

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

C204351

CONTRACT AND
CONTRACT BONDS
FOR CONTRACT NO. C204351

WBS 50118.3.GV1 NHPP-040-1(259)286

T.I.P NO. I-5700

COUNTY OF WAKE

THIS IS THE ROADWAY & STRUCTURE CONTRACT

ROUTE NUMBER I 40 LENGTH 0.798 MILES

LOCATION I-40 AND SR-3015 (AIRPORT BLVD) INTERCHANGE AND I-40
WESTBOUND FROM SR-3015 (AIRPORT BLVD) TO I-540.

CONTRACTOR ZACHRY CONSTRUCTION CORPORATION

ADDRESS P.O. BOX 33240
SAN ANTONIO, TX 78265

BIDS OPENED NOVEMBER 19, 2019

CONTRACT EXECUTION 12/9/2019

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

PROPOSAL

INCLUDES ADDENDUM No.1 DATED 11-13-2019

DATE AND TIME OF BID OPENING: **NOVEMBER 19, 2019 AT 2:00 PM**

CONTRACT ID C204351
WBS 50118.3.GV1

FEDERAL-AID NO. NHPP-040-1(259)286

COUNTY WAKE

T.I.P. NO. I-5700

MILES 0.798

ROUTE NO. I 40

LOCATION I-40 AND SR-3015 (AIRPORT BLVD) INTERCHANGE AND I-40
WESTBOUND FROM SR-3015 (AIRPORT BLVD) TO I-540.

TYPE OF WORK GRADING, DRAINAGE, PAVING, ITS, 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. C204351 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. **C204351** has carefully examined the plans and specifications, which are acknowledged to be part of the proposal, the special provisions, the proposal, the form of contract, and the forms of contract payment bond and contract performance bond; and thoroughly understands the stipulations, requirements and provisions. The undersigned bidder agrees to bound upon his execution of the bid and subsequent award to him by the Board of Transportation in accordance with this proposal to provide the necessary contract payment bond and contract performance bond within fourteen days after the written notice of award is received by him. The undersigned Bidder further agrees to provide all necessary machinery, tools, labor, and other means of construction; and to do all the work and to furnish all materials, except as otherwise noted, necessary to perform and complete the said contract in accordance with *the 2018 Standard Specifications for Roads and Structures* by the dates(s) specified in the Project Special Provisions and in accordance with the requirements of the Engineer, and at the unit or lump sum prices, as the case may be, for the various items given on the sheets contained herein.

The Bidder shall provide and furnish all the materials, machinery, implements, appliances and tools, and perform the work and required labor to construct and complete State Highway Contract No. **C204351** 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 2018* with all amendments and supplements thereto, is by reference incorporated into and made a part of this contract; that, except as herein modified, all the construction and work included in this contract is to be done in accordance with the specifications contained in said volume, and amendments and supplements thereto, under the direction of the Engineer.

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

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

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

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



State Contract Officer

DocuSigned by:

Ronald E. Davenport, Jr.

F81B6038A47A442...

11/13/2019

TABLE OF CONTENTS

COVER SHEET PROPOSAL SHEET

PROJECT SPECIAL PROVISIONS

CONTRACT TIME AND LIQUIDATED DAMAGES:	G-1
INTERMEDIATE CONTRACT TIME NUMBER 1 AND LIQUIDATED DAMAGES:	G-1
INTERMEDIATE CONTRACT TIME NUMBERS 2 THRU 7 AND LIQUIDATED DAMAGES:.....	G-2
INTERMEDIATE CONTRACT TIME NUMBER 8 AND LIQUIDATED DAMAGES:	G-3
INTERMEDIATE CONTRACT TIME NUMBER 9 AND LIQUIDATED DAMAGES:	G-4
INTERMEDIATE CONTRACT TIME NUMBER 10 AND LIQUIDATED DAMAGES:	G-6
INTERMEDIATE CONTRACT TIME NUMBERS 11 AND 12 AND LIQUIDATED DAMAGES:.....	G-6
INTERMEDIATE CONTRACT TIME NUMBER 13 AND LIQUIDATED DAMAGES:	G-7
INTERMEDIATE CONTRACT TIME NUMBER 14 AND LIQUIDATED DAMAGES:	G-8
INTERMEDIATE CONTRACT TIME NUMBER 15 AND LIQUIDATED DAMAGES:	G-8
INTERMEDIATE CONTRACT TIME NUMBER 16 AND LIQUIDATED DAMAGES:	G-8
INTERMEDIATE CONTRACT TIME NUMBER 17 AND LIQUIDATED DAMAGES:	G-9
INTERMEDIATE CONTRACT TIME NUMBER 18 AND LIQUIDATED DAMAGES FOR FAILURE TO REPAIR A DAMAGED NCDOT ITS AND/OR NCTA FIBER OPTIC COMMUNICATIONS CABLE AND RESTORE COMMUNICATION:.....	G-9
INTERMEDIATE CONTRACT TIME NUMBER 19 FOR FAILURE TO REESTABLISH ITS AND/OR NCTA FIBER COMMUNICATIONS:.....	G-9
INTERMEDIATE CONTRACT TIME NUMBER 20 AND LIQUIDATED DAMAGES: ...	G-10
PERMANENT VEGETATION ESTABLISHMENT:.....	G-10
AWARD OF CONTRACT:.....	G-11
DELAY IN RIGHT OF ENTRY:	G-11
NO MAJOR CONTRACT ITEMS:.....	G-11
SPECIALTY ITEMS:.....	G-12
FUEL PRICE ADJUSTMENT:.....	G-12
SCHEDULE OF ESTIMATED COMPLETION PROGRESS:.....	G-13
DISADVANTAGED BUSINESS ENTERPRISE:	G-13
CERTIFICATION FOR FEDERAL-AID CONTRACTS:	G-27
CONTRACTOR'S LICENSE REQUIREMENTS:	G-27
USE OF UNMANNED AIRCRAFT SYSTEM (UAS):	G-27
U.S. DEPARTMENT OF TRANSPORTATION HOTLINE:	G-28
CARGO PREFERENCE ACT:	G-28
SUBSURFACE INFORMATION:.....	G-29
PORTABLE CONCRETE BARRIER - (Partial Payments for Materials):.....	G-29
REMOVABLE PAVEMENT MARKINGS - (Partial Payments for Materials):.....	G-29
COOPERATION BETWEEN CONTRACTORS:.....	G-29
ELECTRONIC BIDDING:.....	G-30
BID DOCUMENTATION:	G-30
TWELVE MONTH GUARANTEE:	G-34
EROSION AND SEDIMENT CONTROL/STORMWATER CERTIFICATION:	G-34

PROCEDURE FOR MONITORING BORROW PIT DISCHARGE:.....	G-39
ROADWAY	R-1

STANDARD SPECIAL PROVISIONS

AVAILABILITY FUNDS – TERMINATION OF CONTRACTS	SSP-1
NCDOT GENERAL SEED SPECIFICATION FOR SEED QUALITY	SSP-2
ERRATA.....	SSP-5
PLANT AND PEST QUARANTINES	SSP-6
TITLE VI AND NONDISCRIMINATION	SSP-7
MINORITY AND FEMALE EMPLOYMENT REQUIREMENTS	SSP-15
REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONST. CONTRACTS	SSP-18
ON-THE-JOB TRAINING	SSP-27
MINIMUM WAGES	SSP-30

UNIT PROJECT SPECIAL PROVISIONS

GEOTECHNICAL	GT-0.1
GEOENVIRONMENTAL	GV-1
SIGNING	SN-1
TRAFFIC CONTROL	TC-1
LIGHTING.....	LT-1
UTILITY CONSTRUCTION	UC-1
UTILITY SPECIAL.....	US-1
UTILITY BY OTHERS.....	UBO-1
EROSION CONTROL	EC-1
FILTRATION BASIN	SW-1
TRAFFIC SIGNALS	TS-1
ITS.....	ITS-1
STRUCTURE / CULVERTS.....	ST-1

<u>PERMITS</u>	P-1
-----------------------------	-----

PROPOSAL ITEM SHEET

ITEM SHEET(S) (TAN SHEETS)

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 **December 30, 2019**, except that work in jurisdictional waters and wetlands shall not begin until a meeting between the DOT, Regulatory Agencies, and the Contractor is held as stipulated in the permits contained elsewhere in this proposal. This delay in availability has been considered in determining the contract time for this project.

The completion date for this contract is **February 11, 2024**.

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

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

INTERMEDIATE CONTRACT TIME NUMBER 1 AND LIQUIDATED DAMAGES:

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

108

SP1 G13 A

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

The date of availability for this intermediate contract time is **December 30, 2019**.

The completion date for this intermediate contract time is **August 15, 2023**.

The liquidated damages for this intermediate contract time are **Three Thousand Dollars (\$ 3,000.00)** per calendar day.

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

INTERMEDIATE CONTRACT TIME NUMBERS 2 THRU 7 AND LIQUIDATED**DAMAGES:**

(2-20-07)

108

SP1 G14 C

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**ICT #2****SR 1035 Airport Blvd northbound (north of I-40 westbound ramps)****Monday thru Friday, 6:00 A.M. to 8:00 P.M.****Saturday and Sunday, 11:00 A.M. to 7:00 P.M.****SR 1035 Airport Blvd southbound (north of I-40 westbound ramps) (one lane)****Monday thru Friday****7:00 A.M. to 10:00 A.M. and 3:00 P.M. to 5:00 P.M.****SR 1035 Airport Blvd (south of I-40 westbound ramps)****Monday thru Friday, 6:00 A.M. to 8:00 P.M.****Saturday and Sunday, 11:00 A.M. to 7:00 P.M.**

The liquidated damages are **Seven Hundred Fifty Dollars (\$ 750.00)** per fifteen **(15)** minute time period.

ICT #3**SR 1035 Airport Blvd southbound (north of I-40 westbound ramps) (two lanes)****Monday thru Friday, 6:00 A.M. to 8:00 P.M.****Saturday and Sunday, 11:00 A.M. to 7:00 P.M.**

The liquidated damages are **One Thousand Five Hundred Dollars (\$ 1,500.00)** per fifteen **(15)** minute time period.

ICT #4**I-40 (one lane) (including any ramp and/or loop)****Monday thru Friday, 6:00 A.M. to 8:00 P.M.****Saturday and Sunday, 10:00 A.M. to 7:00 P.M.**

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

ICT #5**I-40 (two lanes)****Monday thru Friday, 6:00 A.M. to 10:00 P.M.****Saturday and Sunday, 7:00 A.M. to 9:00 P.M.**

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

ICT #6

I-40 (three lanes)

Monday thru Friday, 5:00 A.M. to 12:00 A.M.

Saturday and Sunday, 6:00 A.M. to 1:00 A.M

The liquidated damages are **Five Thousand Dollars (\$ 5,000.00)** per fifteen (15) minute time period.

ICT #7

Aerial Center Pkwy (-Y1-), Slater Road (-Y5-), and/or Factory Shops Road (-Y2-)

Monday thru Friday

7:00 A.M. to 10:00 A.M. and 4:00 P.M. to 6:00 P.M.

The liquidated damages are **Seven Hundred Fifty Dollars (\$ 750.00)** per fifteen (15) minute time period.

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

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

INTERMEDIATE CONTRACT TIME NUMBER 8 AND LIQUIDATED DAMAGES:

(2-20-07)

108

SP1 G14 B

The Contractor shall not narrow or close a lane of traffic on **SR 1035 Airport Blvd**, detain and /or alter the traffic flow on or during 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 **8:00 P.M.** January 2nd. If New Year's Day is on a Friday, Saturday, Sunday or Monday, then until **8:00 P.M.** the following Tuesday.
3. For **Easter**, between the hours of **6:00 A.M.** Thursday and **8:00 P.M.** Monday.
4. For **Memorial Day**, between the hours of **6:00 A.M.** Friday and **8:00 P.M.** Tuesday.
5. For **Independence Day**, between the hours of **6:00 A.M.** the day before Independence Day

and **8:00 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 **8:00 P.M.** the Tuesday after Independence Day.

6. For **Labor Day**, between the hours of **6:00 A.M.** Friday and **8:00 P.M.** Tuesday.
7. For **Thanksgiving**, between the hours of **6:00 A.M.** Tuesday and **8:00 P.M.** Monday.
8. For **Christmas**, between the hours of **6:00 A.M.** the Friday before the week of Christmas Day and **8:00 P.M.** the following Tuesday after the week of Christmas Day.
9. For **graduation events occurring at NC State University, Duke University, and the University of North Carolina at Chapel Hill**, between the hours of **4:00 A.M.** the **Thursday** of the week of the **graduation events** and **12:00 A.M.** the following **Monday** after the week of the **graduation events**.

Holidays and holiday weekends shall include New Year's, Easter, Memorial Day, Independence Day, Labor Day, Thanksgiving, and Christmas. The Contractor shall schedule his work so that lane closures are not 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 herein 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 9 AND LIQUIDATED DAMAGES:

(2-20-07)

108

SP1 G14 B

The Contractor shall not narrow or close a lane of traffic on **I-40 (including any ramp and/or loop)**, detain and /or alter the traffic flow on or during holiday weekends, special events, or any other time when traffic is unusually heavy, including the following schedules:

HOLIDAY AND HOLIDAY WEEKEND LANE CLOSURE RESTRICTIONS

1. For **unexpected occurrence** that creates unusually high traffic volumes, as directed by the Engineer.
2. For **New Year's Day**, between the hours of **5:00 A.M.** December 31st and **1:00 A.M.** January 3rd. If New Year's Day is on a Friday, Saturday, Sunday or Monday, then until **1:00 A.M.** the following Wednesday.
3. For **Easter**, between the hours of **5:00 A.M.** Thursday and **1:00 A.M.** Tuesday.

4. For **Memorial Day**, between the hours of **5:00 A.M.** Friday and **1:00 A.M.** Wednesday.
5. For **Independence Day**, between the hours of **5:00 A.M.** the day before Independence Day and **1:00 A.M.** two days after Independence Day.

If **Independence Day** is on a Friday, Saturday, Sunday or Monday, then between the hours of **5:00 A.M.** the Thursday before Independence Day and **1:00 A.M.** the Wednesday after Independence Day.

6. For **Labor Day**, between the hours of **5:00 A.M.** Friday and **1:00 A.M.** Wednesday.
7. For **Thanksgiving**, between the hours of **5:00 A.M.** Tuesday and **1:00 A.M.** Tuesday.
8. For **Christmas**, between the hours of **5:00 A.M.** the Friday before the week of Christmas Day and **1:00 A.M.** the following Wednesday after the week of Christmas Day.
9. For **graduation events occurring at NC State University, Duke University, and the University of North Carolina at Chapel Hill**, between the hours of **4:00 A.M.** the **Thursday** of the week of the **graduation events** and **12:00 A.M.** the following **Monday** after the week of the **graduation events**.

Holidays and holiday weekends shall include New Year's, Easter, Memorial Day, Independence Day, Labor Day, Thanksgiving, and Christmas. The Contractor shall schedule his work so that lane closures are not 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 herein 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 10 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 **I-40** during the following time restrictions:

DAY AND TIME RESTRICTIONS

**Monday thru Friday
5:00 A.M. to 12:00 A.M.**

**Saturday and Sunday
6:00 A.M. to 1:00 A.M.**

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.

Only directional closures of I-40 shall be permitted, and only for bridge demolition and girder installation operations. Use intersection ramps to maintain traffic.

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 **Five Thousand Dollars (\$ 5,000.00)** per fifteen (15) minute time period.

INTERMEDIATE CONTRACT TIME NUMBERS 11 AND 12 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 **the following roads** during the following time restrictions:

DAY AND TIME RESTRICTIONS

**ICT #11
SR 1035 Airport Blvd.
Monday thru Sunday 3:30 A.M. to 10:00 P.M.**

**Aerial Center Pkwy. (-Y1-)
NO CLOSURE PERMITTED**

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

ICT #12**I-40**

Monday thru Friday 5:00 A.M. to 12:00 A.M.

Saturday and Sunday 6:00 A.M. to 1:00 A.M.

The liquidated damages are **Five Thousand Dollars (\$ 5,000.00)** per fifteen (15) minute time period.

The maximum allowable time for overhead sign removal and installation is **thirty (30)** minutes for **SR 1035 Airport Blvd and I-40**. The Contractor shall reopen the travel lanes to traffic until any resulting traffic queue is depleted.

No road closure is permitted for any operation for Aerial Center Pkwy. 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.

INTERMEDIATE CONTRACT TIME NUMBER 13 AND LIQUIDATED DAMAGES:

(2-20-07) (Rev. 10-15-13)

108

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 **I-40** during the following time restrictions:

DAY AND TIME RESTRICTIONS

Monday thru Thursday

10:30 A.M. to 2:00 P.M.

2:30 P.M. to 10:00 A.M.

Note: No blasting from 2:30 P.M. Thursday to 10:00 A.M. Monday

The maximum allowable time for blasting is **thirty (30)** minutes for **I-40**. 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 **Five Thousand Dollars (\$ 5,000.00)** per fifteen (15) minute time

period.

INTERMEDIATE CONTRACT TIME NUMBER 14 AND LIQUIDATED DAMAGES:

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

108

SP1 G14 F

The Contractor shall complete the work required of **Phase II, Step #2A** as shown on Sheet(s) **TMP-03** and shall place and maintain traffic on same.

The time of availability for this intermediate contract time is the **Friday at 6:00 P.M.** that the Contractor elects to begin the work.

The completion time for this intermediate contract time is the following **Monday at 7:00 A.M.** after the time of availability.

Repeat weekend road closures, as necessary, to complete the work, as directed by the Engineer.

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

INTERMEDIATE CONTRACT TIME NUMBER 15 AND LIQUIDATED DAMAGES:

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

108

SP1 G14 H

The Contractor shall complete the work required of **Phase II, Step #3 thru Phase III, Step #1** as shown on Sheet(s) **TMP-03** 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 five (105)** 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 16 AND LIQUIDATED DAMAGES:

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

108

SP1 G14 H

The Contractor shall complete the work required of **Phase III, Step #2** as shown on Sheet(s) **TMP-03 and TMP-03A** 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 twenty (120)** 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 17 AND LIQUIDATED DAMAGES:

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

108

SP1 G14 F

The Contractor shall complete the work required of **Phase IV, Step #2** as shown on Sheet(s) **TMP-03A** and shall place and maintain traffic on same.

The time of availability for this intermediate contract time is the **Friday at 10:00 P.M.** that the Contractor elects to begin the work.

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

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

INTERMEDIATE CONTRACT TIME NUMBER 18 AND LIQUIDATED DAMAGES FOR FAILURE TO REPAIR A DAMAGED NCDOT ITS AND/OR NCTA FIBER OPTIC COMMUNICATIONS CABLE AND RESTORE COMMUNICATION:

The Contractor shall repair all existing fiber optic communication cables damaged during construction. The Contractor shall immediately report damages to the Engineer, the NCDOT Regional ITS Engineer (919) 825-2635, and the NCTA Engineer (919) 710-0115. The Contractor shall repair all damages within twenty-four (24) hours at no cost to the Department. The Contractor shall bring all affected ITS and/or NCTA fiber optic communication cables back on line within the same twenty-four (24) hours. A “damaged” ITS and/or NCTA fiber optic communications cable is any fiber optic communications cable that is determined damaged due to an accidental or unscheduled outage event.

Liquidated Damages for failure to repair a damaged ITS and/or NCTA fiber optic communications cable and restore communications within twenty-four (24) hours are Five Hundred Dollars (\$ 500.00) per hour, or any portion thereof.

INTERMEDIATE CONTRACT TIME NUMBER 19 FOR FAILURE TO REESTABLISH ITS AND/OR NCTA FIBER COMMUNICATIONS:

During construction, the Contractor shall coordinate any disruption in ITS and/or NCTA fiber optic communications with the Engineer, the NCDOT Regional ITS Engineer, and the NCTA Engineer. The Contractor shall notify the Engineer, the NCDOT Regional ITS Engineer, and the NCTA Engineer a minimum of seven (7) calendar days prior to all proposed disruptions in service. A minimum of twenty one (21) calendar days prior to any disruption in ITS and/or NCTA fiber optic communications, the Contractor shall develop and provide a plan for the Department’s approval that defines 1) an anticipated disruption timeframe and 2) a plan of action for reestablishing ITS and/or NCTA communications within four (4) hours.

Liquidated Damages for failure to reestablish ITS and/or NCTA fiber optic communications within four (4) hours are Two Thousand Five Hundred Dollars (\$ 2,500.00) per day, or any portion thereof.

Liquidated Damages for failure to provide a plan that defines 1) an anticipated ITS and/or NCTA fiber optic communications disruption timeframe and 2) a plan of action for reestablishing ITS and/or NCTA communications a minimum of twenty one (21) calendar days prior to a proposed disruption in service are Ten Thousand Dollars (\$ 10,000.00) per failure.

INTERMEDIATE CONTRACT TIME NUMBER 20 AND LIQUIDATED DAMAGES:

(6-18-13)(Rev. 9-26-19)

108

SP1 G14 L

The Contractor shall complete the work required of **installing and erecting each high mount standard**, as shown on Sheets **E1, E2 and E4** of the plans. **Installation of underground conduit and conductor is not required as part of this intermediate contract time.**

The date of availability for this intermediate contract time is **December 30, 2019.**

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

The liquidated damages are **Five Thousand Dollars (\$ 5,000.00)** 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 *2018 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 *2018 Standard Specifications*. No additional compensation will be made for maintenance and removal of temporary erosion control items.

AWARD OF CONTRACT:

Revise the 2018 *Standard Specifications* as follows:

Page 1-23, Subarticle 103-4 (A) General, first paragraph, replace the 3rd and 4th sentences with the following:

Where award is to be made, the notice of award will be issued within 60 days after the opening of bids or upon issuance of any necessary debt instrument, whichever is later, but not to exceed 120 days; except with the consent of the lowest responsible bidder the decision to award the contract to such bidder may be delayed for as long a time as may be agreed upon by the Department and such bidder. In the absence of such agreement, the lowest responsible bidder may withdraw his bid at the expiration of 120 days without penalty if no notice of award has been issued.

DELAY IN RIGHT OF ENTRY:

(7-1-95)

108

SP1 G22 B

The Contractor will not be allowed right of entry to the following parcels prior to the listed dates unless otherwise permitted by the Engineer.

<u>Parcel No.</u>	<u>Property Owner</u>	<u>Date</u>
002	BRE ESA P Portfolio TXNC Properties, LP	11-18-19
005	BRE/LQ Properties, LLC	11-18-19
008	Cameron Wilson Pearson & Courtney Wilson Schardt	11-18-19
009	Raleigh Durham International	11-18-19
014	Raleigh Durham International	11-18-19

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 2018 Standard Specifications).

Line #	Description
121-130	Guardrail
131-133	Fencing
138-179	Signing
205-211, 214, 216-217, 224-225, 232	Long-Life Pavement Markings
212-213, 215	Removable Tape
233-234	Permanent Pavement Markers
239-272	Lighting
273-297	Utility Construction
298-326	Erosion Control
327	Reforestation
328-383	Signals/ITS System
395-399	Drilled Piers

FUEL PRICE ADJUSTMENT:

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

109-8

SP1 G43

Revise the 2018 Standard Specifications as follows:

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

The base index price for DIESEL #2 FUEL is \$ **2.0418** 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. 5-13-19)

108-2

SP1 G58

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

<u>Fiscal Year</u>	<u>Progress (% of Dollar Value)</u>
2020	(7/01/19 - 6/30/20) 19% of Total Amount Bid
2021	(7/01/20 - 6/30/21) 31% of Total Amount Bid
2022	(7/01/21 - 6/30/22) 30% of Total Amount Bid
2023	(7/01/22 - 6/30/23) 18% of Total Amount Bid
2024	(7/01/23 - 6/30/24) 2% of Total Amount Bid

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

DISADVANTAGED BUSINESS ENTERPRISE:

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

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.

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

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.
<https://connect.ncdot.gov/business/Turnpike/Documents/Form%20DBE-IS%20Subcontractor%20Payment%20Information.pdf>

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 estimated amount (based on quantities and unit prices) listed at the time of bid.

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

Listing of 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](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 **11.0 %**

- (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:// www.ebs.nc.gov/VendorDirectory/default.html](https://www.ebs.nc.gov/VendorDirectory/default.html)

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

Listing of DBE Subcontractors

At the time of bid, bidders shall submit all 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 the electronic submittal file.

- (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 the electronic submittal file, 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 10:00 a.m. of the sixth calendar day following opening of bids, unless the sixth day falls on an official state holiday. In that situation, it is due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day.

If the bidder fails to submit the Letter of Intent from each committed 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 10:00 a.m. on the eighth calendar day following opening of bids, unless the eighth day falls on an official state holiday. In that situation, it is due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day.

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

Note: Where the information submitted includes repetitious solicitation letters, it will be acceptable to submit a representative letter along with a distribution list of the firms that were solicited. Documentation of 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, 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 Opportunity and Work Force Development Unit at BOWD@ncdot.gov 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 not 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 subcontractor (or an approved substitute DBE subcontractor) to meet all or part of a contract goal requirement, the contractor shall not terminate the DBE subcontractor for convenience. This includes, but is not limited to, instances in which the Contractor seeks to perform the work of the terminated subcontractor with another DBE subcontractor, a non-DBE subcontractor, or with the Contractor's own forces or those of an affiliate.

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

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

- (a) The listed DBE subcontractor fails or refuses to execute a written contract;
- (b) The listed DBE subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards. Provided, however, that good cause does not exist if the failure or refusal of the DBE subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the prime contractor;
- (c) The listed DBE subcontractor fails or refuses to meet the prime contractor's reasonable, nondiscriminatory bond requirements;
- (d) The listed DBE subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;

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

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).

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.

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 *2018 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).

USE OF UNMANNED AIRCRAFT SYSTEM (UAS):

(8-20-19)

SP1 G092

The Contractor shall adhere to all Federal, State and Local regulations and guidelines for the use of Unmanned Aircraft Systems (UAS). This includes but is not limited to US 14 CFR Part 107

Small UAS Rule, NC GS 15A-300.2 Regulation of launch and recovery sites, NC GS 63-95 Training required for the operation of unmanned aircraft systems, NC GS 63-96 Permit required for commercial operation of unmanned aircraft system, and NCDOT UAS Policy. The required operator certifications include possessing a current Federal Aviation Administration (FAA) Remote Pilot Certificate, a NC UAS Operator Permit as well as operating a UAS registered with the FAA.

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

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

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

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.

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 *2018 Standard Specifications* have been furnished to the Engineer.

The provisions of Subarticle 109-5(B) of the *2018 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 *2018 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 *2018 Standard Specifications* will not apply to removable pavement marking materials.

COOPERATION BETWEEN CONTRACTORS:

(7-1-95)

105-7

SP1 G133

The Contractor's attention is directed to Article 105-7 of the *2018 Standard Specifications*.

I-5506 (C204069) is located adjacent to this project. I-5506 is currently under construction and not anticipated to be complete prior to the letting of this project.

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

ELECTRONIC BIDDING:

(2-19-19)

101, 102, 103

SP1 G140

Revise the *2018 Standard Specifications* as follows:

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

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

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

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

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

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 disposition 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.

EROSION AND SEDIMENT CONTROL/STORMWATER CERTIFICATION:

(1-16-07) (Rev 04-01-19)

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 and within 24 hours after a rainfall event of greater than 1.0 inch that occurs within a 24 hour period. Additional monitoring may be required at the discretion of Division of Water Resources personnel if the receiving stream is 303(d) listed for turbidity and the project has had documented problems managing turbidity.
 - (c) Maintain an onsite rain gauge or use the Department's Multi-Sensor Precipitation Estimate website to maintain a daily record of rainfall amounts and dates.
 - (d) Maintain erosion and sediment control/stormwater inspection records for review by Department and Regulatory personnel upon request.
 - (e) Implement approved reclamation plans on all borrow pits, waste sites and staging areas.
 - (f) Maintain a log of turbidity test results as outlined in the Department's Procedure for Monitoring Borrow Pit Discharge.
 - (g) Provide secondary containment for bulk storage of liquid materials.
 - (h) Provide training for employees concerning general erosion and sediment control/stormwater awareness, the Department's NPDES Stormwater Permit NCS000250 requirements, and the applicable requirements of the *General Permit, NCG010000*.
 - (i) Report violations of the NPDES permit to the Engineer immediately who will notify the Division of Water Quality Regional Office within 24 hours of becoming aware of the violation.

