-E | SP | SELECT MATERIAL, CLASS ***** (IV) | 70 TON | 55.00 | 3,850.00 |
| 0021 | 0318000000-E | 300 | FOUNDATION CONDITIONING MATERIAL, MINOR STRUCTURES | 2,550 TON | 24.00 | 61,200.00 |
| 0022 | 0320000000-E | 300 | FOUNDATION CONDITIONING GEOTEXTILE | 8,350 SY | 1.10 | 9,185.00 |
| 0023 | 0342000000-E | 310 | **" SIDE DRAIN PIPE (42") | 76 LF | 355.00 | 26,980.00 |
| 0024 | 0342000000-E | 310 | **" SIDE DRAIN PIPE (60") | 48 LF | 475.00 | 22,800.00 |
| 0025 | 0342000000-E | 310 | **" SIDE DRAIN PIPE (8") | 12 LF | 175.00 | 2,100.00 |
| 0026 | 0343000000-E | 310 | 15" SIDE DRAIN PIPE | 712 LF | 115.00 | 81,880.00 |
| 0027 | 0344000000-E | 310 | 18" SIDE DRAIN PIPE | 76 LF | 215.00 | 16,340.00 |
| 0028 | 0345000000-E | 310 | 24" SIDE DRAIN PIPE | 56 LF | 220.00 | 12,320.00 |
| 0029 | 0348000000-E | 310 | **" SIDE DRAIN PIPE ELBOWS (15") | 2 EA | 250.00 | 500.00 |
| 0030 | 0354000000-E | 310 | ***" RC PIPE CULVERTS, CLASS ***** (15", V) | 596 LF | 90.00 | 53,640.00 |
| 0031 | 0354000000-E | 310 | ***" RC PIPE CULVERTS, CLASS ***** (18", V) | 800 LF | 120.00 | 96,000.00 |
| 0032 | 0354000000-E | 310 | ***" RC PIPE CULVERTS, CLASS ***** (24", V) | 176 LF | 110.00 | 19,360.00 |
| 0033 | 0448000000-E | 310 | ****" RC PIPE CULVERTS, CLASS IV (48") | 724 LF | 255.00 | 184,620.00 |
| 0034 | 0448000000-E | 310 | ****" RC PIPE CULVERTS, CLASS IV (54") | 128 LF | 315.00 | 40,320.00 |
| 0035 | 0448000000-E | 310 | ****" RC PIPE CULVERTS, CLASS IV (60") | 412 LF | 410.00 | 168,920.00 |

Contract Item Sheets For C203751

| Line # | ItemNumber | Sec # | Description | Quantity Unit | Unit Bid Price | Amount Bid |
|---|---|---|---|---|---|---|
| 0036 | 0448200000-E | 310 | 15" RC PIPE CULVERTS, CLASS IV | 4,040 LF | 80.00 | 323,200.00 |
| 0037 | 0448300000-E | 310 | 18" RC PIPE CULVERTS, CLASS IV | 2,800 LF | 96.00 | 268,800.00 |
| 0038 | 0448400000-E | 310 | 24" RC PIPE CULVERTS, CLASS IV | 948 LF | 125.00 | 118,500.00 |
| 0039 | 0448600000-E | 310 | 36" RC PIPE CULVERTS, CLASS IV | 252 LF | 170.00 | 42,840.00 |
| 0040 | 0448700000-E | 310 | 42" RC PIPE CULVERTS, CLASS IV | 396 LF | 200.00 | 79,200.00 |
| 0041 | 0542000000-E | 310 | **" PVC PIPE CULVERTS (8") | 8 LF | 190.00 | 1,520.00 |
| 0042 | 0582000000-E | 310 | 15" CS PIPE CULVERTS, 0.064" THICK | 60 LF | 145.00 | 8,700.00 |
| 0043 | 0588000000-E | 310 | 18" CS PIPE CULVERTS, 0.064" THICK | 60 LF | 200.00 | 12,000.00 |
| 0044 | 0636000000-E | 310 | **" CS PIPE ELBOWS, *****" THICK (15", 0.064") | 2 EA | 255.00 | 510.00 |
| 0045 | 0636000000-E | 310 | **" CS PIPE ELBOWS, *****" THICK (18", 0.064") | 2 EA | 285.00 | 570.00 |
| 0046 | 0973100000-E | 330 | **" WELDED STEEL PIPE, ****" THICK, GRADE B IN SOIL (42", 0.625") | 48 LF | 549.00 | 26,352.00 |
| 0047 | 0973100000-E | 330 | **" WELDED STEEL PIPE, ****" THICK, GRADE B IN SOIL (60", 0.875") | 50 LF | 999.00 | 49,950.00 |
| 0048 | 0973300000-E | 330 | **" WELDED STEEL PIPE, ****" THICK, GRADE B NOT IN SOIL (42", 0.625") | 48 LF | 999.00 | 47,952.00 |
| 0049 | 0973300000-E | 330 | **" WELDED STEEL PIPE, ****" THICK, GRADE B NOT IN SOIL (60", 0.875") | 50 LF | 1,905.00 | 95,250.00 |
| 0050 | 0986000000-E | SP | GENERIC PIPE ITEM 16" DUCTILE IRON PIPE, CLASS 250, SEALED | 208 LF | 195.00 | 40,560.00 |
| 0051 | 0986000000-E | SP | GENERIC PIPE ITEM 18" DUCTILE IRON PIPE, CLASS 250, SEALED | 52 LF | 260.00 | 13,520.00 |

Contract Item Sheets For C203751

| Line # | ItemNumber | Sec # | Description | Quantity Unit | Unit Bid Price | Amount Bid |
|---|---|---|---|---|---|---|
| 0052 | 0986000000-E | SP | GENERIC PIPE ITEM 24" DUCTILE IRON PIPE, CLASS 200, SEALED | 248 LF | 210.00 | 52,080.00 |
| 0053 | 0986000000-E | SP | GENERIC PIPE ITEM 36" DUCTILE IRON PIPE, CLASS 150, SEALED | 176 LF | 560.00 | 98,560.00 |
| 0054 | 0992000000-E | SP | GENERIC PIPE ITEM BOOTS FOR SEALED DRAINAGE STRUCTURES | 16 EA | 750.00 | 12,000.00 |
| 0055 | 0995000000-E | 340 | PIPE REMOVAL | 3,128 LF | 31.00 | 96,968.00 |
| 0056 | 1000000000-E | 462 | 6" SLOPE PROTECTION | 57 SY | 150.00 | 8,550.00 |
| 0057 | 1011000000-N | 500 | FINE GRADING | Lump Sum LS | 750,000.00 | 750,000.00 |
| 0058 | 1099500000-E | 505 | SHALLOW UNDERCUT | 6,818 CY | 12.00 | 81,816.00 |
| 0059 | 1099700000-E | 505 | CLASS IV SUBGRADE STABILIZA-TION | 13,800 TON | 15.00 | 207,000.00 |
| 0060 | 1110000000-E | 510 | STABILIZER AGGREGATE | 500 TON | 40.00 | 20,000.00 |
| 0061 | 1115000000-E | SP | GEOTEXTILE FOR PAVEMENT STA-BILIZATION | 5,961 SY | 8.00 | 47,688.00 |
| 0062 | 1121000000-E | 520 | AGGREGATE BASE COURSE | 430 TON | 40.00 | 17,200.00 |
| 0063 | 1220000000-E | 545 | INCIDENTAL STONE BASE | 500 TON | 60.00 | 30,000.00 |
| 0064 | 1297000000-E | 607 | MILLING ASPHALT PAVEMENT, ***" DEPTH (1-1/2") | 2,250 SY | 7.00 | 15,750.00 |
| 0065 | 1308000000-E | 607 | MILLING ASPHALT PAVEMENT, ***" TO ******" (0" TO 1-1/2") | 1,170 SY | 11.00 | 12,870.00 |
| 0066 | 1330000000-E | 607 | INCIDENTAL MILLING | 2,580 SY | 8.61 | 22,213.80 |
| 0067 | 1489000000-E | 610 | ASPHALT CONC BASE COURSE, TYPE B25.0B | 5,380 TON | 69.94 | 376,277.20 |
| 0068 | 1491000000-E | 610 | ASPHALT CONC BASE COURSE, TYPE B25.0C | 12,660 TON | 67.55 | 855,183.00 |

Contract Item Sheets For C203751

| Line # | ItemNumber | Sec # | Description | Quantity Unit | Unit Bid Price | Amount Bid |
|---|---|---|---|---|---|---|
| 0069 | 1498000000-E | 610 | ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B | 3,910 TON | 72.64 | 284,022.40 |
| 0070 | 1503000000-E | 610 | ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C | 8,760 TON | 73.54 | 644,210.40 |
| 0071 | 1519000000-E | 610 | ASPHALT CONC SURFACE COURSE, TYPE S9.5B | 5,310 TON | 77.84 | 413,330.40 |
| 0072 | 1523000000-E | 610 | ASPHALT CONC SURFACE COURSE, TYPE S9.5C | 6,510 TON | 77.04 | 501,530.40 |
| 0073 | 1575000000-E | 620 | ASPHALT BINDER FOR PLANT MIX | 2,105 TON | 375.08 | 789,543.40 |
| 0074 | 1693000000-E | 654 | ASPHALT PLANT MIX, PAVEMENT REPAIR | 6,620 TON | 136.00 | 900,320.00 |
| 0075 | 2000000000-N | 806 | RIGHT OF WAY MARKERS | 87 EA | 431.38 | 37,530.06 |
| 0076 | 2253000000-E | 840 | PIPE COLLARS | 0.553 CY | 1,550.00 | 857.15 |
| 0077 | 2264000000-E | 840 | PIPE PLUGS | 0.065 CY | 6,500.00 | 422.50 |
| 0078 | 2275000000-E | SP | FLOWABLE FILL | 688 CY | 250.00 | 172,000.00 |
| 0079 | 2286000000-N | 840 | MASONRY DRAINAGE STRUCTURES | 183 EA | 3,765.00 | 688,995.00 |
| 0080 | 2297000000-E | 840 | MASONRY DRAINAGE STRUCTURES | 58.845 CY | 1,385.00 | 81,500.33 |
| 0081 | 2308000000-E | 840 | MASONRY DRAINAGE STRUCTURES | 85.8 LF | 165.00 | 14,157.00 |
| 0082 | 2364000000-N | 840 | FRAME WITH TWO GRATES, STD 840.16 | 14 EA | 665.00 | 9,310.00 |
| 0083 | 2366000000-N | 840 | FRAME WITH TWO GRATES, STD 840.24 | 2 EA | 700.00 | 1,400.00 |
| 0084 | 2367000000-N | 840 | FRAME WITH TWO GRATES, STD 840.29 | 30 EA | 675.00 | 20,250.00 |
| 0085 | 2374000000-N | 840 | FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E) | 17 EA | 725.00 | 12,325.00 |
| 0086 | 2374000000-N | 840 | FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F) | 66 EA | 745.00 | 49,170.00 |