- (3) Quality Control Program - Maintain a quality control program to control erosion, prevent sedimentation and follow provisions/conditions of permits. The quality control program shall:
- (a) Follow permit requirements related to the Contractor and subcontractors' construction activities.
 - (b) Ensure that all operators and subcontractors on site have the proper erosion and sediment control/stormwater certification.
 - (c) Notify the Engineer when the required certified erosion and sediment control/stormwater personnel are not available on the job site when needed.
 - (d) Conduct the inspections required by the NPDES permit.
 - (e) Take corrective actions in the proper timeframe as required by the NPDES permit for problem areas identified during the NPDES inspections.
 - (f) Incorporate erosion control into the work in a timely manner and stabilize disturbed areas with mulch/seed or vegetative cover on a section-by-section basis.
 - (g) Use flocculants approved by state regulatory authorities where appropriate and where required for turbidity and sedimentation reduction.
 - (h) Ensure proper installation and maintenance of temporary erosion and sediment control devices.
 - (i) Remove temporary erosion or sediment control devices when they are no longer necessary as agreed upon by the Engineer.
 - (j) The Contractor's quality control and inspection procedures shall be subject to review by the Engineer. Maintain NPDES inspection records and make records available at all times for verification by the Engineer.
- (B) *Certified Foreman* - At least one Certified Foreman shall be onsite for each type of work listed herein during the respective construction activities to control erosion, prevent sedimentation and follow permit provisions:
- (1) Foreman in charge of grading activities
 - (2) Foreman in charge of bridge or culvert construction over jurisdictional areas
 - (3) Foreman in charge of utility activities
- The Contractor may request to use the same person as the Level II Supervisor and Level II Foreman. This person shall be onsite whenever construction activities as described above are taking place. This request shall be approved by the Engineer prior to work beginning.
- The Contractor may request to name a single Level II Foreman to oversee multiple construction activities on small bridge or culvert replacement projects. This request shall be approved by the Engineer prior to work beginning.
- (C) *Certified Installers* - Provide at least one onsite, Level I Certified Installer for each of the following erosion and sediment control/stormwater crew:
- (1) Seeding and Mulching
 - (2) Temporary Seeding

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

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

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

Preconstruction Meeting

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

Ethical Responsibility

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

Revocation or Suspension of Certification

Upon recommendation of the Chief Engineer to the certification entity, certification for *Supervisor*, *Certified Foremen*, *Certified Installers* and *Certified Designer* may be revoked or suspended with the issuance of an *Immediate Corrective Action (ICA)*, *Notice of Violation (NOV)*, or *Cease and Desist Order* for erosion and sediment control/stormwater related issues.

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

- (A) Failure to adequately perform the duties as defined within this certification provision.
- (B) Issuance of an ICA, NOV, or Cease and Desist Order.

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

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

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

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

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

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

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

Measurement and Payment

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

PROCEDURE FOR MONITORING BORROW PIT DISCHARGE:

(2-20-07) (Rev. 4-5-19)

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 *2018 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 <https://connect.ncdot.gov/resources/roadside/FieldOperationsDocuments/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.

PROJECT SPECIAL PROVISIONS**ROADWAY****CLEARING AND GRUBBING - METHOD III:**

(4-6-06) (Rev.8-18-15)

200

SP2 R02B

Perform clearing on this project to the limits established by Method “III” shown on Standard Drawing No. 200.03 of the *2018 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.

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 *2018 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 *2018 Standard Specifications*.

BORROW EXCAVATION (In Place or Truck Measurement):

(7-1-95)

230

SP2 R58

The borrow material used on this project will be measured for payment by in place measurement as provided in Article 230-5 of the *2018 Standard Specifications*, or by truck measurement as provided in Article 230-5 of the *2018 Standard Specifications*, as directed by the Engineer.

COAL COMBUSTION PRODUCTS IN EMBANKMENTS:

(4-16-02) (Rev. 5-19-15)

235

SP02 R70

Description

This specification allows the Contractor an option, with the approval of the Engineer, to use coal combustion products (CCPs) in embankments as a substitute for conventional borrow material. The amount of CCPs allowed to be used for this project will be less than 80,000 tons total and less than 8,000 tons per acre.

Materials

Supply coal combustion products from the Department list of potential suppliers maintained by the Value Management Unit. Site specific approval of CCP material will be required prior to beginning construction.

The following CCPs are unacceptable:

- (A) Frozen material,
- (B) Ash from boilers fired with both coal and petroleum coke, and
- (C) Material with a maximum dry unit weight of less than 65 pounds per cubic foot when tested in accordance with AASHTO T-99 Method A or C.

Collect and transport CCPs in a manner that will prevent nuisances and hazards to public health and safety. Moisture condition the CCPs as needed and transport in covered trucks to prevent dusting.

Preconstruction Requirements

When CCPs are to be used as a substitute for earth borrow material, request written approval from the Engineer at least ninety (90) days in advance of the intent to use CCPs and include the following details using the NCDOT Form #CCP-2015-V1 in accordance with NCGS § 130A-309.219(b)(1):

- (A) Description, purpose and location of project.
- (B) Estimated start and completion dates of project.
- (C) Estimated volume of CCPs to be used on project with specific locations and construction details of the placement.
- (D) Toxicity Characteristic Leaching Procedure analysis from a representative sample of each different CCP source to be used in the project for, at minimum, all of the following constituents: arsenic, barium, cadmium, lead, chromium, mercury, selenium, and silver.
- (E) The names, address, and contact information for the generator of the CCPs.
- (F) Physical location of the project at which the CCPs were generated.

Submit the form to the Engineer and the State Value Management Engineer at valuemanagementunit@ncdot.gov for review. The Engineer and the State Value Management Engineer will coordinate the requirements of NCGS § 130A-309.219(a)(1) and notify the Contractor that all the necessary requirements have been met before the placement of structural fill using coal combustion products is allowed.

Construction Methods

In accordance with the detail in the plans, place CCPs in the core of the embankment section with at least 4 feet of earth cover to the outside limits of the embankments or subgrade and at least 5 feet above the seasonal high ground-water table. CCPs used in embankments shall not be placed as follows:

- (A) Within 50 feet of any property boundary.
- (B) Within 300 horizontal feet of a private dwelling or well.
- (C) Within 50 horizontal feet of the top of the bank of a perennial stream or other surface water body.
- (D) Within a 100-year floodplain except as authorized under NCGS § 143-215.54A(b). A site located in a floodplain shall not restrict the flow of the 100-year floodplain or result in washout of solid waste so as to pose a hazard to human life, wildlife or land and water resources.
- (E) Within 50 horizontal feet of a wetland, unless, after consideration of the chemical and physical impact on the wetland, the United States Army Corps of Engineers issues a permit or waiver for the fill.

Construct embankments by placing CCPs in level uniform lifts with no more than a lift of 10 inches and compacted to at least a density of 95 percent as determined by test methods in AASHTO T-99, Determination of Maximum Dry Density and Optimum Moisture Content, Method A or C depending upon particle size of the product. Provide a moisture content at the time of compaction of within 4 percent of optimum but not greater than one percent above optimum as determined by AASHTO T-99, Method A or C.

Divert surface waters resulting from precipitation from the CCPs placement area during filling and construction activities. Construct embankments such that rainfall will not run directly off of the CCPs. Provide dust control to minimize airborne emissions. Construct fill in a manner that prevents water from accumulating and ponding and do not pump nor discharge waters from CCP's filling and construction areas.

Measurement and Payment

Borrow Excavation will be measured by truck volume and paid in cubic yards in accordance with Article 230-5 of the *2018 Standard Specifications*.

MANUFACTURED QUARRY FINES IN EMBANKMENTS:

(01-17-17)

235

SP02 R72

Description

This specification addresses the use of manufactured quarry fines that are not classified as select materials. The specification allows the Contractor an option, with the approval of the Engineer, to use manufactured quarry fines (MQFs) in embankments as a substitute for conventional borrow material. Furnish and place geotextile for pavement stabilization in accordance with the Geotextile for Pavement Stabilization special provision and detail. Geotextile for pavement stabilization is required to prevent pavement cracking and provide separation between the subgrade and pavement section at embankment locations where manufactured quarry fines are utilized and as directed by the Engineer.

Materials

Manufactured Quarry Fines.

Site specific approval of MQFs material will be required prior to beginning construction as detailed in the preconstruction requirements of this provision.

The following MQFs are unacceptable:

- (A) Frozen material,
- (B) Material with a maximum dry unit weight of less than 90 pounds per cubic foot when tested in accordance with AASHTO T-99 Method A or C.
- (C) Material with greater than 80% by weight Passing the #200 sieve

Collect and transport MQFs in a manner that will prevent nuisances and hazards to public health and safety. Moisture condition the MQFs as needed and transport in covered trucks to prevent dusting. If MQFs are blended with natural earth material, follow Borrow Criteria in Section 1018 of the *Standard Specifications*.

Geotextiles

Areas of embankment where MQFs are incorporated, Geotextile for Pavement Stabilization shall be used. If the Geotextile for Pavement Stabilization special provision is not included elsewhere in this contract, then it along with a detail will be incorporated as part of the contractors request to use. Notification of subgrade elevation, sampling and waiting period as required in the Construction Methods section of the Geotextile for Pavement Stabilization special provision are not required.

Preconstruction Requirements

When MQFs are to be used as a substitute for earth borrow material, request written approval from the Engineer at least ninety (90) days in advance of the intent to use MQFs and include the following details:

- (A) Description, purpose and location of project.
- (B) Estimated start and completion dates of project.

- (C) Estimated volume of MQFs to be used on project with specific locations and construction details of the placement.
- (D) The names, address, and contact information for the generator of the MQFs.
- (E) Physical location of the site at which the MQFs were generated.

The Engineer will forward this information to the State Materials Engineer for review and material approval.

Construction Methods

Place MQFs in the core of the embankment section with at least 4 feet of earth cover to the outside limits of the embankments or subgrade.

Construct embankments by placing MQFs in level uniform lifts with no more than a lift of 10 inches and compacted to at least a density of 95 percent as determined by test methods in AASHTO T-99, Determination of Maximum Dry Density and Optimum Moisture Content, Method A or C depending upon particle size of the product. Provide a moisture content at the time of compaction of within 4 percent of optimum but not greater than one percent above optimum as determined by AASHTO T-99, Method A or C.

Areas of embankment where MQFs are incorporated, Geotextile for Pavement Stabilization shall be used. See Geotextile for Pavement Stabilization special provision for geotextile type and construction method.

Measurement and Payment

Borrow Excavation will be measured by truck volume and paid in cubic yards in accordance with Article 230-5 of the *2018 Standard Specifications*. As an alternate weigh tickets can be provided and payment made by converting weight to cubic yards based on the verifiable unit weight.

Where the pay item of *Geotextile for Pavement Stabilization* is included in the original contract the material will be measured and paid in square yards (see Geotextile for Pavement Stabilization special provision). Where the pay item of *Geotextile for Pavement Stabilization* is not included in the original contract then no payment will be made for this item and will be considered incidental to the use of MQFs in embankment.

FLOWABLE FILL:

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

300, 340, 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 *2018 Standard Specifications*.

Item

Flowable Fill

Section

1000-6

Construction Methods

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

Measurement and Payment

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

Payment will be made under:

Pay Item
Flowable Fill

Pay Unit
Cubic Yard

POLYPROPYLENE CULVERT PIPE:

(8-20-19)

305,310

SP3 R35

Revise the *2018 Standard Specifications* as follows:

Page 3-5, Article 305-1 DESCRIPTION, lines 12-14, replace with the following:

Where shown in the plans, the Contractor may use reinforced concrete pipe, aluminum alloy pipe, aluminized corrugated steel pipe, HDPE pipe, Polypropylene Pipe, or PVC pipe in accordance with the following requirements.

Page 3-5, Article 305-2 MATERIALS, add the following after line 16:

Item	Section
Polypropylene Pipe	1032-9

Page 3-6, Article 310-2 MATERIALS, add the following after line 9:

Item	Section
Polypropylene Pipe	1032-9

Page 3-6, Article 310-4 SIDE DRAIN PIPE, lines 24-25, replace the first sentence of the second paragraph with the following:

Where shown in the plans, side drain pipe may be Class II reinforced concrete pipe, aluminized corrugated steel pipe, corrugated aluminum alloy pipe, polypropylene pipe, HDPE pipe or PVC pipe.

Page 3-7, Article 310-5 PIPE END SECTIONS, lines 2-4, replace the second sentence with the

following:

Both corrugated steel and concrete pipe end sections will work on concrete pipe, corrugated steel pipe, polypropylene pipe, and HDPE smooth lined corrugated plastic pipe.

Page 3-7, Article 310-6 MEASUREMENT AND PAYMENT, add the following after line 14:

Pay Item	Pay Unit
___" Polypropylene Pipe	Linear Foot

Page 10-60, add Article 1032-9:

(A) General

Use polypropylene pipe from sources participating in the Department's Polypropylene Pipe QA/QC Program. A list of participating sources is available from the Materials and Tests Unit. The Department will remove a manufacturer of polypropylene pipe from this program if the monitoring efforts indicated that non-specification material is being provided or test procedures are not being followed.

Use polypropylene culvert pipe that meets AASHTO M 330 for Type S or Type D, or ASTM F2881 or ASTM F2764 Double or Triple wall; and has been evaluated by NTPEP.

(B) End Treatments, Pipe Tees and Elbows

End treatments, pipe tees and elbows shall meet AASHTO M 330, Section 7.7, or ASTM F2764, Section 6.6.

(C) Marking

Clearly mark each section of pipe, end section, tee and elbow and other accessories according to the Department's Polypropylene Pipe QC/QA Program:

- (1) AASHTO or ASTM Designation
- (2) The date of manufacture
- (3) Name or trademark of the manufacturer

When polypropylene pipe, end sections, tees and elbows have been inspected and accepted a sticker will be applied to the inside of the pipe. Do not use pipe sections, flared end sections, tees or elbows which do not have this seal of approval.

BRIDGE APPROACH FILLS:

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

422

SP4 R02A

Description

Bridge approach fills consist of backfilling behind bridge end bents with select material or aggregate to support all or portions of bridge approach slabs. Install drains to drain water from bridge approach fills and geotextiles to separate approach fills from embankment fills, ABC and natural ground as required. For bridge approach fills behind end bents with mechanically stabilized earth (MSE) abutment walls, reinforce bridge approach fills with MSE wall reinforcement connected to end bent caps. Construct bridge approach fills in accordance with the contract, accepted submittals and 2018 Roadway Standard Drawing Nos. 422.01 or 422.02 or Roadway Detail Drawing No. 422D10.

Define bridge approach fill types as follows:

Approach Fills – Bridge approach fills in accordance with 2018 Roadway Standard Drawing Nos. 422.01 or 422.02 or Roadway Detail Drawing No. 422D10;

Standard Approach Fill – Type I Standard Bridge Approach Fill in accordance with 2018 Roadway Standard Drawing No. 422.01;

Modified Approach Fill – Type II Modified Bridge Approach Fill in accordance with 2018 Roadway Standard Drawing No. 422.02 and

Reinforced Approach Fill – Type III Reinforced Bridge Approach Fill in accordance with Roadway Detail Drawing No. 422D10.

Materials

Refer to Division 10 of the *2018 Standard Specifications*.

Item	Section
Geotextiles, Type 1	1056
Portland Cement Concrete	1000
Select Materials	1016
Subsurface Drainage Materials	1044

Provide Type 1 geotextile for separation geotextiles and Class B concrete for outlet pads. Use Class V or Class VI select material for standard and modified approach fills. For an approach fill behind a bridge end bent with an MSE abutment wall, backfill the reinforced approach fill with the same aggregate type approved for the reinforced zone in the accepted MSE wall submittal. For MSE wall aggregate, reinforcement and connector materials, see the *Mechanically Stabilized Earth Retaining Walls* provision. Provide PVC pipes, fittings and outlet pipes for subsurface drainage materials. For PVC drain pipes, use pipes with perforations that meet AASHTO M 278.

Construction Methods

Excavate as necessary for approach fills in accordance with the contract. Notify the Engineer when foundation excavation is complete. Do not place separation geotextiles or aggregate until approach fill dimensions and foundation material are approved.

For reinforced approach fills, cast MSE wall reinforcement or connectors into end bent cap backwalls within 3" of locations shown in the accepted MSE wall submittals. Install MSE wall reinforcement with the orientation, dimensions and number of layers shown in the accepted MSE wall submittals. If a reinforced approach fill is designed with geogrid reinforcement embedded in an end bent cap, cut geogrids to the required lengths and after securing ends of geogrids in place, reroll and rewrap portions of geogrids not embedded in the cap to protect geogrids from damage. Before placing aggregate, pull geosynthetic reinforcement taut so that it is in tension and free of kinks, folds, wrinkles or creases.

Attach separation geotextiles to end bent cap backwalls and wing walls with adhesives, tapes or other approved methods. Overlap adjacent separation geotextiles at least 18" with seams oriented parallel to the roadway centerline. Hold geotextiles in place with wire staples or anchor pins as needed. Contact the Engineer when existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with separation geotextiles or MSE wall reinforcement.

Install continuous perforated PVC drain pipes with perforations pointing down in accordance with 2018 Roadway Standard Drawing Nos. 422.01 or 422.02. Connect drain pipes to outlet pipes just beyond wing walls. Connect PVC pipes, fittings and outlet pipes with solvent cement in accordance with Article 815-3 of the *2018 Standard Specifications* and place outlet pads in accordance with 2018 Roadway Standard Drawing No. 815.03.

Install drain pipes so water drains towards outlets. If the groundwater elevation is above drain pipe elevations, raise drains up to maintain positive drainage towards outlets. Place pipe sleeves in or under wing walls so water drains towards outlets. Use sleeves that can withstand wing wall loads.

Place select material or aggregate in 8" to 10" thick lifts. Compact fine aggregate for reinforced approach fills in accordance with Subarticle 235-3(C) of the *2018 Standard Specifications* except compact fine aggregate to a density of at least 98%. Compact select material for standard or modified approach fills and coarse aggregate for reinforced approach fills with a vibratory compactor to the satisfaction of the Engineer. Do not displace or damage geosynthetics, MSE wall reinforcement or drains when placing and compacting select material or aggregate. End dumping directly on geosynthetics is not permitted. Do not operate heavy equipment on geosynthetics or drain pipes until they are covered with at least 8" of select material or aggregate. Replace any damaged geosynthetics or drains to the satisfaction of the Engineer. When approach fills extend beyond bridge approach slabs, wrap separation geotextiles over select material or aggregate as shown in 2018 Roadway Standard Drawing No. 422.01 or 2018 Roadway Detail Drawing No. 422D10.

Measurement and Payment

Type I Standard Approach Fill, Station _____, Type II Modified Approach Fill, Station _____ and Type III Reinforced Approach Fill, Station _____ will be paid at the contract lump sum price. The lump sum price for each approach fill will be full compensation for providing labor, tools, equipment and approach fill materials, excavating, backfilling, hauling and removing excavated materials, installing geotextiles and drains, compacting backfill and supplying select material, aggregate, separation geotextiles, drain pipes, pipe sleeves, outlet pipes and pads and any incidentals necessary to construct approach fills behind bridge end bents.

The contract lump sum price for *Type III Reinforced Approach Fill, Station _____* will also be full compensation for supplying and connecting MSE wall reinforcement to end bent caps but not designing MSE wall reinforcement and connectors. The cost of designing reinforcement and connectors for reinforced approach fills behind bridge end bents with MSE abutment walls will be incidental to the contract unit price for *MSE Retaining Wall No. ____*.

Payment will be made under:

Pay Item

Type I Standard Approach Fill, Station _____
 Type II Modified Approach Fill, Station _____
 Type III Reinforced Approach Fill, Station _____

Pay Unit

Lump Sum
 Lump Sum
 Lump Sum

AUTOMATED FINE GRADING:

(1-16-96)

610

SP5 R05

On mainline portions and ramps of this project, prepare the subgrade and base beneath the pavement structure in accordance with the applicable sections of the *2018 Standard Specifications* except use an automatically controlled fine grading machine using string lines, laser controls or other approved methods to produce final subgrade and base surfaces meeting the lines, grades and cross sections required by the plans or established by the Engineer.

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

AGGREGATE SUBGRADE:

(5-15-18)

505

SP5 R8

Revise the *2018 Standard Specifications* as follows:

Page 5-8, Article 505-1 DESCRIPTION, lines 4-6, replace the paragraph with the following:

Construct aggregate subgrades in accordance with the contract. Install geotextile for soil stabilization and place Class IV subgrade stabilization at locations shown in the plans and as directed.

Undercut natural soil materials if necessary to construct aggregate subgrades. Define “subbase” as the portion of the roadbed below the Class IV subgrade stabilization. For Type 2 aggregate subgrades, undercut subbases as needed. The types of aggregate subgrade with thickness and compaction requirements for each are as shown below.

Type 1 – A 6 to 24 inch thick aggregate subgrade with Class IV subgrade stabilization compacted to 92% of AASHTO T 180 as modified by the Department or to the highest density that can be reasonably obtained.

Type 2 – An 8 inch thick aggregate subgrade on a proof rolled subbase with Class IV subgrade stabilization compacted to 97% of AASHTO T 180 as modified by the Department.

Page 5-8, Article 505-3 CONSTRUCTION METHODS, line 12, insert the following after the first sentence of the first paragraph:

For Type 2 aggregate subgrades, proof roll subbases in accordance with Section 260 before installing geotextile for soil stabilization.

Page 5-8, Article 505-3 CONSTRUCTION METHODS, lines 16-17, replace the last sentence of the first paragraph with the following:

Compact ABC as required for the type of aggregate subgrade constructed.

Page 5-8, Article 505-4 MEASUREMENT AND PAYMENT, line 26, insert the following after the last sentence of the first paragraph:

Undercut Excavation of natural soil materials from subbases for Type 2 aggregate subgrades will be measured and paid in accordance with Article 225-7 or 226-3. No measurement will be made for any undercut excavation of fill materials from subbases.

CLASS IV SUBGRADE STABILIZATION IN LIEU OF CHEMICAL STABILIZATION:

(6-16-15) (Rev. 5-15-18)

501, 542

SP5 R17

Description

In lieu of chemical stabilization, provide Class IV subgrade stabilization by replacing 8 inches of subgrade soils with geotextile and Class IV select material. This substitution is allowed in full typical section width and cannot result in chemically stabilized sections less than 1,000 feet in length, unless otherwise approved by the Engineer. This substitution is not allowed for chemically stabilized sections with geotextile for pavement stabilization. Notify the Engineer at least 30 days in advance of starting Class IV subgrade stabilization in lieu of chemical stabilization. Define “subbase” as the portion of the roadbed below the Class IV subgrade stabilization.

Materials

Refer to the *2018 Standard Specifications*.

Item	Section
Geotextile for Soil Stabilization, Type 4	1056
Select Material, Class IV	1016

Use Class IV select material for Class IV subgrade stabilization.

Construction Methods

Before placing geotextile for soil stabilization below Class IV subgrade stabilization, proof roll subbases in accordance with Section 260 of the Standard Specifications. Install geotextile for soil stabilization in accordance with Article 270-3 in the *2018 Standard Specifications*. Place, compact and maintain Class IV subgrade stabilization in accordance with Article 505-3 of the *2018 Standard Specifications* for a Type 2 aggregate subgrade.

Measurement and Payment

Class IV Subgrade Stabilization in Lieu of Chemical Stabilization will be paid at the prices established in the contract that relate to the chemical stabilization type that is being replaced (lime or cement). No direct payment will be made for additional excavation required to accommodate this alternate.

The total amount paid for this subgrade stabilization alternative will be limited to the contract amounts per square yard for replacement for Portland cement or lime, theoretical tons of Portland cement or lime replaced, mixing of cement or lime, and theoretical gallons of asphalt curing seal replaced at the rate of 0.15 gallons per square yard.

A supplement agreement will be executed prior to starting the work to create a square yard price for the *Class IV Subgrade Stabilization in Lieu of Chemical Stabilization* and deleting the quantities associated with the work being replaced.

PRICE ADJUSTMENT - ASPHALT BINDER FOR PLANT MIX:

(11-21-00)

620

SP6 R25

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

The base price index for asphalt binder for plant mix is **\$ 496.07** per ton.

This base price index represents an average of F.O.B. selling prices of asphalt binder at supplier's terminals on **October 1, 2019**.

MILLING ASPHALT PAVEMENT:

(1-15-19)

607

SP6 R59

Revise the *2018 Standard Specifications* as follows:

Page 6-5, Article 607-2, EQUIPMENT, lines 14-16, delete the seventh sentence of this Article and replace with the following:

Use either a non-contacting laser or sonar type ski system with a minimum of three referencing stations mounted on the milling machine at a length of at least 24 feet.

ASPHALT CONCRETE PLANT MIX PAVEMENTS:

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

610, 1012

SP6 R65

Revise the *2018 Standard Specifications* as follows:

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

TABLE 609-3 LIMITS OF PRECISION FOR TEST RESULTS	
Mix Property	Limits of Precision
25.0 mm sieve (Base Mix)	± 10.0%
19.0 mm sieve (Base Mix)	± 10.0%
12.5 mm sieve (Intermediate & Type P-57)	± 6.0%
9.5 mm sieve (Surface Mix)	± 5.0%
4.75 mm sieve (Surface Mix)	± 5.0%
2.36 mm sieve (All Mixes, except S4.75A)	± 5.0%
1.18 mm sieve (S4.75A)	± 5.0%
0.075 mm sieve (All Mixes)	± 2.0%
Asphalt Binder Content	± 0.5%
Maximum Specific Gravity (G_{mm})	± 0.020
Bulk Specific Gravity (G_{mb})	± 0.030
TSR	± 15.0%
QA retest of prepared QC Gyratory Compacted Volumetric Specimens	± 0.015
Retest of QC Core Sample	± 1.2% (% Compaction)
Comparison QA Core Sample	± 2.0% (% Compaction)
QA Verification Core Sample	± 2.0% (% Compaction)
Density Gauge Comparison of QC Test	± 2.0% (% Compaction)
QA Density Gauge Verification Test	± 2.0% (% Compaction)

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

TABLE 610-1 MIXING TEMPERATURE AT THE ASPHALT PLANT	
Binder Grade	JMF Temperature
PG 58-28; PG 64-22	250 - 290°F
PG 76-22	300 - 325°F

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

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

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

**TABLE 610-3
MIX DESIGN CRITERIA**

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

A. Based on 20 year design traffic.

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

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

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

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

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

**TABLE 610-5
BINDER GRADE REQUIREMENTS (BASED ON RBR%)**

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

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

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

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

TABLE 610-6 PLACEMENT TEMPERATURES FOR ASPHALT	
Asphalt Concrete Mix Type	Minimum Surface and Air Temperature
B25.0C	35°F
I19.0C	35°F
S4.75A, S9.5B, S9.5C	40°F ^A
S9.5D	50°F

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

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

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

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

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

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

TABLE 610-7 DENSITY REQUIREMENTS	
Mix Type	Minimum % G_{mm} (Maximum Specific Gravity)
S4.75A	85.0 ^A
S9.5B	90.0
S9.5C, S9.5D, I19.0C, B25.0C	92.0

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

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

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

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

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

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

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

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

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

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

Asphalt Concrete Surface Course, Type S9.5D

Ton

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

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

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

A. Requirements apply to the design aggregate blend.

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

AUTOMATED MACHINE GUIDANCE

(1-2-11)

801

SP8 R01

General

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

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

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

Submittals

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

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

Inspection

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

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

Subgrade and Base Controls

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

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

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

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

Measurement and Payment

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

GUARDRAIL END UNITS, TYPE - TL-3:

(4-20-04) (Rev. 7-1-17)

862

SP8 R65

Description

Furnish and install guardrail end units in accordance with the details in the plans, the applicable requirements of Section 862 of the *2018 Standard Specifications*, and at locations shown in the plans.

Materials

Furnish guardrail end 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 end unit certifying it meets the requirements of the AASHTO Manual for Assessing Safety Hardware, Test Level 3, in accordance with Article 106-2 of the *2018 Standard Specifications*.
- (B) Certified working drawings and assembling instructions from the manufacturer for each guardrail end unit in accordance with Article 105-2 of the *2018 Standard Specifications*.

No modifications shall be made to the guardrail end 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 *2018 Standard Specifications* and is incidental to the cost of the guardrail end unit.

Measurement and Payment

Measurement and payment will be made in accordance with Article 862-6 of the *2018 Standard Specifications*.

Payment will be made under:

Pay Item

Guardrail End Units, Type TL-3

Pay Unit

Each

GUARDRAIL ANCHOR UNITS AND TEMPORARY GUARDRAIL ANCHOR UNITS:

(1-16-2018)

862

SP8 R70

Guardrail anchor units will be in accordance with the details in the plans and the applicable requirements of Section 862 of the *2018 Standard Specifications*.