Contract Item Sheets For C203751

| Line # | ItemNumber | Sec # | Description | Quantity Unit | Unit Bid Price | Amount Bid |
|---|---|---|---|---|---|---|
| 0087 | 2374000000-N | 840 | FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G) | 54 EA | 745.00 | 40,230.00 |
| 0088 | 2396000000-N | 840 | FRAME WITH COVER, STD 840.54 | 17 EA | 550.00 | 9,350.00 |
| 0089 | 2418000000-E | SP | FRAME WITH GRATES, DRIVEWAY DROP INLET | 168 LF | 405.00 | 68,040.00 |
| 0090 | 2451000000-N | 852 | CONCRETE TRANSITIONAL SECTION FOR DROP INLET | 10 EA | 990.00 | 9,900.00 |
| 0091 | 2473000000-N | SP | GENERIC DRAINAGE ITEM MASONRY DRAINAGE STRUCTURES (SEALED) | 8 EA | 4,730.00 | 37,840.00 |
| 0092 | 2484000000-E | SP | GENERIC DRAINAGE ITEM MASONRY DRAINAGE STRUCTURES (SEALED) | 3.2 LF | 165.00 | 528.00 |
| 0093 | 2535000000-E | 846 | **"X **" CONCRETE CURB (8" X 12") | 470 LF | 14.08 | 6,617.60 |
| 0094 | 2535000000-E | 846 | **"X **" CONCRETE CURB (8" X 18") | 1,420 LF | 21.93 | 31,140.60 |
| 0095 | 2549000000-E | 846 | 2'-6" CONCRETE CURB & GUTTER | 18,310 LF | 17.26 | 316,030.60 |
| 0096 | 2591000000-E | 848 | 4" CONCRETE SIDEWALK | 7,791 SY | 55.00 | 428,505.00 |
| 0097 | 2605000000-N | 848 | CONCRETE CURB RAMP | 71 EA | 1,198.50 | 85,093.50 |
| 0098 | 2612000000-E | 848 | 6" CONCRETE DRIVEWAY | 1,120 SY | 50.49 | 56,548.80 |
| 0099 | 2619000000-E | 850 | 4" CONCRETE PAVED DITCH | 95 SY | 82.62 | 7,848.90 |
| 0100 | 2655000000-E | 852 | 5" MONOLITHIC CONCRETE ISLANDS (KEYED IN) | 1,154 SY | 85.00 | 98,090.00 |
| 0101 | 2724000000-E | 857 | PRECAST REINFORCED CONCRETE BARRIER, SINGLE FACED | 631 LF | 150.00 | 94,650.00 |
| 0102 | 2753000000-E | 846 | GENERIC PAVING ITEM 2'-6" CONCRETE CURB & GUTTER (SPECIAL) | 8,100 LF | 19.07 | 154,467.00 |
| 0103 | 2800000000-N | 858 | ADJUSTMENT OF CATCH BASINS | 5 EA | 1,510.00 | 7,550.00 |

Contract Item Sheets For C203751

| Line # | ItemNumber | Sec # | Description | Quantity Unit | Unit Bid Price | Amount Bid |
|---|---|---|---|---|---|---|
| 0104 | 2830000000-N | 858 | ADJUSTMENT OF MANHOLES | 8 EA | 1,510.00 | 12,080.00 |
| 0105 | 2845000000-N | 858 | ADJUSTMENT OF METER BOXES OR VALVE BOXES | 2 EA | 725.00 | 1,450.00 |
| 0106 | 2893000000-N | 859 | CONVERT EXISTING CATCH BASIN TO JUNCTION BOX WITH MANHOLE | 1 EA | 2,450.00 | 2,450.00 |
| 0107 | 2965000000-N | 859 | CONVERT EXISTING JUNCTION BOX TO CATCH BASIN | 1 EA | 3,380.00 | 3,380.00 |
| 0108 | 2995000000-N | SP | GENERIC DRAINAGE ITEM CONVERT EXISTING JUNCTION BOX TO SLAB TOP JUNCTION BOX | 2 EA | 2,450.00 | 4,900.00 |
| 0109 | 3000000000-N | SP | IMPACT ATTENUATOR UNIT, TYPE 350 | 6 EA | 15,225.00 | 91,350.00 |
| 0110 | 3030000000-E | 862 | STEEL BM GUARDRAIL | 2,675 LF | 15.99 | 42,773.25 |
| 0111 | 3045000000-E | 862 | STEEL BM GUARDRAIL, SHOP CURVED | 25 LF | 18.27 | 456.75 |
| 0112 | 3105000000-N | 862 | STEEL BM GUARDRAIL TERMINAL SECTIONS | 2 EA | 126.88 | 253.76 |
| 0113 | 3150000000-N | 862 | ADDITIONAL GUARDRAIL POSTS | 15 EA | 60.90 | 913.50 |
| 0114 | 3195000000-N | 862 | GUARDRAIL ANCHOR UNITS, TYPE AT-1 | 1 EA | 558.25 | 558.25 |
| 0115 | 3215000000-N | 862 | GUARDRAIL ANCHOR UNITS, TYPE III | 10 EA | 1,522.50 | 15,225.00 |
| 0116 | 3270000000-N | SP | GUARDRAIL ANCHOR UNITS, TYPE 350 | 11 EA | 1,928.50 | 21,213.50 |
| 0117 | 3317000000-N | 862 | GUARDRAIL ANCHOR UNITS, TYPE B-77 | 6 EA | 1,522.50 | 9,135.00 |
| 0118 | 3360000000-E | 863 | REMOVE EXISTING GUARDRAIL | 1,027 LF | 1.02 | 1,047.54 |
| 0119 | 3380000000-E | 862 | TEMPORARY STEEL BM GUARDRAIL | 275 LF | 8.12 | 2,233.00 |
| 0120 | 3387000000-N | 862 | TEMPORARY GUARDRAIL ANCHOR UNITS, TYPE ********** (AT-1) | 1 EA | 253.75 | 253.75 |

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| Line # | ItemNumber | Sec # | Description | Quantity Unit | Unit Bid Price | Amount Bid |
|---|---|---|---|---|---|---|
| 0121 | 3387000000-N | 862 | TEMPORARY GUARDRAIL ANCHOR UNITS, TYPE ********** (W-BEAM) | 1 EA | 1,827.00 | 1,827.00 |
| 0122 | 3389100000-N | SP | TEMPORARY GUARDRAIL ANCHOR UNITS, TYPE 350 | 2 EA | 1,116.50 | 2,233.00 |
| 0123 | 3524000000-E | SP | VINYL COATED CHAIN LINK FENCE, **" FABRIC (60") | 5,120 LF | 8.63 | 44,185.60 |
| 0124 | 3575000000-E | SP | GENERIC FENCING ITEM CHAIN LINK FENCE WITH BARBED WIRE, 96" FABRIC, VINYL COATED | 590 LF | 17.76 | 10,478.40 |
| 0126 | 3578000000-N | SP | GENERIC FENCING ITEM METAL LINE POST, 60" CHAIN LINK FENCE, VINYL COATED | 427 EA | 52.78 | 22,537.06 |
| 0127 | 3578000000-N | SP | GENERIC FENCING ITEM METAL LINE POST, 96" CHAIN LINK FENCE, VINYL COATED | 50 EA | 91.35 | 4,567.50 |
| 0128 | 3578000000-N | SP | GENERIC FENCING ITEM METAL TERMINAL POST, 60" CHAIN LINK FENCE, VINYL COATED | 36 EA | 121.80 | 4,384.80 |
| 0129 | 3578000000-N | SP | GENERIC FENCING ITEM METAL TERMINAL POST, 96" CHAIN LINK FENCE, VINYL COATED | 6 EA | 228.38 | 1,370.28 |
| 0130 | 3635000000-E | 876 | RIP RAP, CLASS II | 660 TON | 65.00 | 42,900.00 |
| 0131 | 3649000000-E | 876 | RIP RAP, CLASS B | 110 TON | 120.00 | 13,200.00 |
| 0132 | 3656000000-E | 876 | GEOTEXTILE FOR DRAINAGE | 3,465 SY | 1.00 | 3,465.00 |
| 0133 | 4048000000-E | 902 | REINFORCED CONCRETE SIGN FOUN-DATIONS | 4 CY | 927.00 | 3,708.00 |
| 0134 | 4054000000-E | 902 | PLAIN CONCRETE SIGN FOUNDA-TIONS | 1 CY | 10.30 | 10.30 |
| 0135 | 4057000000-E | SP | OVERHEAD FOOTING | 37 CY | 1,236.00 | 45,732.00 |
| 0136 | 4060000000-E | 903 | SUPPORTS, BREAKAWAY STEEL BEAM | 1,496 LB | 5.15 | 7,704.40 |
| 0137 | 4066000000-E | 903 | SUPPORTS, SIMPLE STEEL BEAM | 1,957 LB | 4.12 | 8,062.84 |