Revise the *2018 Standard Specifications* as follows:

Page 8-42, Article 862-6 MEASUREMENT AND PAYMENT, add the following:

Guardrail Anchor Units, Type ____ and Temporary Guardrail Anchor Units Type ____ will be measured and paid as units of each completed and accepted. No separate measurement will be made of any rail, terminal sections, posts, offset blocks, concrete, hardware or any other components of the completed unit that are within the pay limits shown in the plans for the unit as all such components will be considered to be part of the unit.

Payment will be made under:

Pay Item

Guardrail Anchor Units, Type ____
Temporary Guardrail Anchor Units, Type ____

Pay Unit

Each
Each

IMPACT ATTENUATOR UNITS, TYPE TL-3:

(4-20-04) (Rev. 12-18-18)

SP8 R75

Description

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

Materials

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 the Manual for Assessing Safety Hardware (MASH-16), Test Level 3, in accordance with Article 106-2 of the *2018 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 *2018 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 TL-3 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

Impact Attenuator Units, Type TL-3

Pay Unit

Each

MEDIAN HAZARD PROTECTION:**Description**

Construct Median Hazard Protection at locations indicated in the plans in accordance with the detail in the plans and as directed by the Engineer.

Measurement and Payment

Median Hazard Protection will be measured and paid for per linear feet that are completed and accepted. Such price and payment will be full compensation for all labor, materials (including, but not limited to, concrete barrier, earth material, #57 stone, concrete cover, galvanized bar and grout) and incidentals necessary construct the Median Hazard Protection.

Payment will be made under:

Pay Item

Median Hazard Protection

Pay Unit

Linear Foot

FOUNDATIONS AND ANCHOR ROD ASSEMBLIES FOR METAL POLES:

(1-17-12) (Rev. 1-16-18)

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 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 foundations for signal pedestals; see Section 1743 of the *2018 Standard Specifications* and 2018 Roadway Standard Drawing No. 1743.01.

Materials

Refer to the *2018 Standard Specifications*.

Item	Section
Conduit	1091-3
Grout, Type 2	1003
Polymer Slurry	411-2(B)(2)
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 *2018 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 *2018 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 *2018 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 *2018 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 the required slurry properties at all times 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 polymer 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 *2018 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 *2018 Standard Specifications*. A drilled pier will be considered defective in accordance with Subarticle 411-5(D) of the *2018 Standard Specifications* and drilled pier acceptance is based in part on the criteria in Article 411-6 of the *2018 Standard Specifications* except for the top of pier tolerances in Subarticle 411-6(C) of the *2018 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 *2018 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 *2018 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 *2018 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. Place concrete against undisturbed soil or backfill and fill in accordance with Article 410-8 of the *2018 Standard Specifications*. Proper compaction around footings and wings is critical for foundations to resist uplift and torsion forces.

(C) Anchor Rod Assemblies

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

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

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

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

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

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

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

- (11) Ensure nuts, washers and base plate are in firm contact with each other for each anchor rod. Cables, mast arms and trusses may now be attached to metal poles and upright trusses.
- (12) Between 4 and 14 days after pretensioning top nuts, use a torque wrench calibrated within the last 12 months to check nuts in the presence of the Engineer. Completely

erect mast arm poles and cantilever signs and attach any hardware before checking top nuts for these structures. Check that top nuts meet the following torque requirements:

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

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

- (13) Do not grout under base plate.

Measurement and Payment

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

No payment will be made for temporary casings that remain in drilled pier excavations. No payment will be made for PIT. No payment will be made for further investigation of defective piers. Further investigation of piers that are not defective will be paid as extra work in accordance with Article 104-7 of the *2018 Standard Specifications*. No payment will be made for remediation of unacceptable drilled piers or post repair testing.

OVERHEAD AND DYNAMIC MESSAGE SIGN FOUNDATIONS:

(1-16-18)

SP9 R07

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.

Subsurface Conditions

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

- (A) Unit weight (γ) = 120 pcf,

- (B) Friction angle (ϕ) = 30°,
- (C) Cohesion (c) = 0 psf and
- (D) Groundwater 7 feet below finished grade.

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

Subsurface Investigations

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

Use the computer software gINT version 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 *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 psf 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 2016 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 *2018 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 in 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, supplying and placing 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 *2018 Standard Specifications*.

Payment will be made under:

Pay Item

Overhead Footings

Pay Unit

Cubic Yard

THERMOPLASTIC PAVEMENT MARKING MATERIAL – COLOR TESTING:

3-19-19

1087

SP10 R05

Revise the *2018 Standard Specifications* as follows:

Pages 10-183 and 10-184, Subarticle 1087-7(D)(1)(b) Yellow, lines 9-11, delete and replace with the following:

Obtain Color Values Y,x,y per ASTM E1349 using C/2° illuminant/observer.
Results shall be $Y \geq 45\%$, and x,y shall fall within PR#1 chart chromaticity limits.

SNOWPLOWABLE PAVEMENT MARKERS:

3-19-19

1086, 1250, 1253

SP10 R07

Revise the *2018 Standard Specifications* as follows:

Pages 10-177 and 10-178, Subarticle 1086-3 SNOWPLOWABLE PAVEMENT MARKERS, delete items (A), (B) and (C)(1) and replace with the following:

(A) General

Use snowplowable pavement markers evaluated by NTPEP. The snowplowable pavement marker shall consist of a housing with one or more glass or plastic face lens type reflective lenses to provide the required color designation. Shape the housing to deflect a snowplow blade upward in both directions without being damaged. Plastic lens faces shall use an abrasion resistant coating.

Use recycled snowplowable pavement markers that meet all the requirements of new snowplowable pavement markers except Subarticle 1086-3(B)(1). Recycled snowplowable pavement markers with minimal variation in dimensions are acceptable only when the reflector fits in the housing of the recycled snowplowable pavement marker as originally designed.

(B) Housings**(1) Dimensions**

The dimension, slope and minimum area of reflecting surface shall conform to dimensions as shown in the plans. The minimum area of each reflecting surface shall be 1.44 sq.in.

(2) Materials

Use snowplowable pavement markers that are on the NCDOT Approved Products List.

(3) Surface

The surface of the housing shall be free of scale, dirt, rust, oil, grease or any other contaminant which might reduce its bond to the epoxy adhesive.

(4) Identification

Mark the housing with the manufacturer's name and model number of marker.

(C) Reflectors**(1) General**

Laminate the reflector to an elastomeric pad and attach with adhesive to the housing. The thickness of the elastomeric pad shall be 0.04".

Pages 12-14, Subarticle 1250-3(C) Removal of Existing Pavement Markers, lines 19-29, delete and replace with the following:

Remove the existing raised pavement markers or the snowplowable pavement markers including the housings, before overlaying an existing roadway with pavement. Repair the pavement by filling holes as directed by the Engineer.

When traffic patterns are changed in work zones due to construction or reconstruction, remove all raised pavement markers or snowplowable markers including housings that conflict with the new traffic pattern before switching traffic to the new traffic pattern. Lens removal in lieu of total housing removal is not an acceptable practice for snowplowable markers.

Properly dispose of the removed pavement markers. No direct payment will be made for removal or disposal of existing pavement markers or repair of pavement, as such work will be incidental to other items in the contract.

Pages 12-16 and 12-17, Subarticle 1253-3 CONSTRUCTION METHODS, delete items (A), (B) and (C) and replace with the following:

(A) General

Bond marker housings to the pavement with epoxy adhesive. Mechanically mix and dispense epoxy adhesives as required by the manufacturer's specifications. Place the markers immediately after the adhesive has been mixed and dispensed.

Install snowplowable pavement marker housings into slots sawcut into the pavement. Make slots in the pavement to exactly duplicate the shape of the housing of the snowplowable pavement markers.

Promptly remove all debris resulting from the saw cutting operation from the pavement surface. Install the marker housings within 7 calendar days after saw cutting slots in the pavement. Remove and dispose of loose material from the slots by brushing, blow cleaning or vacuuming. Dry the slots before applying the epoxy adhesive. Fill the cleaned slots totally with epoxy adhesive flush with the surface of the existing pavement. Install snowplowable pavement markers according to the manufacturer's recommendations.

Protect the snowplowable pavement markers until the epoxy has initially cured and is track free.

(B) Reflector Replacement

In the event that a reflector is damaged, replace the damaged reflector by using adhesives and methods recommended by the manufacturer of the markers and approved by the Engineer. This work is considered incidental if damage occurs during the initial installation of the marker housings and maintenance of initial snowplowable markers specified in this section. This work will be paid for under the pay item for the type of reflector replacement if the damage occurred after the initial installation of the snowplowable pavement marker.

Missing housings shall be replaced. Broken housings shall be removed and replaced. In both cases the slot for the housings shall be properly prepared prior to installing the new housing. Removal of broken housings and preparation of slots will be considered incidental to the work of replacing housings.

(C) Recycled Snowplowable Pavement Marker Housings

Use properly refurbished snowplowable pavement marker housings as approved by the Engineer such that approved new reflectors can be installed inside the housings.

TEMPORARY SHORING:

(2-20-07) (Rev. 1-16-18)

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 feet 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 and "Temporary Wall Vendor" as the vendor supplying the 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 2018 Roadway Standard Drawing No. 1170.01. Define “concrete barrier” as unanchored or anchored PCB or an approved equal. Define “temporary guardrail” as temporary steel beam guardrail that meets 2018 Roadway Standard Drawing No. 862.02.

Materials

Refer to the *2018 Standard Specifications*.

Item	Section
Concrete Barrier Materials	1170-2
Flowable Fill, Excavatable	1000-6
Geosynthetics	1056
Neat Cement Grout	1003
Portland Cement Concrete	1000
Select Materials	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

Provide Type 6 material certifications for shoring materials in accordance with Article 106-3 of the *2018 Standard Specifications*. Use Class IV select material 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 *2018 Standard Specifications* or Type 1 grout for drilled-in piles. Provide untreated timber with a thickness of at least 3 inches and a bending stress of at least 1,000 pounds per square inch 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 inches 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 *2018 Standard Specifications*. Splice bars in accordance with Article 1070-9 of the *2018 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. 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

Use geogrids with a roll width of at least 4 feet and an “approved” or “approved for provisional use” status code. The list of approved geogrids is available from: connect.ncdot.gov/resources/Materials/Pages/Materials-Manual-by-Material.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 machine direction (MD) and cross-machine direction (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 *2018 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 feet, 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 PDF files of

working drawings and design calculations for temporary shoring designs in accordance with Article 105-2 of the *2018 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.

Provide temporary wall designs sealed by a Design Engineer licensed in the state of North Carolina and employed or contracted by the Temporary Wall Vendor. Include details in temporary wall working drawings of geotextile and reinforcement types, locations and directions and obstructions extending through walls or interfering with reinforcement.

(1) Soil Parameters

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

(a) Unit weight (γ) = 120 pcf;

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

(c) Cohesion (c) = 0 psf.

(2) Traffic Surcharge

Design temporary shoring for a traffic surcharge of 250 pounds per square foot 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 pounds per foot applied 18 inches above top of shoring if concrete barrier is above and next to shoring or temporary guardrail is above and attached to shoring. For anchored shoring designs, apply traffic impact load as horizontal load (P_{HI}) in accordance with Figure 3.11.6.3-2(a) of the AASHTO LRFD specifications.

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

Design cantilever, braced and anchored shoring for a maximum deflection of 3 inches 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 inches. 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 feet behind the critical failure surface. Do not extend anchors beyond right-of-way or easement limits. If existing or future obstructions such as foundations, guardrail posts, pavements, pipes, inlets or utilities will interfere with anchors, maintain a clearance of at least 6 inches 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 inches except for walls on structures or rock as determined by the Engineer. Use a uniform reinforcement length throughout the wall height of at least 0.7H or 6 feet, whichever is longer. Extend the reinforced zone at least 6 inches 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. For temporary geogrid walls with an R_c of less than 1.0, use a maximum horizontal clearance between geogrids of 3 feet and stagger reinforcement so geogrids are centered over gaps in the reinforcement layer below.

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

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

(D) Preconstruction Meeting

The Engineer may require a shoring preconstruction meeting to discuss the construction, inspection and testing of the temporary shoring. If required and if this meeting occurs before all shoring submittals have been accepted, additional preconstruction meetings may be required before beginning construction of temporary shoring without accepted submittals. The Resident, District or Bridge Maintenance Engineer, Area 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 *2018 Standard Specifications* and 2018 Roadway Standard Drawing No. 1170.01. Use temporary guardrail in accordance with Section 862 of the *2018 Standard Specifications* and 2018 Roadway Standard Drawing Nos. 862.01, 862.02 and 862.03.

(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 inches of horizontal and vertical alignment shown in the accepted submittals, and
- (3) Shoring plumbness (batter) is not negative and within 2 degrees of vertical.

(B) Cantilever, Braced and Anchored Shoring Installation

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

(1) Pile Installation

Install piles with the minimum required embedment and extension in accordance with Subarticles 450-3(D) and 450-3(E) of the *2018 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 feet. Remove flowable fill and material in between H-piles as needed to install timber lagging. Position lagging with at least 3 inches 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 inches between the 1 and 10 minute readings or less than 0.08 inches 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 PDF files 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 inches with seams oriented perpendicular to the wall face. Hold geotextiles in place with wire staples or anchor pins as needed.

Place reinforcement within 3 inches of locations shown in the plans and accepted submittals. Before placing shoring backfill, pull reinforcement taut so it is in tension and 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 inch 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 *2018 Standard Specifications*. Use only hand operated compaction equipment to compact backfill within 3 feet of welded wire facing. At a distance greater than 3 feet, compact shoring backfill with at least 4 passes of an 8 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 inches 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 *2018 Standard Specifications*. Bench temporary walls into the sides of excavations where applicable. For temporary geosynthetic walls with top of wall within 5 feet of finished grade, remove top facing and incorporate top reinforcement layer into fill when placing fill in front of wall. Temporary walls remain in place permanently unless otherwise required.

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 *2018 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 *2018 Standard Specifications*.

Payment will be made under:

Pay Item

Temporary Shoring

Pay Unit

Square Foot

WATER FILLED BARRIER:

(11-19-13)

1170

SP11 R25

Revise the *2018 Standard Specifications* as follows:

Page 11-17, Article 1170-4 MEASUREMENT AND PAYMENT, lines 32-35, replace the fourth paragraph with the following:

Remove and Reset Water Filled Barrier will be measured and paid as the number of linear feet of barrier moved from one location on the project to another location on the project. Measurement will be made by counting the number of barrier units moved during any one move and multiplying by the length of a unit. Where barrier units are moved more than once, each move will be measured separately. Whenever the Engineer directs the Contractor to move barrier units from an installed location to a stock pile either on or off the project and then back to another installed location, the complete move from the first installed location to the next installed location will be measured as 2 moves.

Page 11-17, Article 1170-4 MEASUREMENT AND PAYMENT, line 38, replace “Reset Water Filled Barrier” with “Remove and Reset Water Filled Barrier”.

EXTRUDED THERMOPLASTIC PAVEMENT MARKING THICKNESS:

3-19-19

1205

SP12 R05

Revise the *2018 Standard Specifications* as follows:

Page 12-6, Subarticle 1205-4(A)(1) General, lines 5-8, delete the second sentence and replace with the following:

Use application equipment that provides multiple width settings ranging from 4 inches to 12 inches and multiple thickness settings to achieve a minimum pavement marking thickness of 0.090 inch above the surface of the pavement.

Page 12-7, Table 1205-3, THICKNESS REQUIREMENTS FOR THERMOPLASTIC, replace with the following:

TABLE 1205-3 MINIMUM THICKNESS REQUIREMENTS FOR THERMOPLASTIC	
Thickness	Location
240 mils	In-lane and shoulder-transverse pavement markings (rumble strips). May be placed in 2 passes.
90 mils	Center lines, skip lines, transverse bands, mini-skip lines, characters, bike lane symbols, crosswalk lines, edge lines, gore lines, diagonals, and arrow symbols

ROADWAY LIGHTING FOUNDATIONS:

(1-16-18)

SP14 R04

Description

Roadway lighting foundations include foundations for high mount and light standards. High mount foundations for high mount standards and standard foundations for light standards consist of drilled piers or footings with pedestals, conduit and anchor rod assemblies. Construct roadway lighting foundations in accordance with the contract, *2018 Roadway Standard Drawings* and accepted submittals. Define “high mount foundation” as a drilled pier including the conduit and anchor rod assembly that meets 2018 Roadway Standard Drawing No. 1402.01. Define “standard foundation” as a drilled pier or footing with pedestal including the conduit and anchor rod assembly that meets 2018 Roadway Standard Drawing No. 1405.01.

Materials

Use roadway lighting foundation materials that meet the *Foundations and Anchor Rod Assemblies for Metal Poles* provision. Provide metal shrouds for median mounted light standards in accordance with Subarticle 1400-4(I) of the *2018 Standard Specifications*.

Roadway Lighting Foundations**(A) High Mount Foundations**

Construct high mount foundations for the wind zone and high mount heights shown in the plans unless the following assumed site conditions are not applicable to high mount locations:

- (E) Soil with unit weight (γ) \geq 120 pcf and friction angle (ϕ) \geq 30°,
- (F) Groundwater at least 7 feet below finished grade and
- (G) Slope of finished grade 6:1 (H:V) or flatter.

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

(B) Standard Foundations

Construct standard foundation types for the light standard types shown in the plans and the site conditions at each light standard location. When weathered or hard rock, boulders or obstructions conflict with standard foundations, submit an alternate standard foundation design for acceptance in accordance with Article 105-2 of the *2018 Standard Specifications*. No extension of completion date or time will be allowed for alternate standard foundations.

Subsurface Investigations

Use a prequalified geotechnical consultant to perform one standard penetration test (SPT) boring in accordance with ASTM D1586 at each high mount location requiring a subsurface investigation. Rough grade high mount locations to within 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.

High Mount Foundation Designs

Design high mount foundations for the wind zone and high mount heights shown in the plans and the slope of finished grade and subsurface conditions at each high mount location. Design drilled piers, footings and pedestals in accordance with the *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*.

Design drilled piers for side resistance only in accordance with Section 4.6 of the *AASHTO Standard Specifications for Highway Bridges*. Use the computer software LPILE version 2016 or later manufactured by Ensoft, Inc. to analyze drilled piers. Provide drilled pier designs with a horizontal deflection of less than 0.5" at top of piers.

Design footings in accordance with Section 4.4 of the *AASHTO Standard Specifications for Highway Bridges*. Do not use an allowable bearing pressure of more than 3,000 psf for footings. Submit boring logs, working drawings and design calculations for acceptance in accordance with Article 105-2 of the *2018 Standard Specifications*. Submit working drawings showing plan views, required foundation dimensions and elevations and typical sections with reinforcement, conduit and anchor rod assembly details. Include all boring logs, design calculations and LPILE output for high mount foundation design submittals. Have high mount foundations designed, detailed and sealed by an engineer licensed in the state of North Carolina.

Construction Methods

Grade around roadway lighting locations with cut and fill slopes as shown on 2018 Roadway Standard Drawing No. 1402.01 or 1405.01. Construct drilled piers, footings and pedestals and install anchor rod assemblies for roadway lighting foundations in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* provision.

For median mounted light standards, place concrete for median barriers and underlying pedestals

in the same pour. Construct concrete barriers in accordance with the contract and make concrete median barriers continuous through standard foundations. Coordinate construction of median mounted light standards with sign structures, concrete barriers, drainage structures, etc. to avoid conflicts.

Measurement and Payment

High Mount Foundations will be measured and paid in cubic yards. High mount foundations will be measured as the cubic yards of concrete shown on 2018 Roadway Standard Drawing No. 1402.01 for the high mount height and wind zone shown in the plans. All other high mount foundations will be measured as the cubic yards of foundation concrete for drilled piers, footings and pedestals shown in the accepted submittals. Subsurface investigations and high mount foundation designs required by the Engineer will be paid as extra work in accordance with Article 104-7 of the *2018 Standard Specifications*.

Standard Foundation _____ will be measured and paid in units of each. Standard foundations will be measured as the number of each standard foundation type. Alternate standard foundations will be measured as 1.5 times the number of each standard foundation type replaced.

The contract unit prices for *High Mount Foundations* and *Standard Foundation* _____ will be full compensation for providing labor, tools, equipment and foundation materials, stabilizing or shoring excavations, supplying and placing concrete, reinforcing steel, conduit, anchor rod assemblies and any incidentals necessary to construct roadway lighting foundations.

Payment will be made under:

Pay Item

High Mount Foundations
Standard Foundation _____

Pay Unit

Cubic Yard
Each

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 *2018 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.

STANDARD SPECIAL PROVISION
AVAILABILITY OF FUNDS – TERMINATION OF CONTRACTS

(5-20-08)

Z-2

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

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

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

STANDARD SPECIAL PROVISION
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, Sickledod, Sandbur, Wild Onion, and Wild Garlic. Seed shall not be labeled with the above weed species on the seed analysis label. Tolerances as applied by the Association of Official Seed Analysts will NOT be allowed for the above noxious weeds except for Wild Onion and Wild Garlic.

Tolerances established by the Association of Official Seed Analysts will generally be recognized. However, for the purpose of figuring pure live seed, the found pure seed and found germination percentages as reported by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory will be used. Allowances, as established by the NCDOT, will be recognized for minimum pure live seed as listed on the following pages.

The specifications for restricted noxious weed seed refers to the number per pound as follows:

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

Seed of Pensacola Bahiagrass shall not contain more than 7% inert matter, Kentucky Bluegrass, Centipede and Fine or Hard Fescue shall not contain more than 5% inert matter whereas a maximum of 2% inert matter will be allowed on all other kinds of seed. In addition, all seed shall

not contain more than 2% other crop seed nor more than 1% total weed seed. The germination rate as tested by the North Carolina Department of Agriculture shall not fall below 70%, which includes both dormant and hard seed. Seed shall be labeled with not more than 7%, 5% or 2% inert matter (according to above specifications), 2% other crop seed and 1% total weed seed.

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

FURTHER SPECIFICATIONS FOR EACH SEED GROUP ARE GIVEN BELOW:

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

Sericea Lespedeza
Oats (seeds)

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

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

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

Common or Sweet Sundangrass

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

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

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

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

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**

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

Z-4

Revise the *2018 Standard Specifications* as follows:

Division 6

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

Division 7

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

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

Division 10

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

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

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

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

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

Division 17

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

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

Directional Drill (1)(1.25”) Linear Foot

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

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

Z-04a

Within Quarantined Area

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

Originating in a Quarantined County

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

Contact

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

Regulated Articles Include

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

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

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

Z-6

Revise the *2018 Standard Specifications* as follows:

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

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

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

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

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

(a) Compliance with Regulations

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

(b) Nondiscrimination

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

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

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

(d) Information and Reports

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

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

(e) Sanctions for Noncompliance:

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

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

(f) Incorporation of Provisions

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

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

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

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

1. Post NCDOT's Notice of Nondiscrimination and the Contractor's own Equal Employment Opportunity (EEO) Policy in conspicuous locations accessible to all employees, applicants and subcontractors on the jobsite.
2. Physically incorporate the required Title VI clauses into all subcontracts on federally-assisted and state-funded NCDOT projects, and ensure inclusion by subcontractors into all lower-tier subcontracts.
3. Required Solicitation Language. The Contractor shall include the following notification in all solicitations for bids and requests for work or material, regardless of funding source:
"The North Carolina Department of Transportation, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§

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

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

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

**TABLE 103-1
COMPLAINT BASIS**

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

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

(3) Pertinent Nondiscrimination Authorities

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

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

disproportionately high and adverse human health or environmental effects on minority and low-income populations;

- (k) Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of Limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- (l) Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).
- (m) Title VII of the Civil Rights Act of 1964 (42 U.S.C. § 2000e et seq., Pub. L. 88-352), (prohibits employment discrimination on the basis of race, color, religion, sex, or national origin).

(4) Additional Title VI Assurances

***The following Title VI Assurances (Appendices B, C and D) shall apply, as applicable*

(a) Clauses for Deeds Transferring United States Property (1050.2A, Appendix B)

The following clauses will be included in deeds effecting or recording the transfer of real property, structures, or improvements thereon, or granting interest therein from the United States pursuant to the provisions of Assurance 4.

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

(HABENDUM CLAUSE)

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

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

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

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

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

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

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

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

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

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

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

STANDARD SPECIAL PROVISION**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 for 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 AreasArea 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

Goals for FemaleParticipation 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 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 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
MINIMUM WAGES
GENERAL DECISION NC190090 01/04/2019 NC90

Z-090

Date: January 4, 2019

General Decision Number: NC190090 01/04/2019 NC90

Superseded General Decision Numbers: NC20180103

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: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.60 for calendar year 2019 that applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was 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 \$10.60 per hour (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 2019. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR.5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2) – (60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number
0

Publication Date
01/04/2019

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

	Rates	Fringes
IRONWORKER	16.02	
LABORER		
Asphalt Raker and Spreader	12.46	
Asphalt Screed/Jackman	14.33	
Carpenter Tender	12.88	
Cement Mason/Concrete Finisher Tender	12.54	
Common or General	10.20	
Guardrail/Fence Installer	12.87	
Pipelaye	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.
Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work,

up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

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**

STANDARD SHORING - (1/16/2018)

GT-1.1 - GT-1.4

TEMPORARY SOIL NAIL WALLS - (1/16/2018)

GT-2.1 - GT-2.9

GEOTEXTILE FOR PAVEMENT STABILIZATION - (5/15/2018)

GT-3.1 - GT-3.2

EMBANKMENT CONSTRUCTION USING DEGRADABLE ROCK (SPECIAL)

GT-4.1 - GT-4.1

DocuSigned by:

Geotechnical Engineering Unit

E06538624A11498...

8/28/2019

STANDARD SHORING:**(1-16-18)****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 Geotechnical Standard Detail No. 1801.01 or 1801.02.

Define "standard temporary shoring" as cantilever shoring that meets the standard temporary shoring detail (Geotechnical 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 (Geotechnical 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.

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
Concrete Barrier Materials	1170-2
Flowable Fill, Excavatable	1000-6
Geosynthetics	1056
Neat Cement Grout, Type 1	1003
Portland Cement Concrete, Class A	1000
Select Materials	1016
Steel Beam Guardrail Materials	862-2
Steel Sheet Piles and H-Piles	1084
Untreated Timber	1082-2
Welded Wire Reinforcement	1070-3

Provide Type 6 material certifications for shoring materials. Use Class IV select material 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 Geotechnical 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 Geotechnical Standard Detail No. 1801.02. Provide Type 2 geotextile for separation and retention geotextiles. 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 Geotechnical Standard Detail No. 1801.02.

(2) Geogrid Reinforcement

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/Materials-Manual-by-Material.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 Geotechnical Standard Detail No. 1801.02. Geogrids are typically approved for ultimate tensile strengths in the machine direction (MD) and cross-machine direction (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

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 Geotechnical 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 Geotechnical Standard Detail No. 1801.01. Otherwise, use “slope or surcharge case with no traffic impact” in accordance with Geotechnical 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

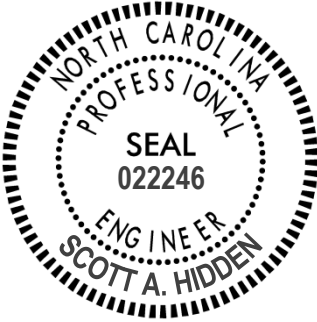
Based on actual wall height, groundwater elevation, slope or surcharge case, geotextile or geogrid reinforcement and shoring backfill in the reinforced zone at each standard temporary wall location, construct walls with the minimum required reinforcement length and number of reinforcement layers for each wall section in accordance with Geotechnical 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 Geotechnical 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.



DocuSigned by:
Scott A. Hidden
F760CAEB96FC4D3...
7/12/2019

TEMPORARY SOIL NAIL WALLS:**(1-16-18)****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
Geocomposites	1056
Neat Cement Grout, Type 2	1003
Reinforcing Steel	1070
Shotcrete	1002
Select Material, Class IV	1016
Steel Plates	1072-2

Use Class IV select material for temporary guardrail. 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 PDF files of working drawings and design calculations 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 psf 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, Area Construction Engineer, Geotechnical Operations Engineer, Contractor and Soil Nail Wall Contractor Superintendent will attend preconstruction meetings.

(E) Preconstruction Meeting

Before beginning wall construction, provide preconstruction test panels in accordance with Subarticle 1002-3(D) of the *Standard Specifications*.

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 Roadway Standard Drawing No. 1170.01. Use temporary guardrail in accordance with Section 862 of the *Standard Specifications* and Roadway Standard Drawing No. 862.01, 862.02 and 862.03.