| Line # | ItemNumber | Sec # | Description | Quantity Unit | Unit Bid Price | Amount Bid |
|---|---|---|---|---|---|---|
| 0138 | 4072000000-E | 903 | SUPPORTS, 3-LB STEEL U-CHANNEL | 1,373 LF | 6.18 | 8,485.14 |
| 0139 | 4082100000-N | SP | SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (30+74 NBL) | Lump Sum LS | 29,870.00 | 29,870.00 |
| 0140 | 4082100000-N | SP | SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (40+28 NBL) | Lump Sum LS | 40,170.00 | 40,170.00 |
| 0141 | 4082100000-N | SP | SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (50+00 NBL) | Lump Sum LS | 19,570.00 | 19,570.00 |
| 0142 | 4096000000-N | 904 | SIGN ERECTION, TYPE D | 4 EA | 87.55 | 350.20 |
| 0143 | 4102000000-N | 904 | SIGN ERECTION, TYPE E | 60 EA | 56.65 | 3,399.00 |
| 0144 | 4108000000-N | 904 | SIGN ERECTION, TYPE F | 8 EA | 87.55 | 700.40 |
| 0145 | 4109000000-N | 904 | SIGN ERECTION, TYPE *** (OVERHEAD) (A) | 5 EA | 978.50 | 4,892.50 |
| 0146 | 4110000000-N | 904 | SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A) | 11 EA | 437.75 | 4,815.25 |
| 0147 | 4149000000-N | 907 | DISPOSAL OF SIGN SYSTEM, OVERHEAD | 1 EA | 2,961.40 | 2,961.40 |
| 0148 | 4152000000-N | 907 | DISPOSAL OF SIGN SYSTEM, STEEL BEAM | 2 EA | 515.00 | 1,030.00 |
| 0149 | 4155000000-N | 907 | DISPOSAL OF SIGN SYSTEM, U-CHANNEL | 58 EA | 1.03 | 59.74 |
| 0150 | 4234000000-N | 907 | DISPOSAL OF SIGN, A OR B (OVERHEAD) | 1 EA | 1.03 | 1.03 |
| 0151 | 4400000000-E | 1110 | WORK ZONE SIGNS (STATIONARY) | 3,970 SF | 5.00 | 19,850.00 |
| 0152 | 4405000000-E | 1110 | WORK ZONE SIGNS (PORTABLE) | 3,342 SF | 12.00 | 40,104.00 |
| 0153 | 4410000000-E | 1110 | WORK ZONE SIGNS (BARRICADE MOUNTED) | 416 SF | 8.50 | 3,536.00 |
| 0154 | 4415000000-N | 1115 | FLASHING ARROW BOARD | 6 EA | 2,000.00 | 12,000.00 |

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| Line # | ItemNumber | Sec # | Description | Quantity Unit | Unit Bid Price | Amount Bid |
|---|---|---|---|---|---|---|
| 0155 | 4420000000-N | 1120 | PORTABLE CHANGEABLE MESSAGE SIGN | 14 EA | 5,000.00 | 70,000.00 |
| 0156 | 4430000000-N | 1130 | DRUMS | 635 EA | 65.00 | 41,275.00 |
| 0157 | 4435000000-N | 1135 | CONES | 93 EA | 24.00 | 2,232.00 |
| 0158 | 4445000000-E | 1145 | BARRICADES (TYPE III) | 736 LF | 22.50 | 16,560.00 |
| 0159 | 4450000000-N | 1150 | FLAGGER | 7,680 HR | 18.00 | 138,240.00 |
| 0160 | 4465000000-N | 1160 | TEMPORARY CRASH CUSHIONS | 6 EA | 3,500.00 | 21,000.00 |
| 0161 | 4470000000-N | 1160 | RESET TEMPORARY CRASH CUSHION | 4 EA | 1,600.00 | 6,400.00 |
| 0162 | 4480000000-N | 1165 | TMA | 6 EA | 10,000.00 | 60,000.00 |
| 0163 | 4485000000-E | 1170 | PORTABLE CONCRETE BARRIER | 4,550 LF | 17.33 | 78,851.50 |
| 0164 | 4490000000-E | 1170 | PORTABLE CONCRETE BARRIER (ANCHORED) | 135 LF | 25.00 | 3,375.00 |
| 0165 | 4500000000-E | 1170 | RESET PORTABLE CONCRETE BAR-RIER | 2,260 LF | 3.50 | 7,910.00 |
| 0166 | 4507000000-E | 1170 | WATER FILLED BARRIER | 4,377 LF | 72.37 | 316,763.49 |
| 0167 | 4508000000-E | 1170 | RESET WATER FILLED BARRIER | 33,884 LF | 3.51 | 118,932.84 |
| 0168 | 4510000000-N | SP | LAW ENFORCEMENT | 990 HR | 40.00 | 39,600.00 |
| 0169 | 4516000000-N | 1180 | SKINNY DRUM | 229 EA | 27.22 | 6,233.38 |
| 0170 | 4520000000-N | 1266 | TUBULAR MARKERS (FIXED) | 46 EA | 65.00 | 2,990.00 |
| 0171 | 4570000000-E | SP | TEMPORARY GLARE SCREEN | 1,580 LF | 11.00 | 17,380.00 |
| 0172 | 4589000000-N | SP | GENERIC TRAFFIC CONTROL ITEM PROTECTIVE CANOPY | Lump Sum LS | 31,643.25 | 31,643.25 |
| 0173 | 4650000000-N | 1251 | TEMPORARY RAISED PAVEMENT MARKERS | 2,082 EA | 6.50 | 13,533.00 |

| Line # | ItemNumber | Sec # | Description | Quantity Unit | Unit Bid Price | Amount Bid |
|---|---|---|---|---|---|---|
| 0174 | 4685000000-E | 1205 | THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS) | 29 LF | 4.00 | 116.00 |
| 0175 | 4686000000-E | 1205 | THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS) | 11,992 LF | 5.00 | 59,960.00 |
| 0176 | 4695000000-E | 1205 | THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS) | 2,303 LF | 6.27 | 14,439.81 |
| 0177 | 4697000000-E | 1205 | THERMOPLASTIC PAVEMENT MARKING LINES (8", 120 MILS) | 880 LF | 5.70 | 5,016.00 |
| 0178 | 4710000000-E | 1205 | THERMOPLASTIC PAVEMENT MARKING LINES (24", 120 MILS) | 4,485 LF | 10.00 | 44,850.00 |
| 0179 | 4721000000-E | 1205 | THERMOPLASTIC PAVEMENT MARKING CHARACTER (120 MILS) | 20 EA | 100.00 | 2,000.00 |
| 0180 | 4725000000-E | 1205 | THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS) | 90 EA | 150.00 | 13,500.00 |
| 0181 | 4770000000-E | 1205 | COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (II) | 709 LF | 1.75 | 1,240.75 |
| 0182 | 4770000000-E | 1205 | COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV) | 1,250 LF | 2.50 | 3,125.00 |
| 0183 | 4800000000-N | 1205 | COLD APPLIED PLASTIC PAVEMENT MARKING CHARACTER, TYPE ** (IV) | 8 EA | 100.00 | 800.00 |
| 0184 | 4805000000-N | 1205 | COLD APPLIED PLASTIC PAVEMENT MARKING SYMBOL, TYPE ** (IV) | 4 EA | 200.00 | 800.00 |
| 0185 | 4810000000-E | 1205 | PAINT PAVEMENT MARKING LINES (4") | 162,912 LF | 0.20 | 32,582.40 |
| 0186 | 4820000000-E | 1205 | PAINT PAVEMENT MARKING LINES (8") | 19,280 LF | 1.00 | 19,280.00 |
| 0187 | 4835000000-E | 1205 | PAINT PAVEMENT MARKING LINES (24") | 5,930 LF | 3.00 | 17,790.00 |
| 0188 | 4840000000-N | 1205 | PAINT PAVEMENT MARKING CHARAC-TER | 116 EA | 25.00 | 2,900.00 |
| 0189 | 4845000000-N | 1205 | PAINT PAVEMENT MARKING SYMBOL | 274 EA | 25.00 | 6,850.00 |

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| Line # | ItemNumber | Sec # | Description | Quantity Unit | Unit Bid Price | Amount Bid |
|---|---|---|---|---|---|---|
| 0190 | 4850000000-E | 1205 | REMOVAL OF PAVEMENT MARKING LINES (4") | 35,060 LF | 0.60 | 21,036.00 |
| 0191 | 4860000000-E | 1205 | REMOVAL OF PAVEMENT MARKING LINES (8") | 3,170 LF | 1.50 | 4,755.00 |
| 0192 | 4870000000-E | 1205 | REMOVAL OF PAVEMENT MARKING LINES (24") | 50 LF | 190.20 | 9,510.00 |
| 0193 | 4875000000-N | 1205 | REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS | 65 EA | 25.00 | 1,625.00 |
| 0194 | 4900000000-N | 1251 | PERMANENT RAISED PAVEMENT MARKERS | 15 EA | 6.50 | 97.50 |
| 0195 | 4905000000-N | 1253 | SNOWPLOWABLE PAVEMENT MARKERS | 294 EA | 50.00 | 14,700.00 |
| 0196 | 5255000000-N | 1413 | PORTABLE LIGHTING | Lump Sum LS | 500,000.00 | 500,000.00 |
| 0197 | 5265000000-E | SP | GENERIC LIGHTING ITEM STREET LIGHTING CONDUIT IN-STALLATION (2" PVC) | 12,600 LF | 2.89 | 36,414.00 |
| 0198 | 5325800000-E | 1510 | 8" WATER LINE | 2,468 LF | 120.00 | 296,160.00 |
| 0199 | 5326200000-E | 1510 | 12" WATER LINE | 6,108 LF | 200.00 | 1,221,600.00 |
| 0200 | 5546000000-E | 1515 | 8" VALVE | 16 EA | 2,761.00 | 44,176.00 |
| 0201 | 5558000000-E | 1515 | 12" VALVE | 21 EA | 3,973.00 | 83,433.00 |
| 0202 | 5600000000-E | 1515 | **" BLOW OFF (12") | 4 EA | 4,520.00 | 18,080.00 |
| 0203 | 5606800000-E | 1515 | 8" BLOW OFF | 3 EA | 10,550.00 | 31,650.00 |
| 0204 | 5648000000-N | 1515 | RELOCATE WATER METER | 43 EA | 1,385.00 | 59,555.00 |
| 0205 | 5649000000-N | 1515 | RECONNECT WATER METER | 2 EA | 2,111.00 | 4,222.00 |
| 0206 | 5666000000-E | 1515 | FIRE HYDRANT | 4 EA | 10,500.00 | 42,000.00 |
| 0207 | 5672000000-N | 1515 | RELOCATE FIRE HYDRANT | 10 EA | 12,135.00 | 121,350.00 |
| 0208 | 5691000000-E | 1520 | **" SANITARY GRAVITY SEWER (36") | 2,010 LF | 600.00 | 1,206,000.00 |