(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 file 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 (in²),
- 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 file 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*.



DocuSigned by:
Scott A. Hidden
F760CAEB96FC4D3...
7/12/2019

GEOTEXTILE FOR PAVEMENT STABILIZATION:**(1-16-18)****Description**

Supply and install geotextile for pavement stabilization in accordance with the contract. Geotextile for pavement stabilization may be required above chemically stabilized subgrades or below Class IV Subgrade Stabilization to prevent pavement cracking at locations shown in the plans and as directed. Define “subbase” as the portion of the roadbed below the Class IV Subgrade Stabilization.

Materials

Refer to Division 10 of the *Standard Specifications*.

Item	Section
Geotextiles	1056
Select Material, Class IV	1016

Use Class IV select material for Class IV Subgrade Stabilization. Provide Type 5 geotextile for geotextile for pavement stabilization that meets the following tensile strength requirements in the machine direction (MD) and cross-machine direction (CD):

GEOTEXTILE FOR PAVEMENT STABILIZATION REQUIREMENTS		
Tensile Strength	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

A. MD, CD and MARV per Article 1056-3 of the *Standard Specifications*.

Construction Methods

Geotextile for pavement stabilization may be required at locations shown in the plans and other locations as directed. For locations with ABC on chemically stabilized subgrades, use of geotextile for pavement stabilization will be based on sampling and testing for chemical stabilization. For all other locations, notify the Engineer when the embankment is completed to within 2 ft of subgrade elevation and allow 3 days for the Engineer to determine if geotextile for pavement stabilization is required.

Place geotextile for pavement stabilization above chemically stabilized subgrades or below Class IV Subgrade Stabilization as shown in the plans. Pull geotextiles taut so they are in tension and free of kinks, folds, wrinkles or creases. Install geotextile for pavement stabilization perpendicular to the survey or lane line in the MD and adjacent to each other in the CD as shown in the plans. Continuous geotextiles are required in the MD, i.e., do not splice or overlap geotextiles so seams are parallel to the survey or lane line. Completely cover stabilized subgrades or subbases with geotextile for pavement stabilization. Overlapping geotextiles in the CD is permitted but not required. Overlap geotextiles in the direction that aggregate will be placed to prevent lifting the edge of the top geotextile. Hold geotextiles in place with wire staples or anchor pins as needed.

Do not damage geotextile for pavement stabilization when placing ABC or Class IV Subgrade Stabilization. Place and compact ABC in accordance with the contract and *Standard Specifications*. Place, compact and maintain Class IV Subgrade Stabilization in accordance with

Article 505-3 of the *Standard Specifications*. Do not operate heavy equipment on geotextiles any more than necessary to construct base courses or subgrades. 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 or subbases as the square yards of exposed geotextiles installed before placing ABC or Class IV Subgrade Stabilization. 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 installing geotextiles, wire staples and anchor pins.

Class IV Subgrade Stabilization will be measured and paid in accordance with Article 505-4 of the *Standard Specifications*.

Payment will be made under:

Pay Item

Geotextile for Pavement Stabilization

Pay Unit

Square Yard



DocuSigned by:
Scott A. Hidden
F760CAEB96FC4D3...
7/15/2019

EMBANKMENT CONSTRUCTION USING DEGRADABLE ROCK:**(SPECIAL)**

Degradable rock is defined as hard rock material which exhibits high slaking characteristics when exposed to air and water. This type material was encountered on this project and is comprised of Triassic sandstone, siltstone, mudstone, and conglomerate. Place all excavated degradable rock and all mixtures of degradable rock and soil accordance with the provision.

Place embankments constructed of degradable rock in 12 inch maximum lifts. Place each lift by blading and dozing in a manner to minimize voids, pockets and bridging. Use a dozer to spread the material that is equivalent to or larger in size than a Caterpillar D-8. Provide each lift with a minimum of three (3) coverages with a static pad foot roller (minimum weight of 45,000 lbs) and two (2) coverages with a vibratory pad foot roller (minimum centrifugal force per drum of 50,000 lbs).

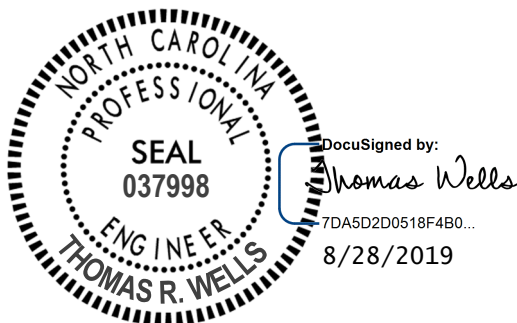
If the material is dry, add water to facilitate breakage of the rocks and compaction. Uniformly mix the added water for the entire depth of the lift by blading, disking, or other approved methods. Make sure that the amount of water added is sufficient to achieve optimum moisture of the particle size material.

The Engineer may modify the sequence or the number of coverages with either roller as deemed necessary to insure satisfactory breakage and compaction of the material. Density measurements are not required.

Do not place degradable rock or degradable rock and soil mixture in the top 36 inches of embankment.

Wasting of degradable rock will be permitted provided the provisions and conditions of Article 225-3 of the Standard Specifications are met.

No additional compensation will be provided for the procedures outlined in this provision. This work is included in the unit price bid for unclassified excavation.



**PROJECT SPECIAL PROVISIONS
GEOENVIRONMENTAL**

CONTAMINATED SOIL (10/15/2019)

The Contractor's attention is directed to the fact that soil contaminated with petroleum hydrocarbons and poly chlorinated biphenyl (PCB) compounds may exist within the project area. The areas of suspected 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", "I-5700", "Individual Sheets", "520 GeoEnvironmental":

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

Petroleum Contaminated Soil

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

In the event that the Contractor chooses to stockpile the soil temporarily, the stockpile shall be created within the property boundaries of the source material and in accordance with the Diagram for Temporary Containment and Treatment of Petroleum-Contaminated Soil per North Carolina Department of Environmental Quality's Division of Waste Management UST Section GUIDELINES FOR EX SITU PETROLEUM CONTAMINATED SOIL REMEDIATION. If the volume of contaminated material exceeds available space on site, the Contractor shall obtain a permit from the NCDEQ UST Section's Regional Office for off-site temporary storage. Stockpiling petroleum contaminated soil will be incidental to the project. The Contractor shall provide copies of disposal manifests completed per the disposal facilities requirements and weigh tickets to the Engineer.

PCB Contaminated Soil

The Contractor's attention is directed to the fact that low levels of PCBs were detected in sediments within the project area. All excavation along Brier Creek within a 100' buffer, as indicated on the plans, shall be stockpiled on-site and tested for PCBs, as directed in the PCB Soil Management Workplan approved by USEPA and NCDEQ. The work plan requires that the tested stockpiled soil to be managed as noted below based on the following test results:

- results below the regulatory level of 1 mg/kg, the soil shall be left on-site to be used by the Contractor.
- results above regulatory action levels, between 1 mg/kg and 49 mg/kg, the soil shall be properly disposed of at a subtitle D landfill by the Contractor.
- results exceeding 50 mg/kg shall be managed by the GeoEnvironmental Section of the Geotechnical Engineering Unit for hauling and disposal at a TSCA disposal facility.

Measurement and Payment:

The quantity of petroleum 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 petroleum contaminated soil, measured as provided above, shall be paid for at the contract unit price per ton for "Hauling and Disposal of Petroleum Contaminated Soil".

The quantity of PCB contaminated soil stockpiled, hauled, and disposed shall be the actual number of tons of stockpiled material excavated from the designated area, which has been acceptably transported and weighed with certified scales as documented by disposal manifests and weigh tickets. The quantity of PCB contaminated soil, measured as provided above, shall be paid for at the contract unit price per ton for "Stockpiling, Testing, Hauling and Disposal of PCB Contaminated Soil". In the event that the Contractor is not required to haul and dispose of the tested stockpile, the contractor will be paid by the "Stockpile and Testing Only of PCB Contaminated Soil" pay item in cubic yards.

The above price and payment shall be full compensation for all work covered by this section, including, but not limited to stockpiling, loading, transportation, weighing, laboratory testing, disposal, equipment, decontamination of equipment, labor, and personal protective equipment.

Payment shall be made under:

Pay Item

Hauling and Disposal of Petroleum Contaminated Soil

Stockpiling, Testing, Hauling and Disposal of PCB Contaminated Soil

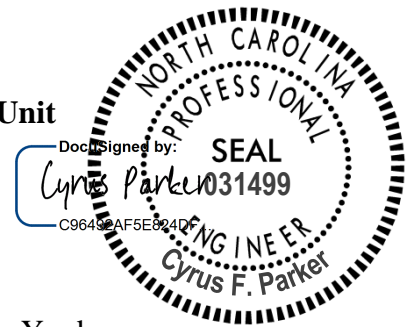
Stockpiling and Testing Only of PCB Contaminated Soil

Pay Unit

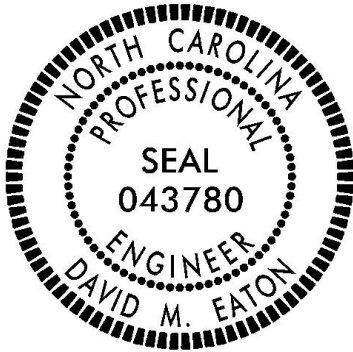
Ton

Ton

Cubic Yard



10/15/2019



DocuSigned by:
David M. Eaton
DDA1C5F247484F7...
8/28/2019

SIGN ERECTION, LOGO MILEAGE PANEL TO SIGN:

(A) DESCRIPTION

Erect proposed or existing Mileage Panels to proposed ramp logo signs and furnish all mounting hardware.

(B) CONSTRUCTION METHODS

Do not weld, cut, or fabricate in any manner in the field, except for as allowed under Section 903, and for the drilling of holes for attachment. Make sure all the horizontal edges of Mileage Panels are level. Refer to Sections 900 and 901 for requirements of care and handling of signs and final clean up.

Carefully detach existing logo panels and existing logo mileage panels from existing ramp logo signs, maintaining sign panels in good serviceable condition until re-erection to new ramp logo signs. Coordinate with the Engineer if new logo mileage panels are needed, and all new Logo Mileage Panels will be made available for pick up at the Division Traffic Services sign shop. Attach mileage panels to ramp signs with six 1/8 inch diameter rivets of the pull through type. Field-drill 5/32 inch holes in the background signs to match those in the mileage panels for attaching the mileage panel to the background signs. Perform such minor repairs to existing signs as necessary prior to the attachment of mileage panels to ensure a finished sign face that is completely flat. The mileage panel will be installed 1/2 inch below the business panel with 3 rivets at the top and 3 rivets at the bottom spaced evenly apart. Exercise sufficient care in attaching the mileage panel to ensure that the finished sign face is completely flat and without ripples and/or buckles. Place mileage panels as shown on the plans or as directed by the Division Logo Coordinator.

(C) MEASUREMENT AND PAYMENT

Sign Erection, Logo Mileage Panel to Sign will be measured and paid for as actual number of Mileage Panels erected and accepted.

Payment will be made under:

Pay Item	Pay Unit
Sign Erection, Logo Mileage Panel to Sign	Each

TC-1

I-5700

Wake County

WORK ZONE TRAFFIC CONTROL Project Special Provisions Table of Contents

Special Provision	Page
ADA Compliant Pedestrian Traffic Control Devices	TC-2
Sequential Flashing Warning Lights	TC-3
Work Zone Digital Speed Limit Signs	TC-6
Work Zone Performance Pavement Markings	TC-10
Pedestrian Transport Service	TC-15

9/18/2019



DocuSigned by:

Bob A. May

513D84424429493...

TC-2

I-5700

Wake County

ADA COMPLIANT PEDESTRIAN TRAFFIC CONTROL DEVICES:
(10/31/2017)

Description

Furnish, install, and maintain all ADA compliant pedestrian traffic control devices for existing sidewalks that are disrupted, closed, or relocated by planned work activities.
The ADA compliant pedestrian traffic control devices used to either close, redirect, divert or detour pedestrian traffic are Pedestrian Channelizing Devices and Audible Warning Devices.

Construction Methods

The ADA compliant pedestrian traffic control devices involved in the closing or redirecting of pedestrians as designated on the Transportation Management Plan (TMP) shall be manufactured and assembled in accordance with the requirements of the Americans with Disabilities Act (ADA) and be on the NCDOT approved products list.

Pedestrian Channelizing Devices shall be manufactured and assembled to be connected as to eliminate any gaps that allow pedestrians to stray from the channelizing path. Any Pedestrian Channelizing Devices used to close or block a sidewalk shall have a “SIDEWALK CLOSED” sign affixed to it and any audible warning devices, if designated on the TMP.

Audible Warning Devices shall be manufactured to include a locator tone activated by a motion sensor and have the ability to program a message for a duration of at least 1 minute. The motion sensor shall have the ability to detect pedestrians a minimum of 10’ away. The voice module may be automatic or it may be push button activated. If push button activated, it shall be at the appropriate height to meet the ADA regulations.

Measurement and Payment

The measurement and payment for the ADA Compliant Pedestrian Traffic Control Devices shall be measured and paid on a per each basis for the Audible Warning Devices. The measurement and payment for the Pedestrian Channelizing Devices will be by the linear foot.

Payment for each of these devices is dependent upon satisfactory installation and acceptance by the Engineer. The unit prices include any costs associated with installation, maintenance and removal of the devices from the project.

Payment will be made under:

Pay Item	Pay Unit
Pedestrian Channelizing Devices.....	Linear Foot

TC-3

I-5700

Wake County

Audible Warning Devices.....Each

SEQUENTIAL FLASHING WARNING LIGHTS:
(10/08/2016)

Description

Furnish and install Sequential Flashing Warning Lights on drums used for merging tapers during nightly work activities.

The purpose of these lights is to assist the motorist in determining which direction to merge when approaching a lane closure. It’s also designed to reduce the number of late merges resulting in devices being struck and having to be reset to maintain positive guidance at the merge point. The successive flashing of the lights shall occur from the upstream end of the merging taper to the downstream end of the merging taper in order to identify the desired vehicle path.

Materials

The Sequential Flashing Warning Lights shall meet all of the requirements for warning lights within the current edition of the Manual of Uniform Traffic Control Devices (MUTCD).

Each light unit shall be capable of operating fully and continuously for a minimum of 200 hours when equipped with a standard battery set.

Each light in the sequence shall be flashed at a rate of not less than 55 times per minute and not more than 75 times per minute. The flash rate and flash duration shall be consistent throughout the sequence.

Supply a Type 3 Certification (Independent Test Lab results) documenting all actual test results for the specified parameters contained in the Institute of Transportation Engineer’s (ITE’s) *Purchase Specification for Flashing and Steady Burn Warning Lights*. The laboratory shall also identify all manufacturer codes and part numbers for the incandescent lamp or LED clusters, lenses, battery, and circuitry, and the total width of the light with the battery in place. The complete assembly shall be certified as crashworthy when firmly affixed to the channelizing device.

All Sequential Flashing Warning Lights shall be on the NCDOT Work Zone Traffic Control Approved Products List.

Construction Methods

Sequential Flashing Warning Lights are to be used for night time lane closures.

TC-4

I-5700

Wake County

These lights shall flash sequentially beginning with the first light and continuing until the final light.

The Sequential Flashing Warning Lights shall automatically flash in sequence when placed on the drums that form the merging taper.

The number of lights used in the drum taper shall equal the number of drums used in the taper.

Drums are the only channelizing device allowed to mount sequential flashing warning lights.

The Sequential Flashing Warning Lights shall be weather independent and visual obstructions shall not interfere with the operation of the lights.

The Sequential Flashing Warning Lights shall automatically sequence when placed in line in an open area with a distance between lights of 10 to 100 feet. A 10 foot stagger in the line of lights shall have no adverse effect on the operation of the lights.

If one light fails, the flashing sequence shall continue. If more than 1 light fails, all of the lights are to be automatically turned to the “off” mode. Non-sequential flashing is prohibited.

When lane closures are not in effect, the Sequential Flashing Warning Lights shall be deactivated.

Measurement and Payment

Sequential Flashing Warning Lights will be measured and paid as the maximum number of sequential flashing warning lights satisfactorily installed and properly functioning at any one time during the life of the project.

This includes all materials and labor to install, maintain and remove all the Sequential Flashing Warning Lights.

Pay Item

Sequential Flashing Warning Lights

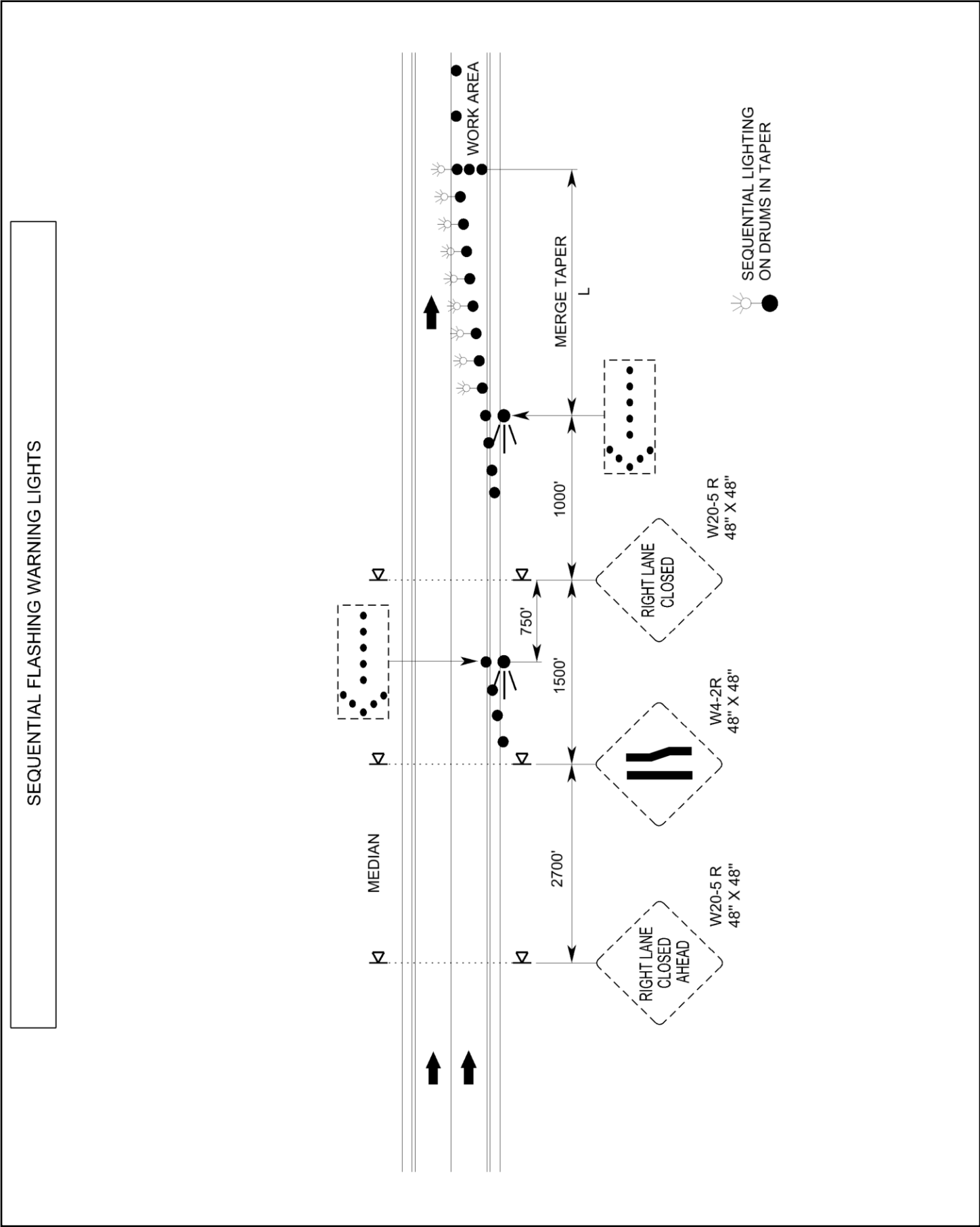
Pay Unit

Each

TC-5

I-5700

Wake County



TC-6

I-5700

Wake County

WORK ZONE DIGITAL SPEED LIMIT SIGNS:

(3/15/2019)

Description

Furnish and install Work Zone Digital Speed Limit Signs on interstates and freeways with speed limits greater than 55 MPH and or facilities that have significant traffic volumes and impacts. These signs are regulatory speed limit signs with LED displays for the speed limit numbers.

The purpose of Digital Speed Limit signs is to easily change work zone speed limits between activities that necessitate the need for a lower speed limit and the ones that do not.

Materials

Digital Speed Limit Signs shall be a minimum 36" wide x 48" high. The speed limit sign (R2-1) shall be black on white with high intensity white prismatic sheeting.

The Digital Speed Limit sign shall be mounted such that the bottom of the sign is 7' above roadway.

The LED panel shall be a minimum of 18" wide x 28" high. The display on the LED panel shall be amber or white.

The LED numbers shall have a minimum 5 wide by 7 high pixel array with a minimum height of 18".

The LED panel shall have auto brightness/dimming capability.

The black on orange "WORK ZONE" sign shall be mounted above the Speed Limit sign. It shall be 36" wide x 24" high with high intensity prismatic orange sheeting.

The black on white "\$250 FINE" sign shall be mounted below the Speed Limit sign. It shall be 36" wide x 24" high with high intensity prismatic white sheeting.

All digital speed limit systems shall have operational software and wireless communications that allows for remote operation and data monitoring. It shall be configured to allow access by the Engineer or his designee to change each sign independently or change the speed limit on all signs at once from a PC, tablet or cellular phone application.

Radar equipment to detect approaching speeds on the digital speed limit systems is optional. However, if the systems have radar, they will be equipped to store the detected speed data, this information should be available in a spreadsheet format and accessed remotely from a secure cloud location.

The Work Zone Digital Speed Limit systems shall have flashing beacons. The beacons are to be a minimum of 8" diameter LED circular yellow. They may be mounted either above/below or beside

TC-7

I-5700

Wake County

the sign assemblies and are to be centered. The beacons shall alternately flash at rates not less than 50 or more than 60 times per minute.

In addition, the flashing beacons shall be mounted in such a manner that the \$250 Speeding Fine sign is not obscured when in operation.

Digital Speed Limit Signs may be trailer mounted or stationary mounted. The unit shall be Solar powered and have the ability to operate continuously. It shall be supplemented with a battery backup system which includes a 110/120 VAC powered on-board charging system.

The batteries, when fully charged; shall be capable of powering the display for 20 continuous days with no solar power. The unit shall be capable of being powered by standard 110/120 VAC power source.

Store the battery bank and charging system in a lockable, weather and vandal resistant box.

All Work Zone Digital Speed Limit equipment shall be on the NCDOT Work Zone Traffic Control Approved Products List.

Digital Speed Limit Displays

The Speed Limit shall be continuously displayed on the signs. All other stationary speed limit signs shall be covered when Digital Speed Limit systems are in operation.

Reduced Speed Limit Displays

The Digital Speed Limit systems shall have beacons activated when the work zone speed limit is reduced. Otherwise, the beacons are to remain off.

IF THE DIGITAL SPEED LIMIT SYSTEM IS EQUIPPED WITH RADAR: The Digital Speed Limit systems shall display the reduced work zone speed limit without flashing the LED speed limit number unless approaching speeds are detected to be 6 MPH or higher than the displayed Speed Limit. If speeds are detected 6 MPH or above the displayed Speed Limit, then the LED shall flash the Speed Limit until the speeds are within the 6 MPH tolerance.

Existing Speed Limit Displays

When the existing Speed Limit is displayed on the Digital Speed Signs, the beacons are to remain off.

IF THE DIGITAL SPEED LIMIT SYSTEM IS EQUIPPED WITH RADAR: The Speed Limit number is not to flash unless the approaching speeds are detected to be 6 MPH or higher than the displayed Speed Limit.

Other Construction Methods

TC-8

I-5700

Wake County

The speed limits are the sole authority of the NCDOT. All speed limits are to be ordinances by the State Traffic Engineer in order to have a lawfully enforceable speed limit.

The Regional Traffic Engineering Office and the Division Construction Engineer in coordination with the Work Zone Traffic Control Section will provide all Work Zone Speed Limit recommendations based on activities and conditions.

The Contractor will be responsible for coordinating with the Engineer when the Work Zone Speed Limits are to be changed and will have to seek approval by the Engineer or his designee before the Speed Limit is changed.

Whenever possible, each trailer mounted unit shall be placed on the paved shoulder and shall have the capability of being leveled.

Measurement and Payment

The measurement for the Work Zone Digital Speed Limit Signs is made according to the number of Work Zone Digital Speed Limit signs required per the spacing requirements according to the attached drawing. Payment will be made for the maximum number of Work Zone Digital Speed Limit signs satisfactorily installed and properly functioning at any one time during the life of the project.

This includes all materials and labor to install, maintain and remove all the Work Zone Digital Speed Limit Units.

Pay Item

Work Zone Digital Speed Limit Signs

Pay Unit

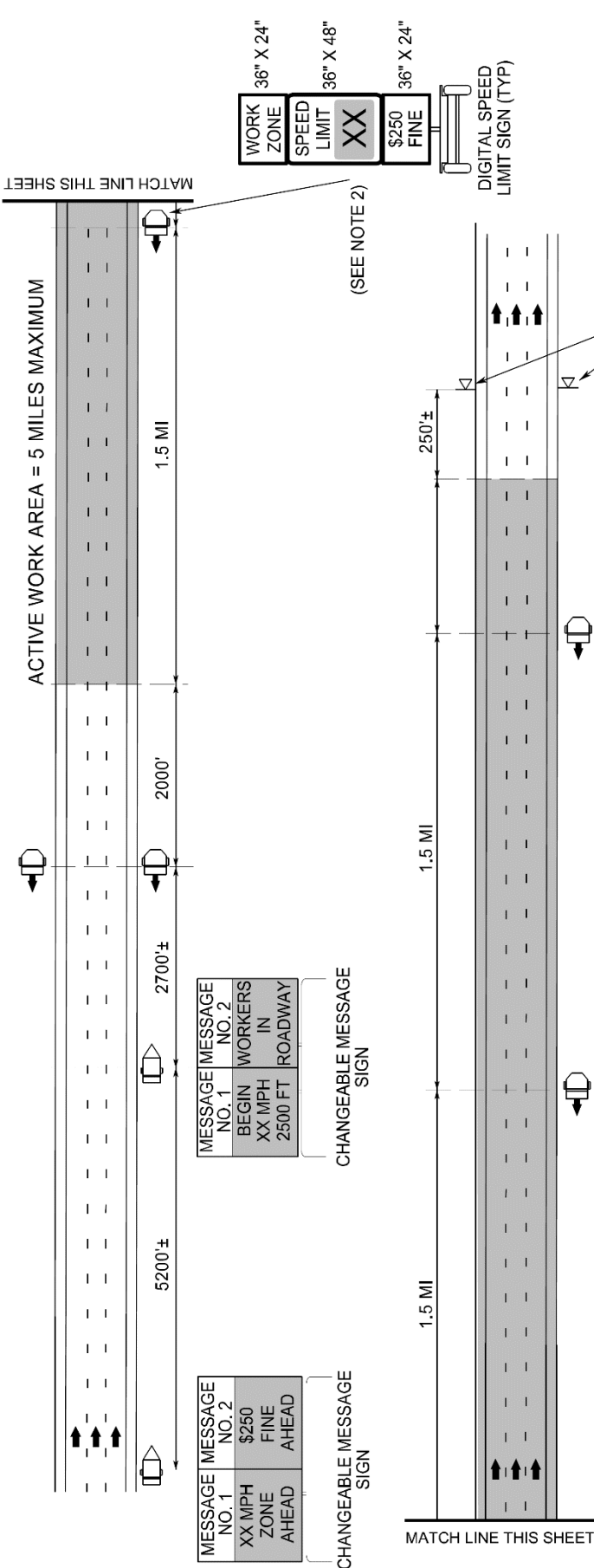
Each

TC-9

I-5700

Wake County

WORK ZONE VARIABLE SPEED LIMIT USING DIGITAL SPEED LIMIT SIGNS



NOTES

1. THE SPEED LIMITS DISPLAYED WITHIN THE ACTIVE WORK AREA MAY VARY BETWEEN 55 MPH AND 70 MPH, DEPENDENT UPON ROAD WORK CONDITIONS AND THE EXISTING SPEED LIMIT. 55 MPH IS ONLY DISPLAYED DURING ACTIVE LANE CLOSURE OPERATIONS.
2. AT THE FIRST DIGITAL SPEED LIMIT LOCATION, PLACE A DIGITAL SPEED LIMIT SIGN ON BOTH THE INSIDE AND OUTSIDE SHOULDERS, UNLESS DIRECTED OTHERWISE BY THE ENGINEER WHEN THERE IS NOT ENOUGH ROOM ON THE INSIDE SHOULDER DUE TO NARROW MEDIAN AND PERMANENT MEDIAN BARRIER. AT SUBSEQUENT LOCATIONS DOWNSTREAM, PLACE A SINGLE DIGITAL SPEED LIMIT SIGN ON THE OUTSIDE SHOULDER.
3. THE ENGINEER MAY DETERMINE TO INSTALL THE DIGITAL SPEED LIMIT SIGNS ON THE OUTSIDE SHOULDER OR ON THE MEDIAN SIDE IF THE SIGNS ARE NOT HIGHLY VISIBLE TO ALL MOTORISTS. THIS APPLICATION IS FOR SHORT-TERM ACTIVITIES. THE MAXIMUM ACTIVE WORK AREA IS 5 MILES.
4. THE DIGITAL SPEED LIMIT SIGNS TAKE PRECEDENCE OVER EXISTING SPEED LIMIT SIGNS. ALL EXISTING SPEED LIMIT SIGNS SHALL BE COVERED OR REMOVED.
5. THE DIGITAL SPEED LIMITS SIGNS WILL BE INSTALLED (TRAILER MOUNTED OR STATIONARY MOUNTED) IN ADVANCE AND SPACED APPROXIMATELY 1.5 MILES THROUGHOUT THE ACTIVE WORK AREA, UNLESS DIRECTED OTHERWISE.
6. NCDOT HAS SOLE AUTHORITY OF THE SPEED LIMITS DISPLAYED ON THE DIGITAL SPEED LIMIT SIGNS.
7. THE WORK ZONE VARIABLE SPEED LIMIT AND THE \$250 SPEEDING PENALTY ARE SEPARATE ORDINANCES THAT MUST BE SIGNED BY THE STATE TRAFFIC ENGINEER TO BE VALID AND ENFORCEABLE. WITHOUT A SIGNED ORDINANCE, THE SPEED LIMIT ON A FACILITY SHALL REMAIN UNCHANGED.

WHEN THERE IS NOT ACTIVE WORK IN THE TRAVEL LANE

SPEED LIMIT DISPLAY	CONDITIONS
	DROP-OFFS BETWEEN OPEN TRAVEL LANES
	PAVED SHOULDER DROP-OFFS
USE EXISTING SPEED LIMIT	< 1.0"
REDUCE SPEED LIMIT 5 MPH	1.0" - 2.0"
	≤ 3.0"
	> 3.0"

DROP-OFFS BETWEEN OPEN TRAVEL LANES SHOULD NOT EXCEED 2.0"

TC-10

I-5700

Wake County

WORK ZONE PERFORMANCE PAVEMENT MARKINGS:

(10/08/2016)

(Rev. 10/9/18)

Description

Furnish and install Work Zone Performance pavement markings that delineate the travel way for work zone traffic patterns on interstates and freeways along with the ramps and loops. They may also be used on roadways with significant alterations of traffic patterns. The purpose of Work Zone Performance pavement marking is to provide a more durable work zone pavement marking that lasts the full duration of a traffic pattern without requiring replacement or reapplication for a period of up to 12 months. Work Zone Performance pavement markings shall also provide a higher performance level in terms of retroreflectivity throughout the required 12 month duration than standard traffic paints to improve nighttime work zone visibility.

Materials**A) General**

Use materials in accordance with the Manufacturer's recommendations that will retain both durability and a minimum retroreflectivity as described elsewhere in this RFP for a period of at least 12 months.

The Work Zone Performance pavement markings shall be manufactured to bond successfully to both concrete and asphalt pavements. The following are approved materials to be used for Work Zone Performance pavement markings:

- Polyurea
- Thermoplastic (Extruded and Sprayed)
- Epoxy
- Polymer (Single System)
- Cold Applied Plastic (Type IV)

B) Material Qualifications/Certifications

Use Work Zone Performance pavement marking materials, as listed above, which are on the NCDOT Approved Products List at the time of installation.

In accordance with Article 106-3, and Section 1087-4 of the 2018 NCDOT Standard Specifications for Roads and Structures, provide a Type 3 Material Certification for all materials and a Type 3 and Type 4 certification for all reflective media.

(C) Performance

TC-11

I-5700

Wake County

Poor performance of a Work Zone Performance pavement marking material at any site, whether or not related to a specific contract, may be grounds for removing the material from any project under contract and the NCDOT Approved Products List.

Construction Methods

Do not use hand applied methods or any other non-truck mounted application equipment /device to install Work Zone Performance pavement markings for applications longer than 1000 feet.

All Work Zone Performance pavement markings are to be installed in a single application. Multiple passes are not allowed.
“No track” dry times shall be 10 minutes or less. Traffic shall not be placed on any material until it’s sufficiently dry/cured to eliminate wheel tracking.

A) Testing Procedures

All Work Zone Performance pavement marking installations will be tested by the Department through an independent Mobile Retroreflective Contractor. The Work Zone Performance pavement markings will be scanned to ensure the retroreflectivity requirements in Section C below are met.

B) Application Equipment

Application equipment shall be in accordance with Section 1205 of the 2018 NCDOT Standard Specifications for Roads and Structures.

C) Material Application

The Work Zone Performance pavement marking material shall be applied at the following minimum thicknesses:

Polyurea =	20 mils wet
Epoxy =	20 mils wet
Thermoplastic =	50 mils (Extruded or Sprayed)
Polymer =	20 mils wet
Cold Applied Plastic (IV) =	Manufacturer’s recommendation

The Work Zone Performance pavement marking line widths for interstates and freeways shall be as follows:

Edge lines, Solid Lane Lines, Skip and Mini-Skip Lines =	6”
Gorelines =	12”

TC-12

I-5700

Wake County

D) Retroreflectivity Requirements

Retroreflectivity Requirements for Work Zone Performance Pavement Markings

Color	Initial	6 Months	12 Months
White	375 mcd/lux/m ²	275 mcd/lux/m ²	150 mcd/lux/m ²
Yellow	250 mcd/lux/m ²	150 mcd/lux/m ²	100 mcd/lux/m ²

The minimum level of retroreflectivity for any Work Zone Performance pavement marking system selected shall meet the initial requirements in the chart above. In addition, the Work Zone Performance pavement markings shall maintain the corresponding retroreflectivity requirements for a period of up to 12 months.

The Contractor shall notify the Engineer a minimum of 7-10 days prior to the installation of Work Zone Performance pavement markings.

The Department will measure initial retroreflectivity within 30 days after placement to ensure compliance with the initial retroreflectivity levels in the chart above.

If the markings appear to be non-performing, the Engineer may request additional retroreflectivity readings. If measured and found to be noncompliant, the Contractor shall replace the Work Zone Performance pavement markings at no cost to the Department. Non-compliant retroreflectivity occurs when the average readings for the project are more than 15% below the requirements in the chart. Pay deductions are appropriate for deficiencies up to the 15% level.

If the Work Zone Performance pavement markings need to remain in place longer than 12 months, the markings are to be scanned by the Mobile Retroreflective Contractor to determine if they are meeting the minimum retroreflectivity levels. If they remain at or above these levels, the Work Zone Performance pavement markings may remain in place. If not, they shall be replaced by the Contractor within 15 days of the 12 month duration and compensation will be made at the contract unit price.

If and when this becomes necessary, the same notification procedure as described above shall be used to have the Work Zone Performance pavement markings scanned for the required retroreflectivity.

E) Snowplow Damage

All Work Zone Performance pavement markings shall be durable enough to withstand a single snow event requiring snow plowing without showing excessive fatigue in either bonding or retroreflectivity.

TC-13

I-5700

Wake County

The Contractor shall replace the Work Zone Performance pavement markings if a single snowplow occurrence results in more than 25% of the pavement marking edgelines or skips being physically removed and/or the Work Zone Performance pavement markings do not meet the following minimum retroreflectivity values:

Retroreflective Requirements for Work Zone Performance Pavement Markings after a Single Snowplow Occurrence

Color	MINIMUM
White	150 mcd/lux/m2
Yellow	100 mcd/lux/m2

Unless the temporary traffic pattern is to be modified within 30 days, the Contractor shall replace all non-compliant Work Zone Performance pavement markings within 30 days of determining they are non-compliant.

If the work zone experiences more than one snow event requiring snow plowing, the retroreflectivity values in the chart above will no longer apply. The Engineer will determine if the pavement markings are performing adequately and/or if replacement is necessary due to excessive damage caused solely by snowplow activities.

If the Work Zone Performance pavement markings are found to be deficient, they shall be replaced. In such case, compensation will be made at the contract unit price. Unless the temporary traffic pattern is to be modified within 30 days, the Contractor shall replace all Work Zone Performance pavement markings damaged due to multiple snowplow events within 30 days.

F) Surface Preparation

Prior to installation, all pavement surfaces to receive Work Zone Performance pavement markings shall be swept clean and prepared in accordance with the Manufacturer's recommendation.

G) Temperature and Weather Limitations

Work Zone Performance pavement markings shall only be applied unless the ambient air temperature and the pavement temperature is 50°F or higher for thermoplastic and is 40°F or higher for all other materials. Do not install unless the pavement surface is completely dry and not within 4 hours of a heavy rain event such as a thunderstorm with rainfall intensities greater than 1 inch/per hour.

TC-14

I-5700

Wake County

In the event a traffic shift has to take place when the air and pavement temperatures are below the required minimums or if a rain event occurs prior to or during a planned traffic shift, upon approval by the Engineer, an acceptable alternative is to install temporary pavement markings. Use 1 application of standard traffic paint to produce a 4” line at 15 mils (wet). Beads shall also be applied to provide proper retroreflectivity until the performance material can be installed. NCDOT will provide compensation for the 4”,15 mil temporary paint. The Work Zone Performance pavement markings shall be applied within 90 days of installation of the temporary pavement markings.

Maintenance

Replace any Work Zone Performance pavement material that prematurely fails due to debonding or excessive wearing where it doesn’t maintain its retroreflectivity for the required 12 month duration. Any traffic control and Work Zone Performance pavement marking costs due to replacement is at no cost to the Department unless it’s due to excessive damage caused by snowplow damage.

Measurement and Payment

Work Zone Performance pavement marking lines will be measured and paid by the linear foot that’s satisfactorily placed and accepted by the Engineer. The quantity of Work Zone Performance pavement marking-solid lines, will be the summation of the linear feet of solid line measured end-to-end of the line. The quantity of skip or broken lines will be the summation of the linear feet derived by multiplying the nominal length of a line by the number of broken lines satisfactorily placed.

Work Zone Performance Pavement Marking *Symbols* will be measured as the actual number of pavement marking symbols satisfactorily placed and accepted by the Engineer. Payment for Work Zone Performance Pavement Marking *Symbols* will be made at the same contract unit price used for the Pavement Marking Symbol pay items used on the final wearing surface.

Work Zone Performance Pavement Marking *Characters* will be measured as the actual number of pavement marking characters satisfactorily placed and accepted by the Engineer. A character is considered to be one letter or one number of a word message. Payment for Work Zone Performance Pavement Marking *Characters* will be made at the same contract unit price used for the Pavement Marking Character pay item used on the final wearing surface.

Payment will be made under:

Pay Item	Pay Unit
Work Zone Performance Pavement Marking Lines, 6”	Linear Foot
Work Zone Performance Pavement Marking Lines, 12”	Linear Foot

TC-15

I-5700

Wake County

PEDESTRIAN TRANSPORT SERVICE:

(09/07/2018)

Description

The Contractor shall provide a Pedestrian Transport Service through and/or around the project when a traversable, firm, stable, and slip-resistant path for pedestrians cannot be maintained through the work area. At minimum, the Pedestrian Transport Service shall be on-call between the hours of 7:00 a.m. and 8:00 p.m. Monday thru Sunday, and operate at no-cost to the users.

Construction Methods

The Contractor shall enlist the services of a registered, licensed, and insured transportation service (which may include ride-sharing or taxi services) during the times listed above.

The Pedestrian Transport Service shall operate on an on-call basis with wait times not exceeding 15 minutes. Pedestrians shall be able to request a ride by calling or text messaging a conspicuously posted number using standard cellular phone. The posted number shall either automatically dispatch a transport vehicle to the pedestrian's location, or shall connect to a responsible individual who can manually dispatch a transport vehicle to the pedestrian's location.

Solely requiring pedestrians to use a third-party cellular phone application (smart phone app) to dispatch the transport vehicle shall be considered non-compliant with this section, but offering a smart phone app to directly dispatch the service is encouraged as a supplement to the posted number.

Pedestrians shall not be required to present any form of payment for the service, and shall not be required to provide any form of identification other than their name.

The Contractor shall install notification signage and Audible Warning Devices at pedestrian path closure points to notify pedestrians of the Pedestrian Transport Service, instruct them how to dispatch the service (by either texting or calling the posted number), and where to wait. Both the Audible Warning Devices and notification signage shall convey the same message and be approved by the Engineer.

The Pedestrian Transport Service shall operate at a prudent speed and have designated, safe, accessible, and traversable areas for pedestrians to wait for the pedestrian transport vehicle. There shall be a location for the Pedestrian Transport Service to safely pull the transport vehicle off the roadway traffic lane or into a closed traffic lane to load or unload passengers. Pedestrians

TC-16

I-5700

Wake County

with ADA needs shall not be unloaded in a location where the surface or facility is not accessible or traversable.

If flaggers are present on the job, the flaggers shall direct pedestrians to use the Pedestrian Transport Service to pass through or around the work zone.

Measurement and Payment

Pedestrian Transport Service (per trip) will be measured and paid as the actual number of completed trips provided to pedestrians. Multiple pedestrians transported using a single trip will be paid as a single trip. No direct payment will be made for the responsible individual dispatching the vehicle the smart phone app, pedestrian loading and unloading areas, or notification signage as these items will be considered incidental to the Pedestrian Transport Service.

Audible Warning Devices will be measured and paid under the ADA Compliant Pedestrian Traffic Control Devices special provision.

Payment will be made under:

Pay Item	Pay Unit
Pedestrian Transport Service (per trip)	Each

**PROJECT SPECIAL PROVISIONS
LIGHTING**

1.0 DESCRIPTION

The work covered by this Section consists of furnishing, installing, connecting, and placing into satisfactory operating condition roadway lighting at locations shown on the plans. Perform all work in accordance with these Special Provisions, the Plans, the National Electrical Code, and North Carolina Department of Transportation "Standard Specifications for Roads and Structures" (*2018 Standard Specifications*).

Perform all work in conformance with Division 14 of the *2018 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 *2018 Standard Specifications* applicable to the work on this project are listed below.

Section 1401	High Mount Standard and Portable Drive Unit
Section 1404	Light Standards
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

1.10 FAA REQUIREMENTS

Under the conditional requirements of the FAA, before any light standard luminaires are energize, the contractor shall contact the FAA RALEIGH SSC at telephone number: 919-380-3145 to arrange procedures to verify that the LightGrid Nodes communication emissions do not cause any interference with the FAA facilities (LEI LOC) critical to aviation safety.

2.00 LIGHT STANDARD LIGHT EMITTING DIODE (LED) LUMINAIRES**2.10 DESCRIPTION**

Furnish, install and place into satisfactory operation luminaire, either on a bracket arm or directly mounted to the standard, complete with all light sources, drivers, wiring inside standard from circuit conductors to luminaire, in-line breakaway fuseholders and fuses and ground wiring at the pole on light standards less than 55 ft. in height.

Type	HPS Replacement Equivalent	Color Temp	Min. % of initial output at 70k hours	Min. Maintained Delivered Lumens
185W LED	250W	3500K \pm 500K	83%	15,500
285W LED	400W	3500K \pm 500K	83%	19,150

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

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

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

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

2.20 MATERIALS

2.21 LUMINAIRE REQUIREMENTS

A. General Requirements

- LM-79 photometric test reports shall be provided for all LED luminaires. LM-79 luminaire photometric reports shall be produced by an independent test laboratory and include the following:
 - Name of test laboratory. The test laboratory must hold National Voluntary Laboratory Accreditation Program (NVLAP) accreditation for the IES LM-79 test procedure or must be qualified, verified, and recognized through the U.S. Department of Energy's CALiPER program.
 - Report number
 - Date
 - Complete luminaire catalog number. Catalog number tested must match the catalog number of the luminaire submitted, except for variations which do not affect performance.
 - Description of luminaire, LED light source(s), and LED driver(s)
 - Goniophotometry
 - Colorimetry
- LM-80 lumen maintenance test report shall be provided for each respective LED light source.
- Luminaire shall be constructed of a single piece die cast aluminum housing. Each luminaire shall be finished gray in color unless otherwise noted.
- The luminaire shall have a 7 pin ANSI C136.41 compliant photocontrol receptacle for future expansion capabilities.
- Provide a summary of reliability testing performed for LED driver.

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

B. Driver

- Shall be 0V-10V dimmable.
- Rated case temperature shall be suitable for operation in the luminaire operating in the ambient temperature range of -20°C to +40°C.
- Shall be rated for 480VAC at 50/60 Hz. and shall operate normally for input voltage fluctuations of $\pm 10\%$.

- Shall have a minimum Power Factor (PF) of 0.90 at full input power and across specified voltage range.
 - Shall provide UL Class II output.
- C. Surge Suppression
- Integral surge protection shall meet ANSI/IEEE C62.45 procedures based on ANSI/IEEE C62.41.2 definitions for standard and optional waveforms for location category C-High 10kV/10kA test, IEC 61000-4-2 (Electrostatic Discharge) 8kV Air/4kV Contact test and IEC 61000-4-4 (Fast Transients).
- D. Electromagnetic interference
- Luminaires shall have a maximum Total Harmonic Distortion (THD) of 20% at full input power and across specified voltage range.
 - Luminaires shall comply with FCC 47 CFR part 15 non-consumer RFI/EMI standards.
- E. Electrical safety testing
- Luminaires shall be listed for wet locations.
 - Luminaires shall be UL listed and labeled.
- F. Finish
- Luminaires shall be painted with a corrosion resistant polyester powdered paint with a minimum 2.0 mil thickness.
 - Luminaires shall exceed a rating of six per ASTM D1654 after 1000 hours of salt spray fog testing per ASTM B117.
 - The coating shall exhibit no greater than 30% reduction of gloss per ASTM D523, after 500 hours of QUV testing at ASTM G154 Cycle 6.
 - Exterior surfaces shall be smooth and free of burrs.
- G. Thermal management
- Mechanical design of protruding external surfaces (heat sink fins) on roadway luminaires shall facilitate hose-down cleaning and discourage debris accumulation.
 - Liquids or moving parts will not be allowed for thermal management.
- H. Color Quality
- Minimum Color Rendering Index (CRI) of 70 with a Correlated Color Temperature (CCT) of 3000K to 4000K
- I. Optics
- Transmissive optical components shall be applied in accordance with OEM design guidelines to ensure suitability for the thermal/mechanical/chemical environment.
- J. The following shall be in accordance with corresponding sections of ANSI C136.37

- All internal components shall be assembled and pre-wired using modular electrical connections.
- Terminal blocks shall be used for incoming AC lines. Terminal blocks shall be easily accessible to installers or repair personnel. Wire nuts are prohibited inside the luminaire housing.

K. Latching and hinging

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

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

2.30 WARRANTY

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

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

2.40 CONSTRUCTION METHODS

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

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

2.50 MEASUREMENT AND PAYMENT

The roadway luminaries measured as provided above will be paid for at the contract unit price per each "Roadway Light Standard Luminaires – LED". Such price and payment will be considered full compensation for providing and installing the LED roadway luminaire on the bracket arm, wiring inside the standard from the circuit conductors to the LED roadway luminaire, in-line breakaway fuseholders with fuses and ground wiring at the pole on the light standard.

Payment will be made under:

Roadway Light Standard Luminaire – ____LED..... Each

3.00 HIGH MAST LIGHT EMITTING DIODE (LED) LUMINAIRES

3.10 DESCRIPTION

Furnish, install and place into satisfactory operation, LED luminaires on high mount standards as detailed in these Special Provisions.

The Contractor shall supply Holophane or Cooper LED high mount luminaires as specified below or approved equal.

Mounting Height	# of Fixtures	Holophane Part Number	Cooper Part Number
120'	8	HMLED3-PK3-40K-HVOLT-G-AW-P7	GAN-AF-10-LED-8-5WQ-AP-MA-4N7
100'	6	HMLED3-PK3-40K-HVOLT-G-AW-P7	GAN-AF-10-LED-8-5WQ-AP-MA-4N7
80'	8	HMLED3-PK1-40K-HVOLT-G-AW-P7	GAN-AF-06-LED-8-5WQ-AP-MA-4N7
60'	4	HMLED3-PK1-40K-HVOLT-G-AW-P7	GAN-AF-06-LED-8-5WQ-AP-MA-4N7

Any alternate luminaire submitted for approval must meet the minimum requirements in the table and sections below.

Mounting Height	Max. LED Fixture Wattage	Number & HPS Replacement Equivalent	Color Temp	Min. % of initial output at 70k hours	Min. Maintained Delivered Lumens (per fixture)
120'	560W	8 x 750W	3500K ±500K	87%	54,000
100'	560W	6 x 750W	3500K ±500K	87%	54,000
80'	335W	8 x 400W	3500K ±500K	87%	27,000
60'	335W	4 x 400W	3500K ±500K	87%	27,000

The Contractor shall supply the Department with current catalog cuts and 3rd party certified photometric data files in Illuminating Engineering Society (IES) format for any alternate high mount luminaire submitted for approval. The Department will thoroughly evaluate alternate luminaires to determine if proposed alternate high mount luminaire meets or exceeds design criteria.

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

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

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

High mount luminaire retrofit LED kits are not an acceptable alternative.

3.20 MATERIALS

3.21 LUMINAIRE REQUIREMENTS

A. General Requirements

- LM-79 photometric test reports shall be provided for all LED luminaires. LM-79 luminaire photometric reports shall be produced by an independent test laboratory and include the following:
 - Name of test laboratory. The test laboratory must hold National Voluntary Laboratory Accreditation Program (NVLAP) accreditation for the IES LM-79 test procedure or must be qualified, verified, and recognized through the U.S. Department of Energy's CALiPER program.
 - Report number
 - Date
 - Complete luminaire catalog number. Catalog number tested must match the catalog number of the luminaire submitted, except for variations which do not affect performance.
 - Description of luminaire, LED light source(s), and LED driver(s)
 - Goniophotometry
 - Colorimetry
- LM-80 lumen maintenance test report shall be provided for each respective LED light source.
- Luminaire shall be constructed of aluminum. Each luminaire shall be finished gray in color unless otherwise noted.
- The luminaire shall have a 7 pin ANSI C136.41 compliant photocontrol receptacle for future expansion capabilities.
- Provide a summary of reliability testing performed for LED driver.
- Luminaires maximum total power consumption shall not exceed the values shown in the table above. Nominal luminaire input wattage shall account for nominal applied voltage and any reduction in driver efficiency due to sub-optimal driver loading.
- Luminaire shall have a maximum Backlight, Uplight & Glare (BUG) rating of 5-0-5 and an IESNA distribution of Type V as required to meet the spacing, the average maintained footcandle level and the average to minimum uniformity ratio

requirements shown on the plans. The same BUG rating and distribution type shall be used throughout the project.

- Luminaire LED modules shall meet dust and moisture rating of IP-66, minimum.
- Luminaire shall have an external label per ANSI C136.15.
- Luminaires shall have an internal label per ANSI C136.22.
- Luminaires shall start and operate in -20°C to +40°C ambient.
- Electrically test fully assembled luminaires before shipment from factory.
- Effective Projected Area (EPA) and weight of the luminaires shall not exceed 1.3 square feet and 65 lbs.
- Luminaires shall be designed for ease of electrical component replacement.
- Luminaires shall be rated for minimum 2G vibration, minimum, per ANSI C136.31-2010
- LED light sources and drivers shall be RoHS compliant.
- The luminaire manufacturer shall have no less than five (5) years of experience in manufacturing LED-based lighting products and the manufacturing facility must be ISO 9001 certified.
- Pole hardware, nuts, bolts, and washers, etc. shall be made from 18-8 stainless steel, or steel conforming to ASTM A307 galvanized in accordance with ASTM A153.

B. Driver

- Shall be 0V-10V dimmable.
- Rated case temperature shall be suitable for operation in the luminaire operating in the ambient temperature range of -20°C to +40°C.
- Shall be rated for 480VAC at 50/60 Hz and shall operate normally for input voltage fluctuations of $\pm 10\%$.
- Shall have a minimum Power Factor (PF) of 0.90 at full input power and across specified voltage range.

C. Surge Suppression

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

D. Electromagnetic interference

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

E. Electrical safety testing

- Luminaires shall be listed for wet locations.
- Luminaires shall be UL listed and labeled.

F. Finish

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

G. Thermal management

- Mechanical design of protruding external surfaces (heat sink fins) shall facilitate hose-down cleaning and discourage debris accumulation.

H. Color Quality

- Minimum Color Rendering Index (CRI) of 70 with a Correlated Color Temperature (CCT) of 3000K to 4000K

I. Optics

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

J. The following shall be in accordance with corresponding sections of ANSI C136.37

- All internal components shall be assembled and pre-wired using modular electrical connections.
- Terminal blocks shall be used for incoming AC lines
- Latching and hinging

K. Manufacturer or local sales representative shall provide installation and troubleshooting support via telephone and/or email.**3.30 WARRANTY**

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

Warranty period shall begin after project acceptance by the Department.

3.40 CONSTRUCTION METHODS

Level and secure each luminaire in all directions. Securely terminate the wiring for each high mount luminaire and include an equipment grounding conductor to bond the housing to the supply cord grounding conductor.

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.

3.50 MEASUREMENT AND PAYMENT

The high mount luminaires measured as provided above will be paid for at the contract unit price per each “(height) High Mount Luminaires – LED”. Such price and payment will be considered full compensation for providing and installing the LED high mount luminaire on the carrier ring tenon arm and connecting the LED high mount luminaire to the supply cord on the carrier ring.

Payment will be made under:

(height) High Mount Luminaire – LED Each

4.00 LIGHTING CONTROL SYSTEM

4.10 DESCRIPTION

The work covered under this section consists of furnishing and installing an entire control system, including enclosure, control panel, breakers, terminal blocks, wiring, conduits, lightning arrester, a concrete foundation, metal pole and galvanized slotted channel is also included.

The control system will be standard electrical components in a stainless steel enclosure mounted on a metal pole with a concrete foundation as shown in the contract.

4.20 MATERIALS

Refer to Division 10 of the *2018 Standard Specifications*.

Item	Section
Conduit	1091-3
Portland Cement Concrete, Class A	1000-4
Wire and Cable	1091-2, 1400-2

Provide concrete foundations and wire in accordance with the *2018 Standard Specifications*.

Use a piece of 4” rigid galvanized steel conduit (RGC), embedded in concrete as shown in the plans, for mounting the control system.

Provide a NEMA type 3R stainless steel enclosure with external stainless mounting flanges, drip shield, back panel and continuous hinge door with a print pocket. Provide a door closing mechanism interlocked with a flange mounted operator handle to prevent the opening of the door with the service circuit breaker in the ON position, except by use of safety override devices.

Provide an enclosure approximately 36" (h) x 30" (w) x 10" (d) unless noted otherwise in the plans. Provide only openings necessary for the entrance of conduits as shown in the plans. Do not use knockouts. Ensure the enclosure conforms with NEC Article 312 and mount the devices so the NEC clearances will be provided, except use 1.5" where not specified or noted in the tables for minimum wire bending space.

Use minimum 1-5/8" x 1-5/8" galvanized slotted steel framing channel with straps and bolts for the mounting brackets and hardware for attaching the enclosure. Use galvanized finish on the brackets and hardware and coat all field cuts or scratches with organic zinc repair paint.

Provide a neutral bar, bonded to the panel, with sufficient box lug type terminals to accept the required number of wires.

Mount components to the back panel with manufacturer supplied mounting brackets or permanently attached screw studs.

Use a service circuit breaker providing a minimum interrupting rating of 22,000 A. Provide thermal magnetic, molded case, permanent trip breakers. Provide multi-tap, solderless, load side box lugs or distribution terminal blocks of the appropriate size. Use insulating material approved for NEMA 3R applications. Provide a breaker with a voltage and amperage rating as indicated in the plans.

Use feeder circuit breakers which are rated 14,000 A minimum interrupting capacity and have an open type molded case with a non-adjustable thermal magnetic trip setting as noted in the plans.