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| Line # | ItemNumber | Sec # | Description | Quantity Unit | Unit Bid Price | Amount Bid |
|---|---|---|---|---|---|---|
| 0209 | 5691300000-E | 1520 | 8" SANITARY GRAVITY SEWER | 2,423 LF | 176.00 | 426,448.00 |
| 0210 | 5691500000-E | 1520 | 12" SANITARY GRAVITY SEWER | 2,051 LF | 246.00 | 504,546.00 |
| 0211 | 5691700000-E | 1520 | 18" SANITARY GRAVITY SEWER | 24 LF | 415.00 | 9,960.00 |
| 0212 | 5768000000-N | 1520 | SANITARY SEWER CLEAN-OUT | 47 EA | 1,360.00 | 63,920.00 |
| 0213 | 5775000000-E | 1525 | 4' DIA UTILITY MANHOLE | 25 EA | 8,000.00 | 200,000.00 |
| 0214 | 5776000000-E | 1525 | 5' DIA UTILITY MANHOLE | 2 EA | 9,000.00 | 18,000.00 |
| 0215 | 5777000000-E | 1525 | 6' DIA UTILITY MANHOLE | 12 EA | 7,000.00 | 84,000.00 |
| 0216 | 5778000000-E | 1525 | 8' DIA UTILITY MANHOLE | 3 EA | 12,030.00 | 36,090.00 |
| 0217 | 5781000000-E | 1525 | UTILITY MANHOLE WALL, 4' DIA | 51 LF | 120.00 | 6,120.00 |
| 0218 | 5782000000-E | 1525 | UTILITY MANHOLE WALL, 5' DIA | 17 LF | 195.00 | 3,315.00 |
| 0219 | 5783000000-E | 1525 | UTILITY MANHOLE WALL, 6' DIA | 98 LF | 280.00 | 27,440.00 |
| 0220 | 5784000000-E | 1525 | UTILITY MANHOLE WALL, 8' DIA | 24 LF | 525.00 | 12,600.00 |
| 0221 | 5800000000-E | 1530 | ABANDON 6" UTILITY PIPE | 336 LF | 15.00 | 5,040.00 |
| 0222 | 5801000000-E | 1530 | ABANDON 8" UTILITY PIPE | 4,588 LF | 10.00 | 45,880.00 |
| 0223 | 5804000000-E | 1530 | ABANDON 12" UTILITY PIPE | 6,150 LF | 15.00 | 92,250.00 |
| 0224 | 5813000000-E | 1530 | ABANDON 24" UTILITY PIPE | 1,411 LF | 34.00 | 47,974.00 |
| 0225 | 5816000000-N | 1530 | ABANDON UTILITY MANHOLE | 15 EA | 1,200.00 | 18,000.00 |
| 0226 | 5828000000-N | 1530 | REMOVE UTILITY MANHOLE | 4 EA | 1,200.00 | 4,800.00 |
| 0227 | 5835700000-E | 1540 | 16" ENCASEMENT PIPE | 600 LF | 215.00 | 129,000.00 |
| 0228 | 5836000000-E | 1540 | 24" ENCASEMENT PIPE | 740 LF | 90.00 | 66,600.00 |
| 0229 | 5871900000-E | 1550 | TRENCHLESS INSTALLATION OF 16" IN SOIL | 285 LF | 89.00 | 25,365.00 |

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| Line # | ItemNumber | Sec # | Description | Quantity Unit | Unit Bid Price | Amount Bid |
|---|---|---|---|---|---|---|
| 0230 | 5871910000-E | 1550 | TRENCHLESS INSTALLATION OF 16" NOT IN SOIL | 285 LF | 219.00 | 62,415.00 |
| 0231 | 5872200000-E | 1550 | TRENCHLESS INSTALLATION OF 24" IN SOIL | 265 LF | 799.00 | 211,735.00 |
| 0232 | 5872210000-E | 1550 | TRENCHLESS INSTALLATION OF 24" NOT IN SOIL | 265 LF | 229.00 | 60,685.00 |
| 0233 | 5882000000-N | SP | GENERIC UTILITY ITEM 12" INSERTION VALVE ASSEMBLY | 5 EA | 899.00 | 4,495.00 |
| 0234 | 5882000000-N | SP | GENERIC UTILITY ITEM 2" AIR RELEASE VALVE | 1 EA | 12,875.00 | 12,875.00 |
| 0235 | 6000000000-E | 1605 | TEMPORARY SILT FENCE | 25,000 LF | 1.88 | 47,000.00 |
| 0236 | 6006000000-E | 1610 | STONE FOR EROSION CONTROL, CLASS A | 400 TON | 110.00 | 44,000.00 |
| 0237 | 6009000000-E | 1610 | STONE FOR EROSION CONTROL, CLASS B | 70 TON | 110.00 | 7,700.00 |
| 0238 | 6012000000-E | 1610 | SEDIMENT CONTROL STONE | 2,300 TON | 30.00 | 69,000.00 |
| 0239 | 6015000000-E | 1615 | TEMPORARY MULCHING | 24 ACR | 816.00 | 19,584.00 |
| 0240 | 6018000000-E | 1620 | SEED FOR TEMPORARY SEEDING | 1,200 LB | 4.08 | 4,896.00 |
| 0241 | 6021000000-E | 1620 | FERTILIZER FOR TEMPORARY SEED-ING | 7 TON | 1,122.00 | 7,854.00 |
| 0242 | 6024000000-E | 1622 | TEMPORARY SLOPE DRAINS | 200 LF | 20.00 | 4,000.00 |
| 0243 | 6029000000-E | SP | SAFETY FENCE | 200 LF | 2.28 | 456.00 |
| 0244 | 6030000000-E | 1630 | SILT EXCAVATION | 1,290 CY | 6.00 | 7,740.00 |
| 0245 | 6036000000-E | 1631 | MATTING FOR EROSION CONTROL | 15,000 SY | 1.79 | 26,850.00 |
| 0246 | 6037000000-E | SP | COIR FIBER MAT | 100 SY | 5.69 | 569.00 |
| 0247 | 6042000000-E | 1632 | 1/4" HARDWARE CLOTH | 10,000 LF | 2.00 | 20,000.00 |
| 0248 | 6045000000-E | SP | **" TEMPORARY PIPE (24") | 400 LF | 27.73 | 11,092.00 |

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| Line # | ItemNumber | Sec # | Description | Quantity Unit | Unit Bid Price | Amount Bid |
|---|---|---|---|---|---|---|
| 0249 | 6070000000-N | 1639 | SPECIAL STILLING BASINS | 4 EA | 352.96 | 1,411.84 |
| 0250 | 6071020000-E | SP | POLYACRYLAMIDE (PAM) | 10 LB | 19.00 | 190.00 |
| 0251 | 6071030000-E | 1640 | COIR FIBER BAFFLE | 225 LF | 8.00 | 1,800.00 |
| 0252 | 6071050000-E | SP | **" SKIMMER (2") | 1 EA | 900.00 | 900.00 |
| 0253 | 6084000000-E | 1660 | SEEDING & MULCHING | 18 ACR | 1,734.00 | 31,212.00 |
| 0254 | 6087000000-E | 1660 | MOWING | 15 ACR | 204.00 | 3,060.00 |
| 0255 | 6090000000-E | 1661 | SEED FOR REPAIR SEEDING | 250 LB | 6.12 | 1,530.00 |
| 0256 | 6093000000-E | 1661 | FERTILIZER FOR REPAIR SEEDING | 0.75 TON | 1,734.00 | 1,300.50 |
| 0257 | 6096000000-E | 1662 | SEED FOR SUPPLEMENTAL SEEDING | 375 LB | 5.10 | 1,912.50 |
| 0258 | 6108000000-E | 1665 | FERTILIZER TOPDRESSING | 11.25 TON | 1,530.00 | 17,212.50 |
| 0259 | 6111000000-E | SP | IMPERVIOUS DIKE | 55 LF | 251.87 | 13,852.85 |
| 0260 | 6114500000-N | 1667 | SPECIALIZED HAND MOWING | 40 MHR | 91.80 | 3,672.00 |
| 0261 | 6117000000-N | SP | RESPONSE FOR EROSION CONTROL | 50 EA | 204.00 | 10,200.00 |
| 0262 | 6132000000-N | SP | GENERIC EROSION CONTROL ITEM CONCRETE WASHOUT STRUCTURE | 8 EA | 4,500.00 | 36,000.00 |
| 0263 | 7048500000-E | 1705 | PEDESTRIAN SIGNAL HEAD (16", 1 SECTION W/COUNTDOWN) | 20 EA | 873.12 | 17,462.40 |
| 0264 | 7060000000-E | 1705 | SIGNAL CABLE | 6,625 LF | 2.09 | 13,846.25 |
| 0265 | 7108000000-E | 1705 | VEHICLE SIGNAL HEAD (12", 1 SECTION) | 4 EA | 542.23 | 2,168.92 |
| 0266 | 7120000000-E | 1705 | VEHICLE SIGNAL HEAD (12", 3 SECTION) | 23 EA | 1,004.70 | 23,108.10 |
| 0267 | 7132000000-E | 1705 | VEHICLE SIGNAL HEAD (12", 4 SECTION) | 1 EA | 1,454.61 | 1,454.61 |