Where Communication Gateways are required, provide a single pole, open type gateway circuit breaker rated at 240 VAC phase to ground with a minimum interrupting current capacity of 5,000 A and a high magnetic trip setting of 15 A.

Use a Type 1 surge protection device (SPD) meeting UL 1449 and UL 96A, designed to contain and arrest an arc of 20,000 A. Install the SPD on the load side of the service breaker.

Use terminals and lugs rated for the connection of the appropriate size copper conductors. All conductors shall be made of copper and neatly wrapped in bundles or run in plastic raceways.

Perform all galvanizing in accordance with Section 1076.

Provide a drawing to scale showing the location, brand and catalog number of each component of the control system for approval. The completed light control system shall be marked "Suitable for Use as Service Equipment", in a prominent location in the enclosure, in accordance with NEC Article 409.110. If the control system is not made in a certified UL 508A Panel Shop, a third party, recognized by the Department of Insurance as having the authority, shall label the control systems.

4.30 CONSTRUCTION METHODS

Construct the new control system foundation at the new location as shown in Standard Drawing 1408 of the Roadway Standard Drawings, with the top of the foundation 3 inches above finished grade.

Fasten the enclosure to the pole by means of a galvanized bracket assembly as shown in the plans. Make all cuts square and remove all rough edges. Have mounting holes match existing mounting holes of the enclosure.

Arrange all conduits entering the enclosure in a neat symmetrical manner and extend directly downward into the foundation. Install six RGC feeder circuit conduits as shown in the Roadway Standard Drawings.

Install a Control System Junction Box as shown in the plans. Stub all feeder circuit conduits and spare conduits from Control System in the Control System Junction Box. See Section 1412 of the *2018 Standard Specifications* for junction box construction methods. See plans for conduit sizes. Place pull cord in any unused conduits and cap unused conduit in junction box.

To prevent the creation of electrically parallel paths, install a bonded conduit choke on the underground termination point of the system grounding conductor conduit in accordance with NEC Article 250.64(E). Do not terminate the system grounding conduit under the concrete foundation pad.

Install a grounding electrode system consisting of a minimum of two ground rods spaced not less than 6 feet apart at all new lighting control system panels. Connect ground rods with an appropriately sized bonding jumper.

Apply two coats of organic zinc repair paint to all field cut metal and conduit threads as specified in Article 1076-7 of the *2018 Standard Specifications*.

Install a 4" to 2" galvanized reducing bushing to the top of the 4" RGC the control system enclosure is mounted to. Install a 10' section of 2" RGC on the reducing bushing and install a cap on the top of the 2" RGC.

4.40 MEASUREMENT AND PAYMENT

Lighting Control System will be measured and paid for as the actual number of the lighting control systems that have been provided, installed and accepted. Such price and payment shall be considered full compensation for the foundation, conduits, enclosure with components and mounting hardware.

Payment will be made under:

Lighting Control System..... Each

5.00 COMMUNICATION GATEWAY

5.10 DESCRIPTION

The Contractor shall provide and install a communication gateway at the lighting control panels noted on the plans. The communication gateway will be used to provide communication from the control nodes on the luminaires to a centralized monitoring software package. The communication gateway will be mounted on a piece of rigid galvanized conduit installed above the lighting control panel.

5.20 MATERIAL

The communication gateway shall be a GE LightGrid gateway rated for the voltage shown in the plans.

Use conduit and conductors as specified in Article 1400-2 of the *2018 Standard Specifications*.

Provide stainless steel straps, galvanized conduit hangers, galvanized bolts, washers and nuts, and liquid-tight flexible metallic conduit (LFMC).

5.30 CONSTRUCTION METHODS

Mount the communication gateway to the 2" RGC pole, installed as part of the control system special provision, using the bands included with the gateway. Remove an existing cable gland in the bottom of the gateway enclosure and replace with a ½" RGC fitting. Install ½" RGC and appurtenances required to route conduit to bottom of lighting control panel enclosure. Transition RGC to LFMC to make the turn into the bottom of the enclosure. Secure LFMC to bottom of enclosure using a weatherproof fitting. Install a bonding bushing on the LFMC fitting inside the enclosure and attach to bonding jumper inside the enclosure.

Strap standoffs with rigid conduit hangers to the 2" RGC and secure ½" conduit to the conduit hanger. Install #12 THWN conductors inside the ½" RGC for power from the gateway circuit breaker in the control system enclosure to the gateway. Use a UV resistant cable tie to secure the magnetic GPS antenna to the frame.

See Section 7.00 below for commissioning requirements.

5.40 MEASUREMENT AND PAYMENT

Communication Gateway will be measured and paid as the actual number of communication gateways installed and accepted. Such price and payment includes mounting of the communication gateway on the 2" RGC pipe, installation of the RGC conduit from the gateway into the control system and installation of the conductors.

Payment will be made under:

Communication Gateway.....Each

6.00 CONTROL NODE**6.10 DESCRIPTION**

The Contractor shall provide and install a communication node with each LED luminaire on the project. The communication node will be used to interface with the Department's Statewide lighting control system.

6.20 MATERIALS

The communication node shall be a GE LightGrid version 2.0 (or higher) node rated for the same service voltage as the luminaire. No other materials are required for this section.

6.30 CONSTRUCTION METHODS

Install communication node on the seven-pin photocell receptacle of the luminaire. The communication node utilizes a twist-lock connection to ensure positive connection to the luminaire.

See Section 7.00 below for commissioning requirements.

6.40 MEASUREMENT AND PAYMENT

Control Node will be measured and paid for as the actual number of control nodes provided, installed and accepted.

Payment will be made under:

Control Node Each

7.00 SMART CONTROL SYSTEM INITIALIZATION AND COMMISSIONING**7.10 DESCRIPTION**

The Communication Gateway(s) and Control Nodes as described in the prior sections require commissioning to enable communication with the existing Statewide lighting control system.

The Contractor shall coordinate with Brady/Trane Services (Brady) at 919-232-5764 or warranty.request@bradyservices.com to have Brady commission the smart controls system, incorporate new gateways and smart nodes into the LightGrid infrastructure and troubleshoot communication issues. Brady shall bill the contractor directly for these services.

7.20 MATERIALS

No materials are required for this section.

7.30 CONSTRUCTION METHODS

As part of this contract, the Contractor shall provide new GE LightGrid gateways and control nodes. See Sections 5.00 and 6.00, respectfully, of these Project Special Provisions for gateway and control node requirements.

As a function of the LightGrid system, the Contractor is unable to turn the lights on for testing during the day. The luminaires installed as part of this project are powered 24/7; however, the control node installed on each luminaire has an integral photocontrol, preventing the luminaire from operating during daylight hours.

The Contractor shall notify Brady at least two weeks prior to beginning the construction work. Brady will remotely commission the new LightGrid system, override the internal control node photocontrol and turn all of the control nodes on for 24/7 operation for the duration of the lighting construction. This will allow the Contractor to turn the lighting circuits on and off during the day via the breakers in the lighting control panel.

The Contractor shall notify Brady again when lighting work is complete. At that point Brady will remotely confirm that there is communication between the control nodes and the gateway and will place the system to normal dusk to dawn operation.

In the event that a communication failure of some, or all, smart nodes or the gateway is encountered, the Contractor shall coordinate with Brady to troubleshoot and resolve the failure.

7.40 MEASUREMENT AND PAYMENT

The Contractor will be reimbursed by the Department for the actual verified cost of charges by Brady for LightGrid service charges. The service charges may include efforts by Brady to: commission the newly installed gateways and control nodes; place the GE LightGrid system into

24/7 operation; place the system in normal dusk to dawn operation; troubleshoot communication issues with the LightGrid system.

8.00 UNDERPASS LIGHTING

8.10 DESCRIPTION

Same as Article 1412-1 of the *2018 Standard Specifications*, except include a photocell receptacle.

8.20 MATERIALS

Same as Article 1412-2 except as amended below:

- Modify the last sentence of lines 1 and 2 of page 14-23 of the *2018 Standard Specifications* to read “Provide sealed, directional LED light engines covered by a glass refractor.”
- Add the following to the last paragraph of Article 1412-2 of the *2018 Standard Specifications*. “Provide a 7-pin photocontrol receptacle securely mounted to the enclosure.”

8.30 CONSTRUCTION METHODS

Same as Article 1412-3 of the *2018 Standard Specifications*, except add the following:

Install the photocontrol receptacle either directly to the top of the enclosure or use a standoff bracket. If a standoff bracket is used, the conductor from the photocontrol receptacle to the disconnect panel shall be enclosed and secured in liquidtight flexible metallic conduit.

Install a GE LightGrid smart node, as described in Section 5.00 of these Special Provisions, on the photocontrol receptacle and integrate with the existing Statewide lighting control system, as described in Section 7.00 above.

8.40 MEASUREMENT AND PAYMENT

Same as Article 1412-4 of the *2018 Standard Specifications*. The GE LightGrid smart node and integration shall be paid for in other Sections of these Special Provisions.

9.00 REMOVE RDU HIGH MOUNT STANDARD

9.10 DESCRIPTION

The work covered by this section consists of providing all equipment, labor and materials necessary to remove an existing high mount light standard. The standard is 100' mounting height and is attached to the foundation with anchor bolts.

The removed high mast light standard will become the property of the Contractor and shall be disposed of in a manner acceptable to the Engineer. Salvage value for the high mast standard shall be reflected as a reduction in the bid price.

9.20 MATERIALS

No materials are required for this work except such miscellaneous items as tape and terminal devices to dead-end circuits serving the light standards. This section also includes storage of materials to be reused.

9.30 CONSTRUCTION METHODS

It is the responsibility of the Contractor to ensure all work that covers the removal of the existing foundation does not damage any existing underground utilities.

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

Coordinate work with the RDU Airport Authority to assure that circuits can be de-energized where and when necessary. Work shall be conducted so that portions of the lighting system which are not in conflict with construction will be maintained in continuous nighttime operation.

Remove luminaires, the L-810 FAA Beacon, the L-810 FAA Beacon's weatherproof 480V-120V transformer and all other hardware associated with operation of the FAA Beacon from the carrier ring. . These luminaires, the L-810 FAA Beacon and transformer shall be reused and reinstalled on the new high mast pole. The Contractor is responsible for loss or damage that occurs after removal and shall provide replacement luminaires, L-810 FAA Beacon and transformer at no cost to the Department in the event of loss or damage.

Remove high mast light standard and dispose of or recycle in a manner acceptable to the Engineer. The Contractor shall furnish cranes, labor, blocking materials and transportation required to safely lower, dismantle and dispose of the existing high mast standard. The Contractor shall provide proper protection so that rain, wind, snow, etc. will not damage the luminaire, the L-810 FAA Beacon, transformer and associated hardware. The Contractor shall furnish cranes, labor, and blocking materials to unload and properly store all material to be reused.

Remove or abandon existing concrete high mount light standard foundations. The Contractor is responsible for any damage to the existing underground utilities during foundation removal or abandonment. Dispose of the removed concrete, reinforcing steel, and anchor bolts in manner acceptable to the Engineer. Backfill the holes with suitable material and compact the material as required.

9.40 MEASUREMENT AND PAYMENT

The quantity of removed high mount light standards to be paid for will be the actual number which have been dismantled from existing foundations and disposed of.

The removed high mount light standards measured as provided above will be paid for at the contract unit price per each "Remove RDU High Mount Standard". Such price and payment will be considered full compensation for disassembly, transportation and disposal of the standard, removal and storage of luminaires, L-810 FAA Beacon and 480V-120V dry type transformer and removal or abandonment of the existing foundation and any incidentals required to dead end circuitry from the existing RDU lighting system..

Payment will be made under:

Remove RDU High Mount Standard.....Each

10.00 REPLACE RDU HIGH MOUNT STANDARD**10.10 DESCRIPTION**

The work covered by this section consists of providing all equipment, labor and materials necessary to install a new 100' high mount light standard, maintained by RDU Airport Authority, on a new foundation at the location shown on the plans. Construction of a new foundation is not included in this section. Refer to Special Provisions SP09-R005 "*Foundations and Anchor Rod Assemblies for Metal Poles*" and SP14-R004 "*Roadway Lighting Foundations*" found in other Sections of this contract for high mount light standard foundation requirements.

10.20 MATERIALS

Same as Standard Specification 1401-2 except as modified below.

Reuse Luminaires, FAA Beacon and 480V-120V dry type transformer, from removed RDU High Mast, on the carrier ring assembly designed to hold 5 luminaires. See Section 9.00 of these Special Provisions.

10.30 CONSTRUCTION METHODS

Same as Standard Specification 1401-3 except as modified below.

It is the responsibility of the Contractor to ensure all work that covers the construction for the new foundation does not damage any existing underground utilities.

10.40 MEASUREMENT AND PAYMENT

Same as Standard Specification 1401-4 except replace the first paragraph of Standard Specification 1401-4 with the following:

New replacement high mount light standard measured as provided above will be paid for at the contract unit bid price per each "Replace RDU High Mount Standard". Such price and payment will be considered full compensation for installation on a new foundation, connection of new circuitry, installing and connecting luminaires, L-810 FAA Beacon and 480V-120V dry type transformer removed from existing high mast, to carrier ring and all incidentals necessary to complete the work. The High Mount Junction Box will be paid under Section 1411. The ground rod in the High Mount Junction Box is incidental to the High Mount Standard.

Payment will be made under:

Replace RDU High Mount Standard..... Each



DocuSigned by: 9/18/2019
Roger C. Kluckman
A47FB0E0B26E420...

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

UC-1

Project: I-5700

County: Wake

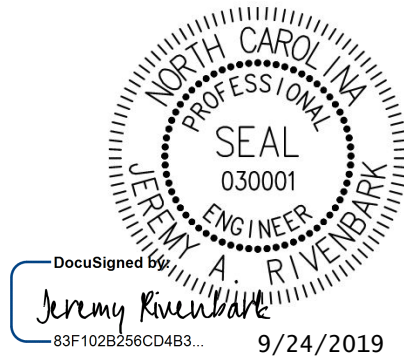
PROJECT SPECIAL PROVISIONS

Utility Construction



320 S. Academy Street
Cary, NC 27511
919-890-3876

License No. P-1611
www.cjsconveyance.com



I. GENERAL CONSTRUCTION REQUIREMENTS

1. Any interruptions in service should be coordinated with appropriate owner in advance of work. All utilities are Town of Cary owned with the exception of RDU Authority force main work shown on Sheet UC-7.
 - a. Town of Cary Water Utilities – 919-469-4090
 - b. RDU Authority – 919-840-7510
2. A representative from the respective utility owner shall witness all tests performed on their water and sewer facilities. Test results shall be provided to the Town / RDU Authority for any tests involving their facilities.
3. The proposed utility construction shall meet the applicable requirements of the NC Department of Transportation's "Standard Specifications for Roads and Structures" dated January 2018, and the following Special Provisions:

Special Provision 1 – Town of Cary Specifications

1. Work shall comply with the Town of Cary Standard Specifications, the Town of Cary Technical Specifications, and the Town of Cary Standard Details which are incorporated herein by reference.

UC-2**Project: I-5700****County: Wake****PROJECT SPECIAL PROVISIONS****Utility Construction****Special Provision 2 - Approved Materials**

1. Provide materials in accordance with the Town of Cary “Approved Products List” provided at the end of this Section.
2. Substitute and “Or-Equal” Items
 - a. Bids shall be based on products on the Town of Cary Approved Products List.

Special Provision 3 – Measurement and Payment

1. These measurement and payment items are for items not explicitly included in the NCDOT Standard Specifications for Roads and Structures dated January 2018.

SP-1 - Thrust Collar: Payment for “Thrust Collar” shall be paid at the contract unit price bid per each thrust collar installed as listed in the Itemized Proposal. The unit price shall include full compensation for all labor, equipment and materials to furnish and install a concrete thrust collar and all other incidental items required for assembly and installation as specified by the Contract Documents and *Town of Cary Standard Specifications*.

Pay Item:**Pay Unit**

Thrust Collar

Each

SP-2 - Reconnect 6-inch Water Line: Payment for “Reconnect 6-inch Water Line” shall be paid at the contract unit price per each 6-inch line reconnected as indicated by the Itemized Proposal. The unit price shall include full compensation for all labor, equipment, and materials to complete the reconnection including piping, thrust restraint, excavation, bedding, backfill and all other incidental items required for assembly and installation as specified by the Contract Documents and *Town of Cary Standard Specifications*.

Pay Item:**Pay Unit**

Reconnect 6-inch Water Line

Each

SP-3 – Concrete Protection on Water Main:

Payment for “Concrete Protection on Water Main” shall be paid at the contract unit price per linear foot as indicated by the Itemized Proposal. The unit price shall include full compensation for all labor, equipment, materials, and all other incidental items required to provide a concrete cap extending from the spring line to six inches above the main and one foot each side of the main at the locations shown on the Contract Documents and as specified in the Contract Documents and *Town of Cary Standard Specifications*.

Pay Item**Pay Unit**

Concrete Protection on Water Main

Linear Foot

UC-3**Project: I-5700****County: Wake****PROJECT SPECIAL PROVISIONS****Utility Construction**

SP-4 - Remove Backflow Preventer: Payment for “Remove Backflow Preventer” shall be paid at the contract unit price per each backflow preventer removed as indicated by the Itemized Proposal. The unit price shall include full compensation for all labor, equipment, and materials to completely isolate, remove, and plug all piping, equipment, and items associated with the backflow preventer including incidentals and restore the affected area as specified by the Contract Documents and *Town of Cary Standard Specifications*.

Pay Item:

Remove Backflow Preventer

Pay Unit

Each

SP-5 – 8” Insertion Valve: Payment for “8-inch Insertion Valve” shall be paid at the contract unit price bid per each installed as indicated by the Itemized Proposal.

The insertion valve shall consist of a fully functioning wedge gate valve with a rated working pressure of 250 psi with standard DIP mechanical joint fitting compatibility. The valve shall operate for full closure and sealing against the valve body rather than the pipe wall for a clean valve body seat. Supplied valve shall allow for full removal of downstream piping following installation and restraint while under an “in-line under pressure installation.” Valve shall contain a two-part valve body that is fully restrained by standard mechanical joint retainer glands when installed.

The unit price shall include full compensation for all labor, equipment, and materials to completely isolate, install, and restrain all piping, equipment, and items associated with the insertion valve including incidentals and restore the affected area. Work shall comply with the requirements of the *Town of Cary Standard Specifications*.

Pay Item:

8” Insertion Valve

Pay Unit

Each

Modify NCDOT Division 10 Material Specifications as follows:

1. DIP Force Main and Fittings 1034-4 (B), Page 10-62, Line 4 - Delete “When required or necessary,” and replace with “All joints shall”
2. DIP Water Line and Fittings: 1036-5, Page 10-63, Line 11 - Delete “When required or necessary,” and replace with “All 16-inch and larger waterline joints shall”

PROJECT SPECIAL PROVISIONS**Utility Special**

The contractor shall provide an experienced Utility Coordinator to coordinate physical utility relocations and protection of utility facilities during the construction phase of the project. The contractor personnel who is assigned as the Utility Coordinator shall solely serve in the role and tasks described herein. This person shall be named and presented in writing at the Preconstruction Conference and cannot perform additional tasks on behalf of the contractor that are beyond the scope of this provision for the duration of the project.

The Department coordinated previous utility relocation on this project in accordance with Article 105-8 of the *2018 Standard Specifications*. The Department's utility coordination and design efforts stop at the dates shown on the Utility by Other and Utility Construction Special Provisions. The Utility Coordinator is tasked to continue the coordination efforts from where the Department left off in order to expedite the project schedule, while maintaining safety, and protecting existing utilities from damage.

Here is a breakdown of Utility Coordinator Responsibilities:

Initial Meetings:

1. Schedule and conduct an **Information Transfer Meeting** between all parties that have been involved with utility coordination prior to contract let, and all relevant parties that will be involved in contract administration.
 - Required Attendees: Assigned DOT Division Construction Personnel; Needed General Contractor Personnel; Assigned DOT Central Personnel (both in the Utilities and Project Management Units); the DOT contracted Utility Coordination Firm who handled Utility Coordination prior to contract let.
 - Items to be discussed: Names and contact information for each utility owner on the project; All past communication with utility owners that is relevant as we continue; The most current update of where we are with each UbO owner; Any other forthcoming issues that we need to be aware of as we proceed into construction.
 - Deliverables: a meeting agenda and meeting minutes for distribution
2. Schedule and conduct a **UbO Scheduling Update Meeting** including all UbO Utility Owners. This meeting should be done after the Contractor has produced their proposed construction schedule.
 - Required Attendees: Assigned DOT Division Construction Personnel, Needed General Contractor Personnel, Representatives of all Utility Owners who are identified in the UbO Special Provisions.
 - Items to be discussed: Current relocation schedules of each UbO Utility Owner; The proposed Contractor construction schedule; Identification of potential conflict points between the construction schedule and the utility schedules; Potential resolutions to these conflicts
 - Deliverables: a meeting agenda, meeting minutes, UbO schedule updates for distribution, list of action items to resolve scheduling conflicts

PROJECT SPECIAL PROVISIONS**Utility Special**

3. Schedule and conduct a **Contract Utility Construction Meeting** including all Utility Owners whose facilities are being moved as part of the general roadway contract. This meeting needs to be conducted well in advance of the commencement of the Utility Construction contract work.
- Required Attendees: Assigned DOT Division Construction Personnel, Needed General Contractor Personnel, Representatives of all Utility Owners and their design engineers being relocated in the roadway contract, Assigned NCDOT Central Utilities Unit Personnel
 - Items to be discussed: Contractor's projected schedule for Utility Owner's relocations; Utility Owner's expectations; Utility Owner construction inspection; All tie-ins and potential service disruptions; Utility Owner testing/sampling/flushing requirements
 - Deliverables: a meeting agenda, meeting minutes, a Utility Construction schedule for each Utility Owner to take, a list of any action items that develop in the meeting

Utility Coordinator Tasks:**1. UbO Relocation Work**

- Observe and track UbO relocation construction that occurs during the roadway contract time frame.
- Develop and maintain relationships with all UbO Utility Owners and their utility relocation construction crews.
- Facilitate communication and scheduling between the multiple UbO Utility Owners.
- Monitor UbO relocation schedule progress to make sure the utility relocation schedule stays on track. Notify DOT Division Personnel if a scheduling problem is foreseen. Conduct meetings, etc. in order to address these scheduling issues on an as-needed basis
- Check actual constructed locations of UbO work to confirm it is out of the way of roadway construction.
- Make sure UbO relocation companies are producing as-built drawings

2. Roadway Contract Work**a. Utility Damage Prevention**

- Identify all major utilities of note (gas, fiber optic cables, large diameter water, large diameter gravity sewer). Monitor excavations in these areas carefully.
- Keep one hard copy of NC811's positive response printout for every locate ticket called in on this contract in a notebook. If the ticket is called in by a subcontractor, the subcontractor must provide the Utility Coordinator with a hard copy of the positive response printout for safe keeping.

PROJECT SPECIAL PROVISIONS**Utility Special**

- Document all utility damage incidents with dates, notes, pictures, etc. Attach the damage incident documentation to the corresponding NC811 locate ticket positive response printout.
- Report all utility damage incidents promptly and properly.
- Work together with locators, excavators, and utility owners to mitigate the associated anger with a damaged utility. Focus on how to prevent these problems going forward.
- Develop and maintain relationships with the NC811 contract locators, as well as the utility owners who locate their own utilities. Identify any utility which is not going to be located by a call to NC811. Make sure that utility owner gets notification of pending excavations.
- Identify trends if utilities consistently get damaged, and work to alleviate the underlying problems to stop these trends
- Monitor all excavating crews/subcontractors and make sure they are practicing safe excavation around utilities.

b. Utility Construction Monitoring

- Supervise and monitor all Utility Construction work. Including associated traffic control.
- Keep track of all contract pay items installed daily.
- Keep utility owners up to date on the progress of their utility relocations.
- For any interruptions in utility service for tie-ins, coordinate with the utility owner on their constraints for a service interruption (amount of down time, time of day that is best for shut down..etc.). Oversee the entire tie-in operation until it is complete.
- Develop a relationship with each utility owner to understand what that owner is looking for with their new utility installation. Make sure the utility owner is getting a final product that matches their expectations during installation.
- Witness and coordinate all tests and procedures the utility owner (and/or regulations) require before that new utility line can be put in service. This could include: pressure testing, flushing, pigging, chlorinating, dechlorinating, tracing line wire testing, etc.
- Facilitate the production of the utility owner's as-built drawings to make sure each utility owner gets accurate drawings as they require on their utility lines

c. Handling Unknowns

- Proactively search for answers and get resolutions to conflicts that arise due to utilities found during excavation that have not been accounted for in the preconstruction utility coordination process.
- Notify DOT Division Personnel of these issues ASAP
- Coordinate meetings, etc. in order to get resolutions to these problems

d. Complaints

- Keep a log of all public complaints that arise due to the utility construction process or due to utility disruption from excavation

PROJECT SPECIAL PROVISIONS**Utility Special**

- Make the proper DOT Division Construction Personnel aware of any public complaints you hear directly from the public
- Proactively resolve these complaints, and inform the proper DOT Division Personnel once a particular complaint is resolved

Monthly Required Utility Coordinator Reports and Meetings:

- 1. UbO Monthly Report:** Provide Division Construction Personnel with a monthly report that includes:
 - The UbO relocation work accomplished that month broken down by individual utility
 - The projected UbO relocation work to be accomplished next month
 - Brief narrative on UbO schedule and any other pertinent concerns that need to be addressed.
 - Questions to answer in report: What's the most important action item on UbO work right now? Does the Utility Coordinator need NCDOT help in getting action out of a UbO utility company?
- 2. Utility Damage Prevention Monthly Report:** Provide Division Construction Personnel with a monthly report that includes:
 - All utility damage incidents for that month with documentation and narratives.
 - Overall performance this month of excavators while digging around utilities.
 - Activities going on other than excavation that can cause utility damage.
 - Projected excavation areas that will be difficult next month
- 3. Utility Construction Monthly Report:** Provide Division Construction Personnel with a monthly report that includes:
 - The utility construction work accomplished that month broken down by Utility Owner
 - Projected Utility Construction work to be accomplished next month
 - Questions to answer in report: Any items of note coming up? Have you hit rock? Shutdowns or Tie-ins? Testing? Any complaints that need to be handled? Or unknown utilities encountered?
- 4. Schedule and conduct a **Monthly Utility Meeting**.** Distribute a meeting agenda with topics to be discussed to all attendees 3 days in advance so attendees have time to review agenda and comment.
 - Required Attendees: Assigned DOT Division Construction Personnel, Needed General Contractor Personnel, Representatives of all Utility Owners who are identified in the UbO Special Provisions, Representatives of all Utility Owners who are being relocated in the roadway contract, other parties as needed
 - Items to be discussed: Start meeting with a relevant "Safety Moment"; Last month's progress; Projected progress last month versus actual progress; Next month's projected progress; All issues concerning utilities: coordination, scheduling, unknowns. etc.; Leave the floor open for questions and concerns.

PROJECT SPECIAL PROVISIONS**Utility Special**

- Deliverables: a meeting agenda, meeting minutes with action items to be done by next meeting.

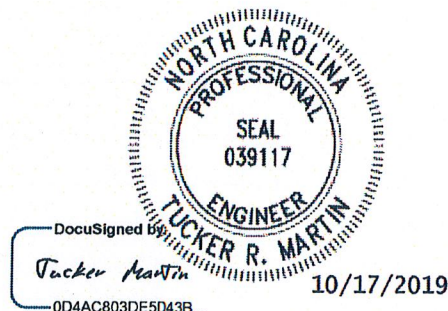
Compensation:

- The work of this provision will be paid for at the contract lump sum price for "Utility Coordinator."
- Before the initial payment request is submitted for approval under this pay item, all 3 Initial Meetings listed in this Special Provision must be completed.
- Before the subsequent monthly pay requests are submitted for approval under this pay item, all 3 Monthly Reports must be completed, and the Monthly Utility Meeting held
- Partial payments will be made on each payment estimate based upon the percentage complete of the utility relocations, with the amount of project excavations being performed under a NC811 locate ticket taken into consideration. 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

Tucker R. Martin, P.E.
 Central Region Utility Manager
 North Carolina Department of Transportation
 1020 Birch Ridge Rd.
 Raleigh, NC 27610



PROJECT SPECIAL PROVISIONS

Utilities by Others

	<p>1223 Jones Franklin Road Raleigh, NC 27606 Phone: 919.851.8077 Fax: 919.851.8107 wei@wetherilleng.com</p>
---	---

General:

- A) Duke Energy (Power Distribution)**
- B) AT&T (Communication)**
- C) Spectrum (Communication)**
- D) SEGRA/Spirit (Communication)**
- E) Centurylink (Communication)**
- F) Crown Castle (Communication)**
- G) Verizon (Communication)**
- H) PSNC/Dominion Energy (Gas)**

The conflicting facilities of these concerns will be adjusted prior to the date of availability, unless otherwise noted and are therefore listed in these special provisions for the benefit of the Contractor. All utility work listed herein will be done by the utility owner. All utilities are shown on the plans from the best available information.

The Contractor's attention is directed to Article 105.8 of the Standard Specifications.

Utilities Requiring Adjustment:

Utility relocations are shown on the Utilities by Others Plans.

A) Duke Energy (Power Distribution)

- 1) Duke Energy's relocation work cannot begin until 18 November 2019.
- 2) Duke Energy will require 28 weeks to complete their relocation work.
Estimated completion date for Duke Energy is 1 June 2020.
- 3) Contact person for Duke Energy: James Richardson, 919-744-2141
jrichardson@pike.com

B) AT&T (Communication)

- 1) AT&T cannot begin relocation work until Duke Energy has completed their work. Estimated start date 1 June 2020
- 2) AT&T will require 24 weeks to complete their relocation work. Estimated completion date for AT&T is 16 November 2020.

PROJECT SPECIAL PROVISIONS

Utilities by Others

- 3) Contact person for AT&T: Kenny Pope, 919-788-2721
kp0824@att.com

C) Spectrum (Communication)

- 1) Spectrum cannot begin relocation work until Duke Energy has completed their work. Estimated start date 1 June 2020
- 2) Spectrum will require 16 weeks to complete their relocation work. Estimated completion date for Spectrum is 21 September 2020.
- 3) Contact person for Spectrum: Sean Young, 919-573-7060
sean.young@charter.com

D) SEGRA/Spirit (Communication)

- 1) SEGRA/Spirit's relocation work cannot begin until 18 November 2019.
- 2) SEGRA/Spirit will require 24 weeks to complete their work. Estimated completion date for SEGRA/Spirit is 4 May 2020.
- 3) Contact person for SEGRA/Spirit Andy Leviner, 919-230-2585
andy.leviner@segra.com

E) Centurylink (Communication)

- 1) Centurylink cannot begin relocation work until Duke Energy has completed their work. Estimated start date 1 June 2020
- 2) Centurylink require 12 weeks to complete their work. Estimated completion date for Centurylink is 24 August 2020.
- 3) Contact person for Centurylink: Dale Copeland, 919-710-8907
dale.copeland@centurylink.com

F) Crown Castle (Communication)

- 1) Crown Castle cannot begin relocation work until Duke Energy has completed their work. Estimated start date 1 June 2020
- 2) Crown Castle will require 20 weeks to complete their work. Estimated completion date for Crown Castle is 19 October 2020.
- 3) Contact person for Crown Castle: Nathan Karras, 919-805-8583
nathan.karras@crowncastle.com

G) Verizon (Communication)

- 1) Verizon cannot begin relocation work until Duke Energy has completed their work. Estimated start date 1 June 2020
- 2) Verizon will require 12 weeks to complete their work. Estimated completion date for Verizon is 24 August 2020.
- 3) Contact person for Verizon: Eric Crane, 919-696-6616
eric.crane@verizon.com

PROJECT SPECIAL PROVISIONS

Utilities by Others

H) PSNC/Dominion Energy (Gas)

- 1) PSNC's relocation work cannot begin until 18 November 2019.
- 2) PSNC will require 28 weeks to complete their work. Estimated completion date for PSNC is 1 June 2020.
- 3) Contact person for PSNC:

Josue Alcaraz, 919-367-2745

josue.alcaraz@scana.com

**Project Special Provisions
Erosion Control**

STABILIZATION REQUIREMENTS:

(4-30-2019)

Stabilization for this project shall comply with the time frame guidelines as specified by the NCG-010000 general construction permit effective April 1, 2019 issued by the North Carolina Department of Environmental Quality Division of Water Resources. 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

50#	Tall Fescue
10#	Centipede
25#	Bermudagrass (hulled)
500#	Fertilizer
4000#	Limestone

September 1 - February 28

50#	Tall Fescue
10#	Centipede
35#	Bermudagrass (unhulled)
500#	Fertilizer
4000#	Limestone

Waste and Borrow Locations

March 1 – August 31

75#	Tall Fescue
25#	Bermudagrass (hulled)
500#	Fertilizer
4000#	Limestone

September 1 - February 28

75#	Tall Fescue
35#	Bermudagrass (unhulled)
500#	Fertilizer
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
2 nd Millennium	Essential	Kalahari	Shelby
3 rd 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

18#	Creeping Red Fescue
6#	Indiangrass
8#	Little Bluestem
4#	Switchgrass
25#	Browntop Millet
500#	Fertilizer
4000#	Limestone

September 1 - February 28

18#	Creeping Red Fescue
6#	Indiangrass
8#	Little Bluestem
4#	Switchgrass
35#	Rye Grain
500#	Fertilizer
4000#	Limestone

Approved Creeping Red Fescue Cultivars:

Aberdeen

Boreal

Epic

Cindy Lou

Fertilizer shall be 10-20-20 analysis. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis and as directed.

Native Grass Seeding and Mulching shall be performed in accordance with Section 1660 of the *Standard Specifications* and vegetative cover sufficient to restrain erosion shall be installed immediately following grade establishment.

Measurement and Payment

Native Grass *Seeding and Mulching* will be measured and paid for in accordance with Article 1660-8 of the *Standard Specifications*.

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.

REFORESTATION:**Description**

Reforestation will be planted within interchanges and along the outside borders of the road, and in other areas as directed. *Reforestation* is not shown on the plan sheets. See the Reforestation Detail Sheet.

All non-maintained riparian buffers impacted by the placement of temporary fill or clearing activities shall be restored to the preconstruction contours and revegetated with native woody species.

The entire *Reforestation* operation shall comply with the requirements of Section 1670 of the *Standard Specifications*.

Materials

Reforestation shall be bare root seedlings 12"-18" tall.

Construction Methods

Reforestation shall be planted as soon as practical following permanent *Seeding and Mulching*. The seedlings shall be planted in a 16-foot wide swath adjacent to mowing pattern line, or as directed.

Root dip: The roots of reforestation seedlings shall be coated with a slurry of water, and either a fine clay (kaolin) or a superabsorbent that is designated as a bare root dip. The type, mixture ratio, method of application, and the time of application shall be submitted to the Engineer for approval.

With the approval of the Engineer, seedlings may be coated before delivery to the job or at the time of planting, but at no time shall the roots of the seedlings be allowed to dry out. The roots shall be moistened immediately prior to planting.

Seasonal Limitations: *Reforestation* shall be planted from November 15 through March 15.

Measurement and Payment

Reforestation will be measured and paid for in accordance with Article 1670-17 of the *Standard Specifications*.

RESPONSE FOR EROSION CONTROL:

Description

Furnish the labor, materials, tools and equipment necessary to move personnel, equipment, and supplies to the project necessary for the pursuit of any or all of the following work as shown herein, by an approved subcontractor.

Section	Erosion Control Item	Unit
1605	Temporary Silt Fence	LF
1606	Special Sediment Control Fence	LF/TON
1615	Temporary Mulching	ACR
1620	Seed - Temporary Seeding	LB
1620	Fertilizer - Temporary Seeding	TN
1631	Matting for Erosion Control	SY

SP	Coir Fiber Mat	SY
1640	Coir Fiber Baffles	LF
SP	Permanent Soil Reinforcement Mat	SY
1660	Seeding and Mulching	ACR
1661	Seed - Repair Seeding	LB
1661	Fertilizer - Repair Seeding	TON
1662	Seed - Supplemental Seeding	LB
1665	Fertilizer Topdressing	TON
SP	Safety/Highly Visible Fencing	LF
SP	Response for Erosion Control	EA

Construction Methods

Provide an approved subcontractor who performs an erosion control action as described in the NPDES Inspection Form SPPP30. Each erosion control action may include one or more of the above work items.

Measurement and Payment

Response for Erosion Control will be measured and paid for by counting the actual number of times the subcontractor moves onto the project, including borrow and waste sites, and satisfactorily completes an erosion control action described in Form 1675. The provisions of Article 104-5 of the *Standard Specifications* will not apply to this item of work.

Payment will be made under:

Pay Item

Response for Erosion Control

Pay Unit

Each

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.

CONSTRUCTION MATERIALS MANAGEMENT

(3-19-19) (rev. 04-27-19)

Description

The requirements set forth shall be adhered to in order to meet the applicable materials handling requirements of the NCG010000 permit. Structural controls installed to manage construction materials stored or used on site shall be shown on the E&SC Plan. Requirements for handling materials on construction sites shall be as follows:

Polyacrylamides (PAMS) and Flocculants

Polyacrylamides (PAMS) and flocculants shall be stored in leak-proof containers that are kept under storm-resistant cover or surrounded by secondary containment structures designed to protect adjacent surface waters. PAMS or other flocculants used shall be selected from the NC DWR List of Approved PAMS/Flocculants. The concentration of PAMS and other flocculants used shall not exceed those specified in the NC DWR List of Approved PAMS/Flocculants and in accordance with the manufacturer's instructions. The NC DWR List of Approved PAMS/Flocculants is available at:

https://files.nc.gov/ncdeq/Water%20Quality/Environmental%20Sciences/ATU/ApprovedPAMS_4_1_2017.pdf

Equipment Fluids

Fuels, lubricants, coolants, and hydraulic fluids, and other petroleum products shall be handled and disposed of in a manner so as not to enter surface or ground waters and in accordance with

applicable state and federal regulations. Equipment used on the site must be operated and maintained properly to prevent discharge of fluids. Equipment, vehicle, and other wash waters shall not be discharged into E&SC basins or other E&SC devices. Alternative controls should be provided such that there is no discharge of soaps, solvents, or detergents.

Waste Materials

Construction materials and land clearing waste shall be disposed of in accordance with North Carolina General Statutes, Chapter 130A, Article 9 - Solid Waste Management, and rules governing the disposal of solid waste (15A NCAC 13B). Areas dedicated for managing construction material and land clearing waste shall be at least 50 feet away from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available. Paint and other liquid construction material waste shall not be dumped into storm drains. Paint and other liquid construction waste washouts should be located at least 50 feet away from storm drain inlets unless there is no alternative. Other options are to install lined washouts or use portable, removable bags or bins. Hazardous or toxic waste shall be managed in accordance with the federal Resource Conservation and Recovery Act (RCRA) and NC Hazardous Waste Rules at 15A NCAC, Subchapter 13A. Litter and sanitary waste shall be managed in a manner to prevent it from entering jurisdictional waters and shall be disposed of offsite.

Herbicide, Pesticide, and Rodenticides

Herbicide, pesticide, and rodenticides shall be stored and applied in accordance with the Federal Insecticide, Fungicide, and Rodenticide Act, North Carolina Pesticide Law of 1971 and labeling restrictions.

Concrete Materials

Concrete materials onsite, including excess concrete, must be controlled and managed to avoid contact with surface waters, wetlands or buffers. No concrete or cement slurry shall be discharged from the site. (Note that discharges from onsite concrete plants require coverage under a separate NPDES permit – NCG140000.) Concrete wash water shall be managed in accordance with the *Concrete Washout Structure* provision. Concrete slurry shall be managed and disposed of in accordance with *NCDOT DGS and HOS DCAR Distribution of Class A Residuals Statewide* (Permit No. WQ0035749). Any hardened concrete residue will be disposed of, or recycled on site, in accordance with state solid waste regulations.

Earthen Material Stock Piles

Earthen material stock piles shall be located at least 50 feet away from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available.

Measurement and Payment

Conditions set within the *Construction Materials Management* provision are incidental to the project for which no direct compensation will be made.

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:

<https://connect.ncdot.gov/resources/roadside/FieldOperationsDocuments/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.

CLEAN WATER DIVERSION:**Description**

This work consists of installing, maintaining, and removing any and all material required for the construction of clean water diversions. The clean water diversions shall be used to direct water flowing from offsite around/away from specific area(s) of construction.

Materials

Refer to Division 10

Item	Section
Geotextile for Soil Stabilization, Type 4	1056

Construction Methods

The Contractor shall install the clean water diversions in accordance with the details in the plans and at locations indicated in the plans, and as directed. Upon installation, the excavated material shall be immediately stabilized as provided in Section 1620 of the *Standard Specifications*. Other stabilization methods may be utilized with prior approval from the Engineer.

Line clean water diversion with geotextile unrolled in the direction of flow and lay smoothly but loosely on soil surface without creases. Bury top of slope geotextile edge in a trench at least 5" deep and tamp securely. Make vertical overlaps a minimum of 18" with upstream geotextile overlapping the downstream geotextile.

Secure geotextile with eleven gauge wire staples shaped into a *u* shape with a length of not less than 6" and a throat not less than 1" in width. Place staples along outer edges and throughout the geotextile a maximum of 3 ft. horizontally and vertically.

Measurement and Payment

Silt Excavation will be measured and paid for in accordance with Article 1630-4 of the *Standard Specifications*.

Geotextile for Soil Stabilization will be measured and paid for in accordance with Article 270-4 of the *Standard Specifications*.

Stabilization of the excavated material will be paid for as *Temporary Seeding* as provided in Section 1620 of the *Standard Specifications*.

Such price and payment shall be considered full compensation for all work covered by this section including all materials, construction, maintenance, and removal of the clean water diversions.

SAFETY FENCE AND JURISDICTIONAL FLAGGING:

Description

Safety Fence shall consist of furnishing materials, installing and maintaining polyethylene or polypropylene fence along the outside riparian buffer, wetland, or water boundary, or other boundaries located within the construction corridor to mark the areas that have been approved to infringe within the buffer, wetland, endangered vegetation, culturally sensitive areas or water. The fence shall be installed prior to any land disturbing activities.

Interior boundaries for jurisdictional areas noted above shall be delineated by stakes and highly visible flagging.

Jurisdictional boundaries at staging areas, waste sites, or borrow pits, whether considered outside or interior boundaries shall be delineated by stakes and highly visible flagging.

Materials

(A) Safety Fencing

Polyethylene or polypropylene fence shall be a highly visible preconstructed safety fence approved by the Engineer. The fence material shall have an ultraviolet coating.

Either wood posts or steel posts may be used. Wood posts shall be hardwood with a wedge or pencil tip at one end, and shall be at least 5 ft. in length with a minimum nominal 2" x 2" cross section. Steel posts shall be at least 5 ft. in length, and have a minimum weight of 0.85 lb/ft of length.

(B) Boundary Flagging

Wooden stakes shall be 4 feet in length with a minimum nominal 3/4" x 1-3/4" cross section. The flagging shall be at least 1" in width. The flagging material shall be vinyl and shall be orange in color and highly visible.

Construction Methods

No additional clearing and grubbing is anticipated for the installation of this fence. The fence shall be erected to conform to the general contour of the ground.

(A) Safety Fencing

Posts shall be set at a maximum spacing of 10 ft., maintained in a vertical position and hand set or set with a post driver. 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
Safety Fence

Pay Unit
Linear Foot

SKIMMER BASIN WITH BAFFLES:

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 Environmental Quality Division of Water Resources 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

IMPERVIOUS DIKE:

Description

This work consists of furnishing, installing, maintaining, and removing an *Impervious Dike* for the purpose of diverting normal stream flow around the construction site. The Contractor shall construct an impervious dike in such a manner approved by the Engineer. The impervious dike shall not permit seepage of water into the construction site or contribute to siltation of the stream. The impervious dike shall be constructed of an acceptable material in the locations noted on the plans or as directed.

Materials

Acceptable materials shall include but not be limited to sheet piles, sandbags, and/or the placement of an acceptable size stone lined with polypropylene or other impervious geotextile.

Earth material shall not be used to construct an impervious dike when it is in direct contact with the stream unless vegetation can be established before contact with the stream takes place.

Measurement and Payment

Impervious Dike will be measured and paid as the actual number of linear feet of impervious dike(s) constructed, measured in place from end to end of each separate installation that has been completed and accepted. Such price and payment will be full compensation for all work including but not limited to furnishing materials, construction, maintenance, and removal of the impervious dike.

Payment will be made under:

Pay Item

Impervious Dike

Pay Unit

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

___" Temporary Pipe

Pay Unit

Linear Foot

COIR FIBER MAT:**Description**

Furnish material, install and maintain coir fiber mat in locations shown on the plans or in locations as directed. Work includes providing all materials, excavating and backfilling, and placing and securing coir fiber mat with stakes, steel reinforcement bars or staples as directed.

Materials**Item**

Coir Fiber Mat

Section

1060-14

Anchors: Stakes, reinforcement bars, or staples shall be used as anchors.

Wooden Stakes:

Provide hardwood stakes 12"- 24" long with a 2" x 2" nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving through the coir fiber mat and down into the underlying soil. The other end of the stake needs to have a 1"- 2" long head at the top with a 1"- 2" notch following to catch and secure the coir fiber mat.

Steel Reinforcement Bars:

Provide uncoated #10 steel reinforcement bars 24" nominal length. The bars shall have a 4" diameter bend at one end with a 4" straight section at the tip to catch and secure the coir fiber mat.

Staples:

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

Construction Methods

Place the coir fiber mat immediately upon final grading. Provide a smooth soil surface free from stones, clods, or debris that will prevent the contact of the mat with the soil. Unroll the mat and apply without stretching such that it will lie smoothly but loosely on the soil surface.

For stream relocation applications, take care to preserve the required line, grade, and cross section of the area covered. Bury the top slope end of each piece of mat in a narrow trench at least 6 in. deep and tamp firmly. Where one roll of matting ends and a second roll begins, overlap the end of the upper roll over the buried end of the second roll so there is a 6 in. overlap. Construct check trenches at least 12 in. deep every 50 ft. longitudinally along the edges of the mat or as directed. Fold over and bury mat to the full depth of the trench, close and tamp firmly. Overlap mat at least 6 in. where 2 or more widths of mat are installed side by side.

Place anchors across the mat at the ends approximately 1 ft. apart. Place anchors along the outer edges and down the center of the mat 3 ft. apart.

Adjustments in the trenching or anchoring requirements to fit individual site conditions may be required.

Measurement and Payment

Coir Fiber Mat will be measured and paid for as the actual number of square yards measured along the surface of the ground over which coir fiber mat is installed and accepted.

No measurement will be made for anchor items.

Payment will be made under:

Pay Item

Coir Fiber Mat

Pay Unit

Square Yard

CONCRETE WASHOUT STRUCTURE:

(01-03-19)

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 wash water.

Materials**Item**

Temporary Silt Fence

Section

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 thick 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. Install safety fence as directed for visibility to construction traffic.

The construction details for the above grade and below grade concrete washout structures can be found on the following web page link:

<https://connect.ncdot.gov/resources/roadside/SoilWaterDocuments/ConcreteWashoutStructuredetail.pdf>

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

I-5700

SW-1

Wake County

FILTRATION BASIN**GENERAL**

Furnish all labor, equipment and materials required to complete all work associated with installing the Filtration Basin, as described within these Technical Specifications and as shown within the Plans and Details. The Summary of Earthwork and Summary of Basin Component Items are shown on plan sheet 2D-8 for reference.

The Contractor shall perform all work as shown on the Plans and Details in accordance with the applicable *NCDOT 2018 Standard Specifications for Roads and Structures* and ASTM standards.

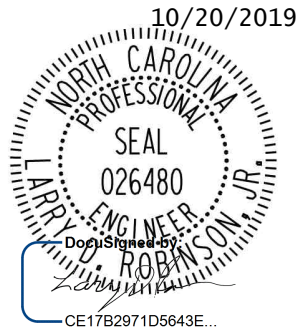
Payment will be made under:

Pay Item

Filtration Basin

Pay Unit

Lump Sum

**FILTRATION RISER OUTLET STRUCTURE****Description:**

The work covered by this section consists of construction and maintenance of a riser outlet structure located within the Filtration area as shown within the Plans and Details. The Riser Outlet Structure for the Filtration area outfalls to a dissipater pad and then to an existing swale. Construction of the Riser Outlet Structure will include installation of the stormwater precast junction box sections and joints, trash rack, capped drawdown orifice, under drain connection, anti-flotation device, and emergency drain and water tight connection to the proposed outlet pipe and inlet pipes as shown within the Plans and Details.

The Riser Outlet Structure associated with the Filtration Area shall be measured as described in Masonry Drainage Structures, *NCDOT 2018 Standard Specifications for Roads and Structures* Section 840.

Submittals:

Contractor shall provide three (3) copies of the shop drawings or product data of the Riser Outlet Structure and any associated components to be installed to Owner's Representative for approval by Engineer.

No construction shall commence until all shop drawings and product sheets are received and approved.

I-5700

SW-2

Wake County

Shop drawings shall include a plan and cross-section schematic of the proposed Riser Outlet Structure installation with dimensions and components shown.

Materials:

Riser Outlet Structure - shall meet the necessary ASTM standards for a Precast concrete structure of this nature, *NCDOT 2018 Standard Specifications for Roads and Structures* Section 1077, and shall meet the necessary dimensions noted in the “Riser Structure” detail in the Plans and Details.

Sluice Gate - shall be constructed and be sized per the details within the Plans and Details. Deviations from the Plans and Details shall be approved by the Engineer prior to installation.

Drainage Structure Steps – shall conform to Detail 840.66

Removable Trash Rack – shall be constructed and be sized per the details within the Plans and Details. Deviations from the Plans and Details shall be approved by the Engineer prior to installation.

Anti-flotation Device concrete – shall meet the requirements of the Special Provisions Section 06 Cast-in-Place Structural Concrete.

Construction Methods:

Riser Outlet Structure shall be constructed according to the details shown in the Plans and Details or as directed by the Engineer. Riser Outlet Structure should be located as noted in the Plans and Details. Ensure that the Riser Outlet Structure is extended into the ground to the indicated depth below the invert elevation to accommodate the anti-flotation structure for the Riser Outlet Structure. Install capped orifice and trash rack as shown in the Plans and Details.

Measurement and Payment:

The Riser Outlet Structure associated with the Filtration Area shall conform to a Masonry Drainage Structure described in Section 840 - Minor Drainage Structures, of the *NCDOT Standard Specifications for Roads and Structures*. Quantities have been listed on plan sheet 2D-8 for reference and will be considered incidental to Lump Sum Filtration Basin.

TRASH RACK FOR RISER**Description:**

The work consists of the fabrication and installation of a trash rack in accordance with the details in the plans. The trash rack should be installed in accordance with the manufacturer's recommendations and as directed by the Engineer.

Materials:

I-5700

SW-3

Wake County

Materials and fabrication methods for the trash rack shall conform to requirements of Sections 1070, 1072, 1074 and 1081 of the *2018 Standard Specifications*.

Measurement and Payment

Trash Rack for Riser quantities have been listed on plan sheet 2D-8 for reference and will be considered incidental to Lump Sum Filtration Basin.

HDPE PIPE**Description:**

This specification describes 4- through 60-inch High Density Polyethylene Pipe (HDPE) for use in gravity-flow drainage applications.

Materials:

Virgin material for pipe and fitting production shall be high density polyethylene conforming with the minimum requirements of cell classification 424420C for 4- through 10-inch diameters, or 435400C for 12- through 60-inch diameters, as defined and described in the latest version of ASTM D3350, except that carbon black content should not exceed 5%. The 12- through 60-inch virgin pipe material shall comply with the notched constant ligament-stress (NCLS) test as specified in Section 9.5 and 5.1 of AASHTO M294 and ASTM F2306, respectively.

Pipe shall be ADS (Advanced Drainage Systems) N-12 ST IB or N-12 WT IB pipe (as indicated on the plans) or approved equal. The pipe shall have smooth interior and annular exterior corrugations.

- 4- through 10-inch shall meet AASHTO M252, Type S.
- 12- through 60-inch shall meet AASHTO M294, Type S or ASTM F2306.
- Manning's "n" value for use in design shall be 0.012.

(A) Joint Performance:

Pipe shall be joined using a bell & spigot joint meeting AASHTO M252, AASHTO M294 or ASTM F2306. The joint shall be soil-tight and gaskets, when applicable, shall meet the requirements of ASTM F477. Gaskets shall be installed by the pipe manufacturer and covered with a removable wrap to ensure the gasket is free from debris. A joint lubricant supplied by the manufacturer shall be used on the gasket and bell during assembly.

(B) Fittings:

Fittings shall conform to AASHTO M252, AASHTO M294, or ASTM F2306.

(C) Dimensions

I-5700

SW-4

Wake County

Nominal Diameter (in)													
Pipe I.D. (in)	4	6	8	10	12	15	18	24	30	36	42	48	60
Pipe O.D. (in)	4.8	6.9	9.1	11.4	14.5	18	22	28	36	42	48	54	67

*Pipe O.D. values stated for 12- through 60-inch are ± 1 inch.

(D) Pipe Perforations

Perforations shall conform to the following requirements unless otherwise specified by ADS or approved equal manufacturer:

Circular perforations shall be $1/4 \pm 1/16$ -inch diameter holes arranged in rows parallel to the axis of the pipe. Perforations shall be evenly spaced along each row such that the center-to-center distance between perforations is not less than eight times the perforation diameter. Perforations may appear at the ends of short and random lengths. The minimum perforation opening per foot of pipe shall be as shown in the table below.

Nominal Pipe Size (in)	Minimum Number of Rows	Minimum Opening/Foot (sq. in.)
4	2	0.22
6	4	0.44
8	4	0.44
10	4	0.44
12	6	0.66

Rows shall be arranged in two equal groups at equal distance from the bottom on each side of the vertical centerline of the pipe. The lowermost rows of perforations shall be separated by an arc of not less than 60 degrees or more than 125 degrees. The uppermost rows of perforations shall be separated by an arc not to exceed 166 degrees. The spacing of rows between these limits shall be uniform. The minimum number of rows shall be as shown in the above table.

On both the inside and outside of the pipe, perforations shall be free of cuttings or frayed edges and of any material that would reduce the effective opening.

Installation:

Installation shall be in accordance with ASTM D2321 and ADS (or approved manufacturer) published installation guidelines with the exception that minimum cover in trafficked areas for 4- through 48-inch diameters shall be one foot and for 60-inch diameters shall be 2 ft in single run applications.

Measurement and Payment:

HDPE Pipe and Perforated HDPE Pipe quantities have been listed on plan sheet 2D-8 for reference and will be considered incidental to Lump Sum Filtration Basin.

I-5700

SW-5

Wake County

POLYVINYL CHLORIDE PLASTIC (PVC) PIPE AND CAPS:**Description:**

This specification describes Polyvinyl Chloride Plastic (PVC) Pipe and Caps, schedule 40, for use in gravity-flow drainage applications.

Materials:

PVC Schedule 40 pipe shall meet the requirements of ASTM D1785. PVC pipe fittings shall meet the requirements of ASTM D2466.

Pipe or fittings may be rejected for failure to comply with any requirement of this specification.

Construction Methods:

Installation shall be in accordance with ASTM D2321 and ADS (or approved manufacturer) published installation guidelines. Provide connectors and joints for all pipe fittings that are suitable for gravity flow and underground conditions. Solvent cement joints shall conform to ASTM D2564.

Measurement and Payment:

Polyvinyl Chloride Plastic (PVC) Pipe quantities have been listed on plan sheet 2D-8 for reference and will be considered incidental to Lump Sum Filtration Basin.

Polyvinyl Chloride Plastic (PVC) Cap quantities have been listed on plan sheet 2D-8 for reference and will be considered incidental to Lump Sum Filtration Basin.

WATERTIGHT FLEXIBLE PIPE-TO-MANHOLE CONNECTOR:**Description:**

This work consists of furnishing all necessary materials, installing, and testing watertight seals for pipe connection with drainage structures.

Materials:

A watertight, flexible pipe-to-manhole connector shall be employed in the connection of all pipe to precast manholes or other drainage structures. The connector shall be the sole element relied on to assure a flexible watertight seal of the pipe to the structure.

(A) Pipe Connection Diameters 4" to 8"

I-5700

SW-6

Wake County

The rubber connector shall be constructed solely of synthetic or natural rubber, shall meet/exceed the requirements of ASTM C923, and shall have a minimum tensile strength of 1600 psi.

(B) Pipe Connection Diameters 8" to 72"

The connector shall consist of a rubber gasket, an internal expansion sleeve, and one or more external compression take-up clamps. The rubber gasket element shall be constructed solely of poly-isoprene or natural rubber, and shall meet/exceed the requirements of ASTM C923, and shall have a minimum tensile strength of 1600 psi. Minimum thickness of the cross-section shall be 0.275 inches. If metal, the internal expansion sleeve shall be made of 11 gauge, Series 304, non-magnetic stainless steel and shall utilize no welds in its construction.