| Line # | ItemNumber | Sec # | Description | Quantity Unit | Unit Bid Price | Amount Bid |
|---|---|---|---|---|---|---|
| 0268 | 7144000000-E | 1705 | VEHICLE SIGNAL HEAD (12", 5 SECTION) | 3 EA | 1,449.44 | 4,348.32 |
| 0269 | 7252000000-E | 1710 | MESSENGER CABLE (1/4") | 500 LF | 2.37 | 1,185.00 |
| 0270 | 7279000000-E | 1715 | TRACER WIRE | 1,800 LF | 0.77 | 1,386.00 |
| 0271 | 7288000000-E | 1715 | PAVED TRENCHING (**********) (1, 2") | 25 LF | 26.00 | 650.00 |
| 0272 | 7300000000-E | 1715 | UNPAVED TRENCHING (**********) (1, 2") | 800 LF | 5.23 | 4,184.00 |
| 0273 | 7300000000-E | 1715 | UNPAVED TRENCHING (**********) (2, 2") | 225 LF | 6.63 | 1,491.75 |
| 0274 | 7300100000-E | 1715 | UNPAVED TRENCHING FOR TEMP-ORARY LEAD-IN | 350 LF | 4.77 | 1,669.50 |
| 0275 | 7301000000-E | 1715 | DIRECTIONAL DRILL (**********) (1, 2") | 675 LF | 16.90 | 11,407.50 |
| 0276 | 7301000000-E | 1715 | DIRECTIONAL DRILL (**********) (2, 2") | 1,725 LF | 19.12 | 32,982.00 |
| 0277 | 7301000000-E | 1715 | DIRECTIONAL DRILL (**********) (3, 2") | 50 LF | 21.49 | 1,074.50 |
| 0278 | 7324000000-N | 1716 | JUNCTION BOX (STANDARD SIZE) | 31 EA | 464.53 | 14,400.43 |
| 0279 | 7348000000-N | 1716 | JUNCTION BOX (OVER-SIZED, HEA-VY DUTY) | 8 EA | 725.09 | 5,800.72 |
| 0280 | 7360000000-N | 1720 | WOOD POLE | 2 EA | 1,027.60 | 2,055.20 |
| 0281 | 7372000000-N | 1721 | GUY ASSEMBLY | 5 EA | 519.19 | 2,595.95 |
| 0282 | 7430000000-N | 1722 | HEAT SHRINK TUBING RETROFIT KIT | 1 EA | 98.82 | 98.82 |
| 0283 | 7432000000-E | 1722 | 2" RISER WITH HEAT SHRINK TUBING | 4 EA | 541.64 | 2,166.56 |
| 0284 | 7444000000-E | 1725 | INDUCTIVE LOOP SAWCUT | 4,025 LF | 5.15 | 20,728.75 |
| 0285 | 7456000000-E | 1726 | LEAD-IN CABLE (**********) (14-2) | 5,425 LF | 1.54 | 8,354.50 |

| Line # | ItemNumber | Sec # | Description | Quantity Unit | Unit Bid Price | Amount Bid |
|---|---|---|---|---|---|---|
| 0286 | 7516000000-E | 1730 | COMMUNICATIONS CABLE (**FIBER) (12) | 1,200 LF | 1.68 | 2,016.00 |
| 0287 | 7516000000-E | 1730 | COMMUNICATIONS CABLE (**FIBER) (48) | 2,100 LF | 1.90 | 3,990.00 |
| 0288 | 7540000000-N | 1731 | SPLICE ENCLOSURE | 3 EA | 1,680.19 | 5,040.57 |
| 0289 | 7541000000-N | 1731 | MODIFY SPLICE ENCLOSURE | 3 EA | 1,130.24 | 3,390.72 |
| 0290 | 7552000000-N | 1731 | INTERCONNECT CENTER | 3 EA | 1,464.45 | 4,393.35 |
| 0291 | 7566000000-N | 1733 | DELINEATOR MARKER | 5 EA | 130.34 | 651.70 |
| 0292 | 7575160000-E | 1734 | REMOVE EXISTING COMMUNICATIONS CABLE | 1,400 LF | 1.26 | 1,764.00 |
| 0293 | 7575180000-N | 1735 | CABLE TRANSFER | 1 EA | 344.01 | 344.01 |
| 0294 | 7588000000-N | SP | METAL POLE WITH SINGLE MAST ARM | 5 EA | 11,642.35 | 58,211.75 |
| 0295 | 7590000000-N | SP | METAL POLE WITH DUAL MAST ARM | 3 EA | 16,098.21 | 48,294.63 |
| 0296 | 7613000000-N | SP | SOIL TEST | 8 EA | 767.58 | 6,140.64 |
| 0297 | 7614100000-E | SP | DRILLED PIER FOUNDATION | 48 CY | 910.21 | 43,690.08 |
| 0298 | 7631000000-N | SP | MAST ARM WITH METAL POLE DE-SIGN | 8 EA | 34.39 | 275.12 |
| 0299 | 7636000000-N | 1745 | SIGN FOR SIGNALS | 12 EA | 460.01 | 5,520.12 |
| 0300 | 7642100000-N | 1743 | TYPE I POST WITH FOUNDATION | 1 EA | 1,090.50 | 1,090.50 |
| 0301 | 7642200000-N | 1743 | TYPE II PEDESTAL WITH FOUND-ATION | 14 EA | 1,767.40 | 24,743.60 |
| 0302 | 7642300000-N | 1743 | TYPE III PEDESTAL WITH FOUND-ATION | 2 EA | 3,818.54 | 7,637.08 |
| 0303 | 7648000000-N | 1746 | RELOCATE EXISTING SIGN | 4 EA | 180.59 | 722.36 |
| 0304 | 7684000000-N | 1750 | SIGNAL CABINET FOUNDATION | 3 EA | 1,175.60 | 3,526.80 |

Contract Item Sheets For C203751

| Line # | ItemNumber | Sec # | Description | Quantity Unit | Unit Bid Price | Amount Bid |
|---|---|---|---|---|---|---|
| 0305 | 7756000000-N | 1751 | CONTROLLER WITH CABINET (TYPE 2070L, BASE MOUNTED) | 3 EA | 13,215.37 | 39,646.11 |
| 0306 | 7780000000-N | 1751 | DETECTOR CARD (TYPE 2070L) | 14 EA | 102.69 | 1,437.66 |
| 0307 | 7901000000-N | 1753 | CABINET BASE EXTENDER | 3 EA | 606.42 | 1,819.26 |
| 0308 | 7960000000-N | SP | METAL POLE FOUNDATION REMOVAL | 3 EA | 1,088.38 | 3,265.14 |
| 0309 | 7972000000-N | SP | METAL POLE REMOVAL | 3 EA | 339.51 | 1,018.53 |
| 0310 | 7980000000-N | SP | GENERIC SIGNAL ITEM 900MHZ SPREAD SPECTRUM ETHER-NET RADIO | 2 EA | 3,409.45 | 6,818.90 |
| 0311 | 7980000000-N | SP | GENERIC SIGNAL ITEM ETHRNET EDGE SWITCH | 3 EA | 2,515.25 | 7,545.75 |
| 0312 | 7980000000-N | SP | GENERIC SIGNAL ITEM RELOCATE FLASHER CABINET/SOLAR ASSEMBLY/RADIO ASSEMBLY | 1 EA | 3,029.25 | 3,029.25 |
| 0355 | 2190000000-N | 828 | TEMPORARY STEEL PLATE COVERS FOR MASONRY DRAINAGE STRUCTURE | 25 EA | 745.00 | 18,625.00 |
| 0356 | 2542000000-E | 846 | 1'-6" CONCRETE CURB & GUTTER | 592 LF | 14.28 | 8,453.76 |
| 0357 | 2738000000-E | SP | GENERIC PAVING ITEM CONCRETE PAVER SIDEWALK | 391 SY | 85.00 | 33,235.00 |
| 0358 | 2738000000-E | SP | GENERIC PAVING ITEM CONCRETE PAVER MEDIAN ISLAND | 297 SY | 59.67 | 17,721.99 |
| 0359 | 2738000000-E | SP | GENERIC PAVING ITEM CONCRETE SIDEWALK (CAPITAL CITY GRID) | 2,645 SY | 85.00 | 224,825.00 |
| 0360 | 3575000000-E | SP | GENERIC FENCING ITEM ORNAMENTAL FENCE | 54 LF | 50.00 | 2,700.00 |
| 0361 | 6645000000-N | SP | GENERIC PLANTING ITEM TREE WELL SYSTEM | 31 EA | 8,000.00 | 248,000.00 |
| 0362 | 0000910000-N | SP | GENERIC MISCELLANEOUS ITEM EXPLORATORY EXCAVATION - STANDARD | 600 HR | 250.00 | 150,000.00 |

Contract Item Sheets For C203751

| Line # | ItemNumber | Sec # | Description | Quantity Unit | Unit Bid Price | Amount Bid |
|---|---|---|---|---|---|---|
| 0363 | 0000910000-N | SP | GENERIC MISCELLANEOUS ITEM EXPLORATORY EXCAVATION - VACUUM | 150 HR | 500.00 | 75,000.00 |
| 0364 | 5120000000-N | 1407 | ELECTRIC SERVICE POLE **** ******** (30', CLASS 4) | 3 EA | 190.00 | 570.00 |
| 0365 | 5125000000-E | 1407 | ELECTRIC SERVICE LATERAL ********** (3, #1/0 USE) | 45 LF | 26.00 | 1,170.00 |
| 0366 | 5270000000-N | SP | GENERIC LIGHTING ITEM LIGHT CONTROL SYSTEM, TYPE RW, 120/240V | 3 EA | 4,500.00 | 13,500.00 |
| 0367 | 5155000000-E | 1409 | ELECTRICAL DUCT, TYPE BD, SIZE ***** (2") | 370 LF | 6.32 | 2,338.40 |
| 0368 | 5160000000-E | 1409 | ELECTRICAL DUCT, TYPE JA, SIZE ***** (4") | 150 LF | 16.50 | 2,475.00 |
| 0369 | 5170000000-E | 1410 | ** #8 W/G FEEDER CIRCUIT (2) | 320 LF | 3.24 | 1,036.80 |
| 0370 | 5205000000-E | 1410 | ** #8 W/G FEEDER CIRCUIT IN *****" CONDUIT (2, 1-1/2") | 2,930 LF | 4.15 | 12,159.50 |
| 0371 | 5270000000-N | SP | GENERIC LIGHTING ITEM ELECTRICAL JUNCTION BOXES TYPE PC18 | 2 EA | 1,100.00 | 2,200.00 |
| 0372 | 5270000000-N | SP | GENERIC LIGHTING ITEM ELECTRICAL JUNCTION BOXES TYPE PC30 | 2 EA | 1,100.00 | 2,200.00 |
| 0373 | 5252000000-N | 1412 | UNDERPASS LUMINARIES ********* (TYPE WM) | 8 EA | 600.00 | 4,800.00 |
| 0374 | 5260000000-N | SP | GENERIC LIGHTING ITEM ELECTRICAL CONDUIT SYSTEM AT PEACE ST | Lump Sum LS | 8,000.00 | 8,000.00 |
| 0375 | 5270000000-N | SP | GENERIC LIGHTING ITEM SPOTLIGHT LUMINAIRE | 8 EA | 1,200.00 | 9,600.00 |
| 0376 | 5270000000-N | SP | GENERIC LIGHTING ITEM AESTHETIC LIGHTING LUMINAIRE | 169 EA | 1,037.00 | 175,253.00 |

Contract Item Sheets For C203751

| Line # | ItemNumber | Sec # | Description | Quantity Unit | Unit Bid Price | Amount Bid |
|---|---|---|---|---|---|---|
| 0377 | 5260000000-N | SP | GENERIC LIGHTING ITEM AESTHETIC LIGHTING SYSTEM AT BRIDGE OVER PEACE ST | Lump Sum LS | 9,000.00 | 9,000.00 |
| 0378 | 5260000000-N | SP | GENERIC LIGHTING ITEM AESTHETIC LIGHTING SYSTEM AT WADE AVE FLYOVER | Lump Sum LS | 9,000.00 | 9,000.00 |

Contract Item Sheets For C203751

| Line # | ItemNumber | Sec # | Description | Quantity Unit | Unit Bid Price | Amount Bid |
|---|---|---|---|---|---|---|
| 0313 | 8056000000-N | 402 | REMOVAL OF EXISTING STRUCTURE AT STATION ********** (15+13.11-Y1-) | Lump Sum LS | 58,762.92 | 58,762.92 |
| 0314 | 8126000000-N | 414 | CULVERT EXCAVATION, STA ****** (15+13.11-Y1-) | Lump Sum LS | 4,561.76 | 4,561.76 |
| 0315 | 8133000000-E | 414 | FOUNDATION CONDITIONING MATERIAL, BOX CULVERT | 258 TON | 28.76 | 7,420.08 |
| 0316 | 8196000000-E | 420 | CLASS A CONCRETE (CULVERT) | 331.2 CY | 549.87 | 182,116.94 |
| 0317 | 8245000000-E | 425 | REINFORCING STEEL (CULVERT) | 49,779 LB | 0.90 | 44,801.10 |

Contract Item Sheets For C203751

| Line # | ItemNumber | Sec # | Description | Quantity Unit | Unit Bid Price | Amount Bid |
|---|---|---|---|---|---|---|
| 0318 | 8801000000-E | SP | MSE RETAINING WALL NO **** (2) | 4,230 SF | 75.00 | 317,250.00 |
| 0319 | 8801000000-E | SP | MSE RETAINING WALL NO **** (3) | 4,150 SF | 75.00 | 311,250.00 |
| 0320 | 8801000000-E | SP | MSE RETAINING WALL NO **** (4) | 3,305 SF | 75.00 | 247,875.00 |
| 0321 | 8801000000-E | SP | MSE RETAINING WALL NO **** (5) | 2,535 SF | 75.00 | 190,125.00 |
| | | | ******* BEGIN SCHEDULE IA ******* ******* ( 2 ALTERNATES ) ******* | | | |
| 0322 IA1 | 8801000000-E | SP | MSE RETAINING WALL NO **** (1) | 3,910 SF | 75.00 | 293,250.00 |
| | | | *** OR *** | | | |
| 0323 IA2 | 8802014000-E | SP | SOLDIER PILE RETAINING WALLS | 3,595 SF | | |
| | | | ***** END SCHEDULE IA ***** | | | |

Contract Item Sheets For C203751

| Line # | ItemNumber | Sec # | Description | Quantity Unit | Unit Bid Price | Amount Bid |
|---|---|---|---|---|---|---|
| 0324 | 8035000000-N | 402 | REMOVAL OF EXISTING STRUCTURE AT STATION ********** (20+19.94 -FLYOVER-) | Lump Sum LS | 150,000.00 | 150,000.00 |
| 0325 | 8035000000-N | 402 | REMOVAL OF EXISTING STRUCTURE AT STATION ********** (22+06.91-L-) | Lump Sum LS | 119,000.00 | 119,000.00 |
| 0326 | 8096000000-E | 450 | PILE EXCAVATION IN SOIL | 191 LF | 297.10 | 56,746.10 |
| 0327 | 8097000000-E | 450 | PILE EXCAVATION NOT IN SOIL | 76 LF | 266.64 | 20,264.64 |
| 0328 | 8105540000-E | 411 | 3'-6" DIA DRILLED PIERS IN SOIL | 112 LF | 637.14 | 71,359.68 |
| 0329 | 8105640000-E | 411 | 3'-6" DIA DRILLED PIERS NOT IN SOIL | 70 LF | 1,527.65 | 106,935.50 |
| 0330 | 8112730000-N | 450 | PDA TESTING | 2 EA | 4,027.35 | 8,054.70 |
| 0331 | 8113000000-N | 411 | SID INSPECTIONS | 2 EA | 2,000.00 | 4,000.00 |
| 0332 | 8115000000-N | 411 | CSL TESTING | 2 EA | 2,000.00 | 4,000.00 |
| 0333 | 8147000000-E | 420 | REINFORCED CONCRETE DECK SLAB | 14,218 SF | 28.89 | 410,758.02 |
| 0334 | 8154000000-E | 420 | REINFORCED CONCRETE DECK SLAB (SAND LIGHTWEIGHT CONC) | 16,350 SF | 20.66 | 337,791.00 |
| 0335 | 8161000000-E | 420 | GROOVING BRIDGE FLOORS | 31,190 SF | 0.49 | 15,283.10 |
| 0336 | 8182000000-E | 420 | CLASS A CONCRETE (BRIDGE) | 441.5 CY | 900.00 | 397,350.00 |
| 0337 | 8210000000-N | 422 | BRIDGE APPROACH SLABS, STATION ********** (20+19.94-FLYOVER-) | Lump Sum LS | 79,000.00 | 79,000.00 |
| 0338 | 8210000000-N | 422 | BRIDGE APPROACH SLABS, STATION ********** (22+06.91-L-) | Lump Sum LS | 160,000.00 | 160,000.00 |
| 0339 | 8217000000-E | 425 | REINFORCING STEEL (BRIDGE) | 68,480 LB | 1.45 | 99,296.00 |
| 0340 | 8238000000-E | 425 | SPIRAL COLUMN REINFORCING STEEL (BRIDGE) | 6,384 LB | 2.60 | 16,598.40 |
| 0341 | 8277000000-E | 430 | MODIFIED 72" PRESTRESSED CONC GIRDERS | 1,840.71 LF | 350.00 | 644,248.50 |

Contract Item Sheets For C203751

| Line # | ItemNumber | Sec # | Description | Quantity Unit | Unit Bid Price | Amount Bid |
|---|---|---|---|---|---|---|
| 0342 | 8280000000-E | 440 | APPROX ..... LBS STRUCTURAL STEEL | 652,000 LS | 1,800,000.00 | 1,800,000.00 |
| 0343 | 8364000000-E | 450 | HP12X53 STEEL PILES | 2,135 LF | 85.00 | 181,475.00 |
| 0344 | 8391000000-N | 450 | STEEL PILE POINTS | 50 EA | 150.00 | 7,500.00 |
| 0345 | 8517000000-E | 460 | 1'-**"X *****" CONCRETE PARA-PET (1'-4" X 3'-6") | 182.71 LF | 170.00 | 31,060.70 |
| 0346 | 8522000000-E | 460 | GENERIC STRUCTURE ITEM DECORATIVE CONCRETE PARAPET | 775.24 LF | 300.00 | 232,572.00 |
| 0347 | 8531000000-E | 462 | 4" SLOPE PROTECTION | 210 SY | 75.00 | 15,750.00 |
| 0348 | 8654000000-N | SP | DISC BEARINGS | Lump Sum LS | 135,000.00 | 135,000.00 |
| 0349 | 8657000000-N | 430 | ELASTOMERIC BEARINGS | Lump Sum LS | 63,000.00 | 63,000.00 |
| 0350 | 8706000000-N | SP | EXPANSION JOINT SEALS | Lump Sum LS | 200,000.00 | 200,000.00 |
| 0351 | 8860000000-N | SP | GENERIC STRUCTURE ITEM APPLICATION OF BRIDGE COATING | Lump Sum LS | 300,847.98 | 300,847.98 |
| 0352 | 8860000000-N | SP | GENERIC STRUCTURE ITEM ASBESTOS ASSESSMENT | Lump Sum LS | 669.50 | 669.50 |
| 0353 | 8867000000-E | SP | GENERIC STRUCTURE ITEM CONC PARAPET WITH MOMENT SLAB | 367.62 LF | 675.00 | 248,143.50 |
| 0354 | 8892000000-E | SP | GENERIC STRUCTURE ITEM PRECAST CONCRETE PANELS | 383 SF | 50.00 | 19,150.00 |
| 0379 | 8867000000-E | SP | GENERIC STRUCTURE ITEM ARCHITECTURAL METAL FASCIA | 718.75 LF | 661.26 | 475,280.63 |

**TOTAL AMOUNT OF BID FOR ENTIRE PROJECT** **$36,902,396.26**

Contract No. C203751

County Wake

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

Zachry Construction Corporation

Full name of Corporation

P. O. Box 33240, San Antonio, TX 78265

Address as Prequalified

Attest Jaclyn M. Golson

~~Secretary~~/Assistant Secretary

*Select appropriate title*

By

President/~~Vice President~~/~~Assistant Vice President~~

*Select appropriate title*

Jaclyn M. Golson

Print or type Signer's name

Mr. Jean J. Abiassi, P.E.

Print or type Signer's name

**CORPORATE SEAL**

Zachry Construction Corporation SEAL DELAWARE 2007

## AFFIDAVIT MUST BE NOTARIZED

Subscribed and sworn to before me this the

8th day of August 2016.

Sandra A De Hoyos

Signature of Notary Public

of Bexar County

State of Texas

My Commission Expires: 02-07-2020

**NOTARY SEAL**

NOTARY PUBLIC STATE OF TEXAS

SANDRA A DE HOYOS
NOTARY PUBLIC-STATE OF TEXAS
COMM. EXP. 02-07-2020
NOTARY ID 12478047-9

Contract No. C203751
County Wake

Rev. 5-19-11

# 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. C203751
County Wake

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.** **C203751**

**County (ies):** **Wake**

ACCEPTED BY THE
DEPARTMENT OF TRANSPORTATION

DocuSigned by:
Randy A Sam
A7079FC32A09478...

Contract Officer

8/12/2016

Date

Execution of Contract and Bonds
Approved as to Form:

DocuSigned by:
Steven Armstrong
5C738C23AF00459...

Attorney General

8/12/2016

Date

Signature Sheet (Bid - Acceptance by Department)

Contract No. C203751
County Wake

Rev 5-17-11

Zurich Bond Number: 9186973
Pacific Bond Number: 82387465

# CONTRACT PAYMENT BOND

| | |
|---|---|
| Date of Payment Bond Execution | August 8, 2016 |
| Name of Principal Contractor | Zachry Construction Corporation |
| Name of Surety: | Zurich American Insurance Company; Pacific Indemnity Company |
| Name of Contracting Body: | **North Carolina Department of Transportation** |
| | **Raleigh, North Carolina** |
| Amount of Bond: | $36,902,396.26 |
| Contract ID No.: | C203751 |
| County Name: | Wake |

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. C203751
County Wake

Rev 5-17-11

# CONTRACT PAYMENT BOND

*Affix Seal of Surety Company*

Zurich American Insurance Company
Pacific Indemnity Company

Print or type Surety Company Name

By Donald E. Miller, Jr.

Print, stamp or type name of Attorney-in-Fact

Signature of Attorney-in-Fact

Signature of Witness

Deborah L. Jung

Print or type Signer's name

131 Interpark Blvd., San Antonio, TX 78216

Address of Attorney-in-Fact

Contract No. C203751
County Wake

Rev 5-17-11

# CONTRACT PAYMENT BOND

## CORPORATION

SIGNATURE OF CONTRACTOR (Principal)

Zachry Construction Corporation

Full name of Corporation

P. O. Box 33240, San Antonio, TX 78265
2330 N. Loop 1604 W, San Antonio, TX 78248-4512 (Corporate Office)

Address as prequalified

By _____
Signature of President, ~~Vice President~~, ~~Assistant Vice President~~
*Select appropriate title*

Jean Abiassi
Print or type Signer's name

*Affix Corporate Seal*

Attest _____
Signature of ~~Secretary~~, Assistant Secretary
*Select appropriate title*

Jaclyn M. Golson
Print or type Signer's name

**ZURICH AMERICAN INSURANCE COMPANY**
**COLONIAL AMERICAN CASUALTY AND SURETY COMPANY**
**FIDELITY AND DEPOSIT COMPANY OF MARYLAND**
**POWER OF ATTORNEY**

KNOW ALL MEN BY THESE PRESENTS: That the ZURICH AMERICAN INSURANCE COMPANY, a corporation of the State of New York, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, a corporation of the State of Maryland, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND a corporation of the State of Maryland (herein collectively called the "Companies"), by **THOMAS O. MCCLELLAN, Vice President,** in pursuance of authority granted by Article V, Section 8, of the By-Laws of said Companies, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, do hereby nominate, constitute, and appoint **Michael N. VENSON, Robert B. WRAY, Deborah L. JUNG, S. West WARREN, Catherine M. MARTINEZ, Thomas E. WHITNEY and Donald E. MILLER, JR., all of San Antonio, Texas, EACH** its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: **any and all bonds and undertakings, EXCEPT bonds on behalf of Independent Executors, Community Survivors and Community Guardians.** and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the ZURICH AMERICAN INSURANCE COMPANY at its office in New York, New York., the regularly elected officers of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at its office in Owings Mills, Maryland., and the regularly elected officers of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at its office in Owings Mills, Maryland., in their own proper persons.

The said Vice President does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article V, Section 8, of the By-Laws of said Companies, and is now in force.

IN WITNESS WHEREOF, the said Vice-President has hereunto subscribed his/her names and affixed the Corporate Seals of the said **ZURICH AMERICAN INSURANCE COMPANY, COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND,** this 8th day of January, A.D. 2015.

**ATTEST:**

**ZURICH AMERICAN INSURANCE COMPANY**
**COLONIAL AMERICAN CASUALTY AND SURETY COMPANY**
**FIDELITY AND DEPOSIT COMPANY OF MARYLAND**

By:

*Secretary*
*Michael McKibben*

*Vice President*
*Thomas O. McClellan*

**State of** Maryland
County of Baltimore

On this 8th day of January, A.D. 2015, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, **THOMAS O. MCCLELLAN, Vice President, and MICHAEL MCKIBBEN, Secretary,** of the Companies, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and acknowledged the execution of same, and being by me duly sworn, deposeth and saith, that he/she is the said officer of the Company aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and that the said Corporate Seals and the signature as such officer were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.

Maria D. Adamski, Notary Public
My Commission Expires: July 8, 2015

POA-F 168-9150

## EXTRACT FROM BY-LAWS OF THE COMPANIES

"Article V, Section 8, Attorneys-in-Fact. The Chief Executive Officer, the President, or any Executive Vice President or Vice President may, by written instrument under the attested corporate seal, appoint attorneys-in-fact with authority to execute bonds, policies, recognizances, stipulations, undertakings, or other like instruments on behalf of the Company, and may authorize any officer or any such attorney-in-fact to affix the corporate seal thereto; and may with or without cause modify of revoke any such appointment or authority at any time."

## CERTIFICATE

I, the undersigned, Vice President of the ZURICH AMERICAN INSURANCE COMPANY, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that Article V, Section 8, of the By-Laws of the Companies is still in force.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the ZURICH AMERICAN INSURANCE COMPANY at a meeting duly called and held on the 15th day of December 1998.

RESOLVED: "That the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the Seal of the Company may be affixed by facsimile on any Power of Attorney...Any such Power or any certificate thereof bearing such facsimile signature and seal shall be valid and binding on the Company."

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at a meeting duly called and held on the 5th day of May, 1994, and the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF I have hereunto subscribed my name and affixed the corporate seals of the said Companies, this 0 day of August, 20 16

Gerald F. Haley

Gerald F. Haley, Vice President

| Chubb Surety | POWER OF ATTORNEY | Federal Insurance Company<br>Vigilant Insurance Company<br>Pacific Indemnity Company | Attn: Surety Department<br>15 Mountain View Road<br>Warren, NJ 07059 |
|---|---|---|---|

**Know All by These Presents**, That **FEDERAL INSURANCE COMPANY**, an Indiana corporation, **VIGILANT INSURANCE COMPANY**, a New York corporation, and **PACIFIC INDEMNITY COMPANY**, a Wisconsin corporation, do each hereby constitute and appoint **Deborah L. Jung, Catherine M. Martinez, Donald E. Miller, Jr., Michael N. Venson, S. West Warren and Thomas E. Whitney of San Antonio, Texas** ----------

each as their true and lawful Attorney- in- Fact to execute under such designation in their names and to affix their corporate seals to and deliver for and on their behalf as surety thereon or otherwise, bonds and undertakings and other writings obligatory in the nature thereof (other than bail bonds) given or executed in the course of business, and any instruments amending or altering the same, and consents to the modification or alteration of any instrument referred to in said bonds or obligations.

**In Witness Whereof**, said **FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY**, and **PACIFIC INDEMNITY COMPANY** have each executed and attested these presents and affixed their corporate seals on this **8th** day of **January, 2015.**

Dawn M. Chloros, Assistant Secretary

David B. Norris, Jr., Vice President

STATE OF NEW JERSEY

ss.

County of Somerset

On this **8th** day of **January, 2015** before me, a Notary Public of New Jersey, personally came Dawn M. Chloros, to me known to be Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY, the companies which executed the foregoing Power of Attorney, and the said Dawn M. Chloros, being by me duly sworn, did depose and say that she is Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY and knows the corporate seals thereof, that the seals affixed to the foregoing Power of Attorney are such corporate seals and were thereto affixed by authority of the By- Laws of said Companies; and that she signed said Power of Attorney as Assistant Secretary of said Companies by like authority; and that she is acquainted with David B. Norris, Jr., and knows him to be Vice President of said Companies; and that the signature of David B. Norris, Jr., subscribed to said Power of Attorney is in the genuine handwriting of David B. Norris, Jr., and was thereto subscribed by authority of said By- Laws and in deponent's presence.

Notarial Seal

KATHERINE J. ADELAAR NOTARY PUBLIC NEW JERSEY

KATHERINE J. ADELAAR
NOTARY PUBLIC OF NEW JERSEY
No. 2316685
Commission Expires July 16, 2019

Notary Public

## CERTIFICATION

Extract from the By- Laws of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY:

> "All powers of attorney for and on behalf of the Company may and shall be executed in the name and on behalf of the Company, either by the Chairman or the President or a Vice President or an Assistant Vice President, jointly with the Secretary or an Assistant Secretary, under their respective designations. The signature of such officers may be engraved, printed or lithographed. The signature of each of the following officers: Chairman, 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 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 upon the Company with respect to any bond or undertaking to which it is attached."

I, Dawn M. Chloros, Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY (the "Companies") do hereby certify that

(i) the foregoing extract of the By- Laws of the Companies is true and correct,
(ii) the Companies are duly licensed and authorized to transact surety business in all 50 of the United States of America and the District of Columbia and are authorized by the U.S. Treasury Department; further, Federal and Vigilant are licensed in the U.S. Virgin Islands, and Federal is licensed in Guam, Puerto Rico, and each of the Provinces of Canada except Prince Edward Island; and
(iii) the foregoing Power of Attorney is true, correct and in full force and effect.

Given under my hand and seals of said Companies at Warren, NJ this August 8, 2016

Dawn M. Chloros, Assistant Secretary

IN THE EVENT YOU WISH TO NOTIFY US OF A CLAIM, VERIFY THE AUTHENTICITY OF THIS BOND OR NOTIFY US OF ANY OTHER MATTER, PLEASE CONTACT US AT ADDRESS LISTED ABOVE, OR BY: Telephone (908) 903- 3493 Fax (908) 903- 3656 e-mail: surety@chubb.com

Contract No. C203751
County Wake

Rev 5-17-11

Zurich Bond Number: 9186973
Pacific Bond Number: 82387465

# CONTRACT PERFORMANCE BOND

| | |
|---|---|
| Date of Performance Bond Execution: | August 8, 2016 |
| Name of Principal Contractor: | Zachry Construction Corporation |
| Name of Surety: | Zurich American Insurance Company; Pacific Indemnity Company |
| Name of Contracting Body: | **North Carolina Department of Transportation** |
| | **Raleigh, North Carolina** |
| Amount of Bond: | $36,902,396.26 |
| Contract ID No.: | C203751 |
| County Name: | Wake |

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. C203751
County Wake

Rev 5-17-11

# CONTRACT PERFORMANCE BOND

*Affix Seal of Surety Company*

Zachry American Insurance Company
Pacific Indemnity Company

Print or type Surety Company Name

By Donald E. Miller, Jr.

Print, stamp or type name of Attorney-in-Fact

Signature of Attorney-in-Fact

Signature of Witness

Deborah L. Jung

Print or type Signer's name

131 Interpark Blvd., San Antonio, TX 78216

Address of Attorney-in-Fact

Contract No. C203751
County Wake

Rev 5-17-11

# CONTRACT PERFORMANCE BOND

## CORPORATION

SIGNATURE OF CONTRACTOR (Principal)

Zachry Construction Corporation

Full name of Corporation

P. O. Box 33240, San Antonio, TX 78265
2330 N. Loop 1604 W, San Antonio, TX 78248-4512 (Corporate Office)

Address as prequalified

By _____
Signature of **President**, ~~**Vice President**~~, ~~**Assistant Vice President**~~
*Select appropriate title*

Jean Abiassi
Print or type Signer's name

*Affix Corporate Seal*

Attest _____
Signature of ~~**Secretary**~~, **Assistant Secretary**
*Select appropriate title*

Jaclyn M. Golson
Print or type Signer's name

**ZURICH AMERICAN INSURANCE COMPANY**
**COLONIAL AMERICAN CASUALTY AND SURETY COMPANY**
**FIDELITY AND DEPOSIT COMPANY OF MARYLAND**
**POWER OF ATTORNEY**

KNOW ALL MEN BY THESE PRESENTS: That the ZURICH AMERICAN INSURANCE COMPANY, a corporation of the State of New York, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, a corporation of the State of Maryland, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND a corporation of the State of Maryland (herein collectively called the "Companies"), by **THOMAS O. MCCLELLAN, Vice President,** in pursuance of authority granted by Article V, Section 8, of the By-Laws of said Companies, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, do hereby nominate, constitute, and appoint **Michael N. VENSON, Robert B. WRAY, Deborah L. JUNG, S. West WARREN, Catherine M. MARTINEZ, Thomas E. WHITNEY and Donald E. MILLER, JR., all of San Antonio, Texas, EACH** its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: **any and all bonds and undertakings, EXCEPT bonds on behalf of Independent Executors, Community Survivors and Community Guardians.** and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the ZURICH AMERICAN INSURANCE COMPANY at its office in New York, New York., the regularly elected officers of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at its office in Owings Mills, Maryland., and the regularly elected officers of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at its office in Owings Mills, Maryland., in their own proper persons.

The said Vice President does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article V, Section 8, of the By-Laws of said Companies, and is now in force.

IN WITNESS WHEREOF, the said Vice-President has hereunto subscribed his/her names and affixed the Corporate Seals of the said **ZURICH AMERICAN INSURANCE COMPANY, COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND**, this 24th day of February, A.D. 2016.

**ATTEST:**

**ZURICH AMERICAN INSURANCE COMPANY**
**COLONIAL AMERICAN CASUALTY AND SURETY COMPANY**
**FIDELITY AND DEPOSIT COMPANY OF MARYLAND**

By:

*Secretary*
*Michael McKibben*

*Vice President*
*Thomas O. McClellan*

**State of** Maryland
County of Baltimore

On this 24th day of February, A.D. 2016, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, **THOMAS O. MCCLELLAN, Vice President, and MICHAEL MCKIBBEN, Secretary,** of the Companies, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and acknowledged the execution of same, and being by me duly sworn, deposeth and saith, that he/she is the said officer of the Company aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and that the said Corporate Seals and the signature as such officer were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.

Maria D. Adamski, Notary Public
My Commission Expires: July 8, 2019

POA-F 168-9150

## EXTRACT FROM BY-LAWS OF THE COMPANIES

"Article V, Section 8, Attorneys-in-Fact. The Chief Executive Officer, the President, or any Executive Vice President or Vice President may, by written instrument under the attested corporate seal, appoint attorneys-in-fact with authority to execute bonds, policies, recognizances, stipulations, undertakings, or other like instruments on behalf of the Company, and may authorize any officer or any such attorney-in-fact to affix the corporate seal thereto; and may with or without cause modify of revoke any such appointment or authority at any time."

## CERTIFICATE

I, the undersigned, Vice President of the ZURICH AMERICAN INSURANCE COMPANY, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that Article V, Section 8, of the By-Laws of the Companies is still in force.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the ZURICH AMERICAN INSURANCE COMPANY at a meeting duly called and held on the 15th day of December 1998.

RESOLVED: "That the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the Seal of the Company may be affixed by facsimile on any Power of Attorney...Any such Power or any certificate thereof bearing such facsimile signature and seal shall be valid and binding on the Company."

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at a meeting duly called and held on the 5th day of May, 1994, and the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF I have hereunto subscribed my name and affixed the corporate seals of the said Companies, this 8th day of August, 2016.

Gerald F. Haley

Gerald F. Haley, Vice President

| Chubb Surety | POWER OF ATTORNEY | Federal Insurance Company<br>Vigilant Insurance Company<br>Pacific Indemnity Company | Attn: Surety Department<br>15 Mountain View Road<br>Warren, NJ 07059 |
|---|---|---|---|

**Know All by These Presents**, That **FEDERAL INSURANCE COMPANY**, an Indiana corporation, **VIGILANT INSURANCE COMPANY**, a New York corporation, and **PACIFIC INDEMNITY COMPANY**, a Wisconsin corporation, do each hereby constitute and appoint **Deborah L. Jung, Catherine M. Martinez, Donald E. Miller, Jr., Michael N. Venson, S. West Warren and Thomas E. Whitney of San Antonio, Texas** ----------

each as their true and lawful Attorney- in- Fact to execute under such designation in their names and to affix their corporate seals to and deliver for and on their behalf as surety thereon or otherwise, bonds and undertakings and other writings obligatory in the nature thereof (other than bail bonds) given or executed in the course of business, and any instruments amending or altering the same, and consents to the modification or alteration of any instrument referred to in said bonds or obligations.

**In Witness Whereof**, said **FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY**, and **PACIFIC INDEMNITY COMPANY** have each executed and attested these presents and affixed their corporate seals on this **8th** day of **January, 2015.**

Dawn M. Chloros, Assistant Secretary

David B. Norris, Jr., Vice President

STATE OF NEW JERSEY

ss.

County of Somerset

On this **8th** day of **January, 2015** before me, a Notary Public of New Jersey, personally came Dawn M. Chloros, to me known to be Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY, the companies which executed the foregoing Power of Attorney, and the said Dawn M. Chloros, being by me duly sworn, did depose and say that she is Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY and knows the corporate seals thereof, that the seals affixed to the foregoing Power of Attorney are such corporate seals and were thereto affixed by authority of the By- Laws of said Companies; and that she signed said Power of Attorney as Assistant Secretary of said Companies by like authority; and that she is acquainted with David B. Norris, Jr., and knows him to be Vice President of said Companies; and that the signature of David B. Norris, Jr., subscribed to said Power of Attorney is in the genuine handwriting of David B. Norris, Jr., and was thereto subscribed by authority of said By- Laws and in deponent's presence.

Notarial Seal

KATHERINE J. ADELAAR NOTARY PUBLIC NEW JERSEY

KATHERINE J. ADELAAR
NOTARY PUBLIC OF NEW JERSEY
No. 2316685
Commission Expires July 16, 2019

Notary Public

## CERTIFICATION

Extract from the By- Laws of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY:

> "All powers of attorney for and on behalf of the Company may and shall be executed in the name and on behalf of the Company, either by the Chairman or the President or a Vice President or an Assistant Vice President, jointly with the Secretary or an Assistant Secretary, under their respective designations. The signature of such officers may be engraved, printed or lithographed. The signature of each of the following officers: Chairman, 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 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 upon the Company with respect to any bond or undertaking to which it is attached."

I, Dawn M. Chloros, Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY (the "Companies") do hereby certify that

(i) the foregoing extract of the By- Laws of the Companies is true and correct,
(ii) the Companies are duly licensed and authorized to transact surety business in all 50 of the United States of America and the District of Columbia and are authorized by the U.S. Treasury Department; further, Federal and Vigilant are licensed in the U.S. Virgin Islands, and Federal is licensed in Guam, Puerto Rico, and each of the Provinces of Canada except Prince Edward Island; and
(iii) the foregoing Power of Attorney is true, correct and in full force and effect.

Given under my hand and seals of said Companies at Warren, NJ this August 8, 2016

Dawn M. Chloros, Assistant Secretary

IN THE EVENT YOU WISH TO NOTIFY US OF A CLAIM, VERIFY THE AUTHENTICITY OF THIS BOND OR NOTIFY US OF ANY OTHER MATTER, PLEASE CONTACT US AT ADDRESS LISTED ABOVE, OR BY: Telephone (908) 903- 3493 Fax (908) 903- 3656 e-mail: surety@chubb.com