Installation:

For pipe connection diameters between 4" and 8", the connector shall be directly cast into the structure according to manufacturer specifications using casting accessories available from the connector manufacturer.

For pipe connection diameters between 8" and 72", installation shall be performed according to manufacturer specifications using either a hydraulic or mechanical insertion tool available from the connector manufacturer. The external compression take-up clamp(s) shall be constructed of Series 304 and Series 305, non-magnetic stainless steel and shall utilize no welds in its constructions. The clamp(s) shall be installed by torquing the adjusting screw using a torque-setting wrench available from the connector manufacturer.

Selection of the proper size connector for the drainage structure and pipe requirement, and installation thereof, shall be in strict conformance with the recommendations of the connector manufacturer. Any dead end pipe stubs installed in connectors shall be restrained from movement per ASTM C923.

Finished connections shall provide sealing to 13 psi (minimum), and shall accommodate deflection of pipe to 7 degrees (minimum) without loss of seal. Vacuum testing, if required, shall be conducted in strict conformance with ASTM C1244 prior to backfill. Other testing shall be conducted in strict conformance with the requirements of the connector manufacturer.

Measurement and Payment:

No separate measurement or payment will be made for furnishing, installing, and testing *Watertight Flexible Pipe-to-Manhole Connector* and will be considered incidental to Lump Sum Filtration Basin.

Select Fill (Bio-Retention Soil Media):**Description:**

I-5700

SW-7

Wake County

All engineered soil media within the proposed bio-basin shall be installed in accordance with and meet the specifications outlined on plan sheets 6, 2D-2, 2D-3, 2D-4, and 2D-8.. A representative sample of the Engineered Soil Media mixture shall be provided and approved by NCDOT prior to installation.

Do not deliver or place soils in frozen, wet, or muddy conditions. Material should be at or near optimum compaction moisture content as determined by AASHTO T 99 (ASTM D 698). Do not place materials in an excessively moist condition.

The soil media mixture percentage as outlined on plan sheet 2D-4 shall be a percent by weight in accordance with test methods AASHTO T88 and T194. The Phosphorus Index measurement for the soil media shall be provided and approved by NCDOT prior to installation.

When stockpiled, protect soil media from absorbing excess water and from erosion at all times. Do not store materials unprotected from large rainfall events. Do not allow excess water to enter site prior to compaction. If water is introduced into the material after stockpiling, allow material to drain or aerate to optimum compaction moisture content. Protect the media from contamination from silt produced from construction runoff onto the system. Equipment shall be pressure washed prior to handling the media in order to prevent weed seed contamination.

Engineered Soil Media – Materials:

The engineered soil mix shall consist of the following blend:

Recycled Expanded Slate Fines: 80%
Approved Compost Organic Component: 20%

Mechanically mix 1 part compost with 4 parts of the expanded slate fines until a uniform distribution of the components is achieved. The slate aggregate fines and organic component consist of the following:

Recycled Expanded Slate Fines:

The recycled expanded slate aggregate fines shall conform to the following screening operation:

Sieve Size	% Retained
#4	4 – 8%
#8	28 – 38%
#16	46 – 58%
#30	63 – 75%
#50	74 – 84%
#100	82 – 90%
Fine Material	2.79 – 3.53% passing #100

Organic Component:

I-5700

SW-8

Wake County

The compost or organic component shall conform to the following specifications:

1. Humus material shall have an ash content of no less than 8% and no more than 40%.
2. The pH of the organic matter shall be between 5.5 and 8.5.
3. The salt content shall be less than 10 millimho/cm at 25 degrees C, (Ece<10) on a saturated paste extract.
4. Types of acceptable composted products can be derived from yard wastes, low in salts, low in phosphorus (P205 below 1% wet wt. basis), free from weed seeds, free of pathogens and other deleterious materials.
5. Composted pine park products are conditionally acceptable (stable humus must be present).
6. Sludge-based materials are not acceptable including municipal sewage sludge bio-solids.
7. The organic amendment must have a Carbon/Nitrogen ration of <25:1.
8. The compost shall be aerobic without malodorous presence of decomposition products.
9. From 75 to 100% organic amendment particles shall pass the 4.0 mm sieve size.
10. From 45 to 65% moisture measured via wet-weight basis.
11. Free of stones, debris, and plant material.
12. Organic content must be above 50% on a dry weight basis.
13. Metals and contaminants must meet or exceed US EPA Standard 40.

Placement and Compaction of the Bioretention Soil Mixture:

The Bioretention Soil Media Mixture shall be placed and graded using low ground-contact pressure equipment or by excavators and/or backhoes operating on the ground adjacent to the bioretention facility. The Media shall be placed in horizontal layers not to exceed 12 inches for the entire area of the bioretention facility. The Media shall be compacted by saturating the entire area of the bioretention facility after each lift of Media is placed until water flows from the underdrain. Water for saturation shall be applied by spraying or sprinkling. Saturation of each lift shall be performed in the presence of the NCDOT. If the Media becomes contaminated during the construction of the facility, the contaminated material shall be removed and replaced with uncontaminated material at no additional cost to the NCDOT. Final grading of the Media shall be performed after a 24-hour settling period. Final elevations shall be within 2 inches of elevations shown on the Construction Drawings.

The contract unit bid price per cubic yard will include all incidentals associated with performing this work.

Measurement and Payment:

Engineered Soil Media quantities have been listed on plan sheet 2D-8 for reference and will be considered incidental to Lump Sum Filtration Basin.

WASHED NO. 57 STONE**Description**

Furnish and place washed No. 57 stone as shown in the plans and as directed. Stone shall be thoroughly washed with clear water and permitted to dry prior to placement. The washed stone

I-5700

SW-9

Wake County

shall be free of clay, loam, dust, similar adherent materials and organic materials unless otherwise permitted by the Engineer in writing.

Materials:

Refer to Division 10

Item	Section
Washed course aggregate (Size No. 57) as indicated on the plans	1005 & 1014-2

Measurement and Payment:

Washed No. 57 Stone quantities have been listed on plan sheet 2D-8 for reference and will be considered incidental to Lump Sum Filtration Basin.

POLYPROPYLENE NONWOVEN GEOTEXTILE FABRIC:**Description:**

This work consists of furnishing and placing polypropylene nonwoven geotextile fabric of the type specified, over previously prepared areas as directed.

Materials:

The product shall be a nonwoven polypropylene geotextile and will meet the following Minimum Average Roll Values (MARV) when tested in accordance with the methods listed below. The mat shall have the following physical properties:

Property	Test Method	Value	Unit
Tensile Strength (Grab)	ASTM D4632	120	lbs
Elongation	ASTM D4632	≥50	%
CBR Puncture	ASTM D6241	300	lbs
Trapezoidal Tear	ASTM D4533	40	lbs
UV Resistance	ASTM D4355	50	%
Apparent Opening Size (AOS)	ASTM D4751	60	US Std. Sieve
Permittivity	ASTM D4491	1.10	sec ⁻¹
Water Flow Rate	ASTM D4491	110	gpm/ft ²

Provide Type 1, Type 2 or Type 4 material certification in accordance with Article 106-3 for geosynthetics.

Construction Methods**(A) Preparation**

Prepare surfaces on which polypropylene nonwoven geotextile fabric is to be placed to smooth condition as indicated or as directed by the Engineer. Remove debris,

I-5700

SW-10

Wake County

depressions, and obstructions that could damage the polypropylene nonwoven geotextile fabric.

(B) Installation

Polypropylene nonwoven geotextile fabric shall be installed at the proper elevation and alignment as shown on the Drawings or as directed by the Engineer.

Successive sheets of polypropylene nonwoven geotextile fabric shall be overlapped a minimum of 12 inches, with the upstream sheet overlapping the downstream sheet. All seams shall be subject to the approval of the Engineer. Should the polypropylene nonwoven geotextile fabric be damaged during installation or engineered soil placement, a geotextile patch shall be placed over the damaged area extending beyond the damaged area a minimum distance of 12 inches, or the specified seam overlap, whichever is greater.

Placement of engineered soil, as applicable, should proceed immediately following placement of the polypropylene nonwoven geotextile fabric. The polypropylene nonwoven geotextile fabric should be covered with a minimum of 12 inches of loosely placed engineered soil. Select construction equipment that will prevent excess rutting.

On side slopes, anchor polypropylene nonwoven geotextile fabric at top, then unroll. Keep polypropylene nonwoven geotextile fabric free of wrinkles and folds.

Cut polypropylene nonwoven geotextile fabric using upward cutting hook blade.

Use sandbags or other weights to prevent wind displacement.

(C) Protection

Atmospheric exposure of the polypropylene nonwoven geotextile fabric to the elements following lay down shall be limited to 14 days to prevent damage.

Vehicles and construction equipment shall not be operated directly over installed polypropylene nonwoven geotextile fabric without approval of the Engineer.

Measurement and Payment:

Polypropylene Nonwoven Geotextile Fabric quantities have been listed on plan sheet 2D-8 for reference and will be considered incidental to Lump Sum Filtration Basin. Geotextiles will be measured along the ground surface as the square yards of exposed geotextiles before placing backfill material. No measurement will be made for overlapping geotextiles or sewing seams. The incidentals for *Polypropylene Nonwoven Geotextile Fabric* include providing, transporting and placing geotextiles, wire staples and anchor pins, overlaps and sewing geotextiles, and for all required maintenance.

SODDING:

I-5700

SW-11

Wake County

Description:

Sod shall be Zoysia and shall be approved by the Engineer prior to installation. Zoysia sod materials and installation shall be in accordance with Section 1664 of the *Standard Specifications*.

Sufficient water, supplied by the Contractor, shall be applied to keep sod alive. Any sod that dies prior to final acceptance of the project shall be replaced by the Contractor at no expense to the Department.

Measurement and Payment

Sodding quantities have been listed on plan sheet 2D-8 for reference and will be considered incidental to Lump Sum Filtration Basin. This includes all materials, installation, and incidentals associated with performing this work.

WATER AND ESTABLISHMENT**Description:**

Watering shall be in accordance with Section 1664 of the 2018 *Standard Specifications for Roads and Structures*. Sufficient water, supplied by the contractor, shall be applied to keep new vegetated areas alive (including seeded and sodded areas). Any seeded or sodded areas that die prior to contract completion shall be replaced or repaired as directed by the Engineer.

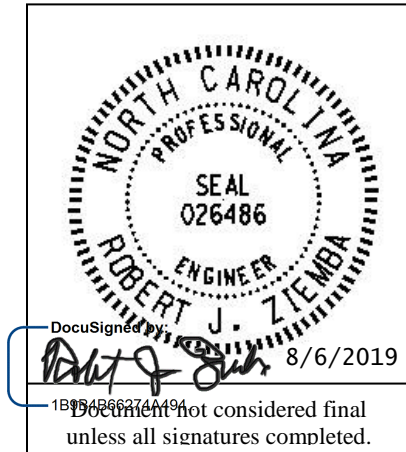
Method and Payment:

Watering will be considered incidental to the Lump Sum Filtration Basin.

I-5700

**Signals and Intelligent Transportation Systems
Project Special Provisions
(Version 18.2)**

*Prepared By: JA Lohr
6-Aug-19*



Contents

1.	2018 STANDARD SPECIFICATIONS FOR ROADS & STRUCTURES.....	3
1.1.	GENERAL REQUIREMENTS – CONSTRUCTION METHODS (1700-3(K))	3
1.2.	WOOD POLES – CONSTRUCTION METHODS (1720-3)	3
2.	SIGNAL HEADS.....	3
2.1.	MATERIALS	3
A.	General:.....	3
B.	Vehicle Signal Heads:.....	5
C.	Pedestrian Signal Heads:	7
D.	Signal Cable:	9
3.	CONTROLLERS WITH CABINETS	9
3.1.	MATERIALS – GENERAL CABINETS	9
3.2.	MATERIALS – NEMA TS-2 TYPE 1 CABINETS	10
A.	NEMA TS-2 Type 1 Cabinets General:.....	10
B.	NEMA TS-2 Type 1 Cabinet Physical Requirements:.....	10
C.	NEMA TS-2 Type 1 Cabinet Electrical Requirements:	11
3.3.	MATERIALS – NEMA TS-2 DETECTOR CARDS AND RACKS	17
3.4.	MATERIALS – TYPE 2070E CONTROLLERS	17
3.5.	MEASUREMENT AND PAYMENT	18
4.	VIDEO IMAGING LOOP EMULATOR DETECTOR SYSTEMS	18
4.1.	DESCRIPTION	18
4.2.	MATERIALS	18
A.	General:.....	18
B.	Loop Emulator System:.....	20
C.	Video Imaging Loop Emulator System Support:.....	21
4.3.	CONSTRUCTION METHODS	21
4.4.	MEASUREMENT AND PAYMENT	22
5.	TRAFFIC SIGNAL SUPPORTS.....	22
5.1.	METAL TRAFFIC SIGNAL SUPPORTS – ALL POLES	22
A.	General:.....	22
B.	Materials:	25
C.	Construction Methods:	26
5.2.	METAL POLE UPRIGHTS (VERTICAL MEMBERS)	26
A.	Materials:	26
B.	Construction Methods:	28
5.3.	MAST ARMS.....	28
A.	Materials:	29

B.	Construction Methods:	29
5.4.	DRILLED PIER FOUNDATIONS FOR METAL TRAFFIC SIGNAL POLES.....	29
A.	Description:	30
B.	Soil Test and Foundation Determination:	30
C.	Drilled Pier Construction:.....	32
5.5.	CUSTOM DESIGN OF TRAFFIC SIGNAL SUPPORTS	32
A.	General:.....	32
B.	Metal Poles:.....	33
C.	Mast Arms:	36
5.6.	POLE NUMBERING SYSTEM	36
5.7.	MEASUREMENT AND PAYMENT	36

1. 2018 STANDARD SPECIFICATIONS FOR ROADS & STRUCTURES

The 2018 Standard Specifications are revised as follows:

1.1. GENERAL REQUIREMENTS – Construction Methods (1700-3(K))

Page 17-4, revise sentence starting on line 14 to read “Modify existing electrical services, as necessary, to meet the grounding requirements of the NEC, these *Standard Specifications*, *Standard Drawings*, and the project plans.”

Page 17-4, revise sentence beginning on line 21 to read “Furnish and install additional ground rods to grounding electrode system as necessary to meet the *Standard Specifications*, *Standard Drawings*, and test requirements.”

1.2. WOOD POLES – Construction Methods (1720-3)

Page 17-18, revise sentence starting on line 13 to read “On new Department-owned poles, install a grounding system consisting of #6 AWG solid bare copper wire that is mechanically crimped using an irreversible compression tool with die to a single ground rod installed at base of pole or to the electrical service grounding electrode system located within 10 feet of the pole.”

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 2018 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 $\pm 1\%$ to measure the nominal wattage and maximum wattage of a circular traffic signal module. Power may also be derived from voltage, current and power factor measurements.

2. LED Arrow Signal Modules

Provide 12-inch omnidirectional arrow signal modules. All makes and models of LED modules purchased for use on the State Highway System shall appear on the current NCDOT Traffic Signal Qualified Products List (QPL).

Provide the manufacturer's model number and the product number (assigned by the Department) for each module that appears on the 2018 or most recent Qualified Products List. In addition, provide manufacturer's certification in accordance with Article 106-3 of the *Standard Specifications*, that each module meets or exceeds the requirements for 12-inch omnidirectional modules specified in the

ITE “Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Vehicle Arrow Traffic Signal Supplement” dated July 1, 2007 (hereafter referred to as VTCSH Arrow Supplement) and other requirements stated in this specification.

Provide modules that meet the following requirements when tested under the procedures outlined in the VTCSH Arrow Supplement:

Module Type	Max. Wattage at 165° F	Nominal Wattage at 77° F
12-inch red arrow	12	9
12-inch green arrow	11	11

For yellow arrow signal modules, provide modules tested under the procedures outlined in the VTCSH Arrow Supplement to insure power required at 77° F is 12 Watts or less.

Note: Use a wattmeter having an accuracy of $\pm 1\%$ to measure the nominal wattage and maximum wattage of an arrow traffic signal module. Power may also be derived from voltage, current and power factor measurements.

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 2018 or most recent Qualified Products List. In addition, provide manufacturer's certification in accordance with Article 106-3 of the *Standard Specifications*, that each module meets or exceeds the ITE "Pedestrian Traffic Control Signal Indicators - Light Emitting Diode (LED) Signal Modules" dated August 04, 2010 (hereafter referred to as PTCSI Pedestrian Standard) and other requirements stated in this specification.

Provide modules that meet the following requirements when tested under the procedures outlined in the PTCSI Pedestrian Standard:

Module Type	Max. Wattage at 165° F	Nominal Wattage at 77° F
Hand Indication	16	13
Walking Man Indication	12	9
Countdown Indication	16	13

Note: Use a wattmeter having an accuracy of $\pm 1\%$ to measure the nominal wattage and maximum wattage of a circular traffic signal module. Power may also be derived from voltage, current and power factor measurements.

Provide module lens that is hard coated or otherwise made to comply with the material exposure and weathering effects requirements of the Society of Automotive Engineers (SAE) J576. Ensure all exposed components of the module are suitable for prolonged exposure to the environment, without appreciable degradation that would interfere with function or appearance.

Ensure the countdown display continuously monitors the traffic controller to automatically learn the pedestrian phase time and update for subsequent changes to the pedestrian phase time.

Ensure the countdown display begins normal operation upon the completion of the preemption sequence and no more than one pedestrian clearance cycle.

D. Signal Cable:

Furnish 16-4 and 16-7 signal cable that complies with IMSA specification 20-1 except provide the following conductor insulation colors:

- For 16-4 cable: white, yellow, red, and green
- 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. CONTROLLERS WITH CABINETS

3.1. MATERIALS – GENERAL CABINETS

Provide a moisture resistant coating on all circuit boards.

Provide one 20 mm diameter radial lead UL-recognized metal oxide varistor (MOV) between each load switch field terminal and equipment ground. Electrical performance is outlined below.

PROPERTIES OF MOV SURGE PROTECTOR	
Maximum Continuous Applied Voltage at 185° F	150 VAC (RMS) 200 VDC
Maximum Peak 8x20μs Current at 185° F	6500 A
Maximum Energy Rating at 185° F	80 J
Voltage Range 1 mA DC Test at 77° F	212-268 V
Max. Clamping Voltage 8x20μs, 100A at 77° F	395 V
Typical Capacitance (1 MHz) at 77° F	1600 pF

Provide a power line surge protector that is a two-stage device that will allow connection of the radio frequency interference filter between the stages of the device. Ensure that a maximum continuous current is at least 10A at 120V. Ensure that the device can withstand a minimum of 20 peak surge current occurrences at 20,000A for an 8x20 microsecond waveform. Provide a maximum clamp voltage of 395V at 20,000A with a nominal series inductance of 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

3.2. MATERIALS – NEMA TS-2 TYPE 1 CABINETS

A. NEMA TS-2 Type 1 Cabinets General:

Comply with the *NEMA Standards Publication TS-2* (NEMA TS-2) except as otherwise stated herein.

Furnish unpainted, natural, aluminum cabinet shells that comply with Section 7 of NEMA TS-2. Ensure all non-aluminum hardware on the cabinet is stainless steel or a Department approved non-corrosive alternate. Provide a roof with a slope from front to back at a minimum ratio of 1 inch drop per 2 feet. Ensure that each exterior cabinet plane surface is constructed of a single sheet of aluminum and is seamless.

Ensure all components are arranged for easy access during servicing. When modular in construction, provide guides and positive connection devices to insure proper pin alignment and connection.

Provide a moisture resistant coating on all circuit boards.

B. NEMA TS-2 Type 1 Cabinet Physical Requirements:

Provide a handle and three point latching mechanism designed to be disassembled using hand tools. Provide a shaft connecting the latching plate to the door handle by passing through the door within a bushing, bearing, or equivalent device. Provide a latching plate at least 3/16 inch thick and that mates securely with the lock bolt. Provide a lock bolt with a flat end (no bevel) and that has at least 1/4 inch of length in contact with the latching plate.

Ensure that the handle and lock are positioned so that the lock does not lie in the path of the rotating handle as the door is unlatched and that the handle points down in the latched position.

Provide continuous welds made from the inside wherever possible. On the exterior, provide smooth and flush joints. Ensure that no screws, bolts, or rivets protrude to outside of cabinet shell.

Provide a main door opening that encompasses the full frontal area of the cabinet shell exclusive of the area reserved for plenums and flanges. Provide a rear door in base-mounted cabinets, unless

otherwise specified. Ensure that the rear door complies with all requirements for the front door, except as follows:

- * Hinge the rear door on the left side as viewed from the rear of the cabinet shell facing the door.
- * No police compartment is required on a rear door.

Ensure that the cabinet shell is sturdy and does not exhibit noticeable flexing, bending or distortion under normal conditions except that a minor amount of flexing is permitted in the main door and rear door only when the cabinet is open. In such case, the flexing must not result in permanent deformation of the door or damage to components mounted on the door. Ensure that pedestal-mounted cabinets have sufficient framing around the slipfitter attachment so that no noticeable flexing will occur at or about this point.

Provide NEMA TS-2, Type 1 cabinets with 2 shelves. Ensure top shelf has an unobstructed depth of at least 12 inches for base-mounted cabinets. Ensure top shelf has an unobstructed shelf depth of at least 13 inches for pole-mounted cabinets. Locate the top shelf at least 12 inches below the top of the door opening. Provide a lower shelf for mounting detector racks, its associated BIU, and other auxiliary equipment. Locate the lower shelf at least 10 inches below the top shelf, and provide at least 13 inches of unobstructed shelf depth. Secure card racks and associated BIU connector housings to the shelf by a removable means. Place the rack so that the front of the rack is not obscured by any object and so that backpanel terminals are not obscured even when the rack is fully utilized.

Provide a back panel hinged at the bottom for access during service.

Provide a minimum 12 x 14 inch plastic envelope or container located in the cabinet so that it is convenient for service personnel.

Furnish two sets of non-fading cabinet wiring diagrams and schematics in a paper envelope or container and placed in the plastic envelope or container.

Do not locate permanently mounted equipment in such a way that will restrict access to terminals.

C. NEMA TS-2 Type 1 Cabinet Electrical Requirements:

Provide a neutral that is not connected to the earth ground or the logic ground anywhere within the cabinet. Ensure the earth ground bus and the neutral ground bus each have ten compression type terminals each of which can accommodate wires ranging from number 14 through number 4.

Provide surge suppression in the cabinet and ensure that all devices operate over the temperature range of -40 to 185 degrees F.

Provide a loop surge suppresser for each set of loop terminals in the cabinet. Use terminal mount or stud mount devices for terminating the loop surge suppresser. Ensure that the device can withstand a minimum of 25 peak surge current occurrences at 100A in differential and common modes for a 10x700 microsecond waveform. Ensure that the maximum breakover voltage is 170V and the maximum on-state clamping voltage is 30V. Provide a maximum response time less than 5 nanoseconds and an off-state leakage current less than 10 μ A. Ensure that a nominal capacitance less than 220pf for both differential and common modes.

Provide surge suppression on each communications line entering or leaving a cabinet. Ensure that the communications surge suppresser can withstand at least 80 occurrences of an 8x20 microsecond waveform at 2000A, or a 10x700 microsecond waveform at 400A. Provide a maximum clamping voltage suited to the equipment protected. Provide a maximum response time less than 1 nanosecond with a nominal capacitance less than 1500pf and a series resistance less than 15 Ω .

Furnish a fluorescent fixture as required by NEMA TS-2 Specifications with a second lighting fixture mounted under the bottom shelf to light the terminals. Ensure that the second fixture is a fluorescent lighting fixture that complies with NEMA TS-2 Specifications or is a flexible gooseneck fixture containing a protected incandescent reflector bulb of at least 25 Watts. Furnish all bulbs. Ensure that the lamps are door switch actuated.

Provide connector type harnesses for all equipment installed in the cabinet, including detector racks. Furnish a harness with connectors to adapt the NEMA TS-2, Type 2 controller "A" connector to the NEMA TS-2, Type 1 "A" connector furnished with the cabinet assembly.

Tag all conductors that are likely to be disconnected from time to time with non-fading, permanent sleeve labels at the ends of the conductors.

In cabinets that are not base mounted, have no terminals closer than 4 inches to the bottom of the cabinet.

Fasten all wiring and harness supports to the cabinet with screws or other removable mechanical means. Do not use adhesives.

Provide harnesses in the cabinet for non-permanently mounted equipment that are long enough to allow the equipment to be relocated in an upright position to the roof of the cabinet or to be located to the ground 1 foot below cabinet level.

Do not locate terminals on the underside of shelves or at other places where they are not readily visible and accessible, or where they may be a hazard to personnel. Provide a clear plastic guard for exposed 120 volt AC terminals on the power panel and the rear of terminal facilities accessible from the rear door.

Provide compression type earth grounds with 10 position terminal buses sized for four Number 14 AWG wires. Provide screw-type terminals for signal feed, detector lead-in, NEMA I/Os, backpanels, and interconnect terminals. Provide screw terminals for all other devices not defined by NEMA TS-2 Specifications. Ensure that wiring by the manufacturer is terminated either on double terminal strips with crimped-on lugs or soldered to rear terminals.

Ensure that upon leaving any cabinet or malfunction management unit (MMU) initiated flashing operation, the controller reverts to its programmed start-up operation through the use of the START UP FLASH CALL feature. Do not require special controller software to implement the return from flash in the start up mode of operation. Wire one of the output relays of the MMU to apply a logic ground to the STOP TIME input for rings 1 and 2 when the MMU initiates flashing operation because of a sensed failure. Ensure that the MMU is interlocked within the cabinet control circuitry as to prevent normal signal operation with the MMU disconnected. Ensure that the 24Vdc supply to the load switches is disconnected when cabinet flashing operation is initialized. Provide a momentary pushbutton, or equivalent method, to apply 24Vdc to the load switches during cabinet flash for troubleshooting purposes.

Unless otherwise required, provide switches that are heavy-duty toggle switches.

Provide a technician panel mounted on the inside of the door with an EQUIPMENT POWER (ON/OFF) switch and an AUTO/FLASH switch. Ensure switches are protected against accidental activation by a flip-up switch guard that does not affect switch position when closed. Provide an EQUIPMENT POWER (ON/OFF) toggle switch that connects or disconnects protected equipment power to all devices in the cabinet and does not affect AC power to the flasher. Provide an AUTO/FLASH toggle switch which immediately places the intersection into flashing operation, disconnects the STOP TIME input generated by the MMU, and applies a logic ground to the LOCAL FLASH STATUS input of the MMU. When placed in the AUTO position, ensure that this switch causes the return of the intersection to normal operation at the programmed start up phases and intervals via the START-UP FLASH CALL feature of the controller unit. Provide a DETECTOR CHANNEL CALL three position detector test switch (on, normal, momentary on) installed for every detector channel in the detector racks. Provide four pedestrian detector test switches (on normal, momentary on) to the 4 pedestrian detector inputs of BIU no. 1. The switches may be installed on the door or on the non-door hinge side of the cabinet at the front of the cabinet.

Provide a police compartment constructed such that neither water nor dust will enter the interior of the cabinet through the police compartment, even when the police compartment door is open. Provide a rigid enclosure over the terminals of its components. Do not use flexible guards. Provide a SIGNAL POWER (ON/OFF) switch, an AUTO/FLASH switch, and an AUTO/MANUAL switch. Provide a locking jack for an optional manual push-button. Provide a SIGNAL POWER (ON/OFF) toggle switch which, when in the "OFF" position, disconnects AC power to the field terminals, applies logic ground to the LOCAL FLASH STATUS input of the MMU, and disconnects the STOP TIME input generated by the MMU. Ensure that a means to prevent recognition of red failure by the malfunction management unit is used and the switch does not affect power to equipment in the cabinet. When the SIGNAL POWER switch is switched to the "ON" position, ensure controller reverts to the programmed start-up phases and intervals via the START-UP FLASH CALL feature of the controller unit. Provide an AUTO/FLASH toggle switch that immediately places the intersection into flashing operation, and applies logic ground to the MMU LOCAL FLASH STATUS input. When placed in the AUTO position, ensure this switch allows the return of the intersection to normal operation at the programmed start-up phases and intervals via THE START-UP FLASH CALL feature of the controller unit. Provide an AUTO/MANUAL toggle switch that selects between normal operation (in the AUTO position) and manually controlled operation (in the MANUAL position). When in the MANUAL position, ensure that a logic ground is applied to the Manual Control Enable input of the controller. Ensure that only when a logic ground signal is applied to Manual Control Enable, the optional manual push-button can be used to advance the phases by applying and removing a logic ground signal to the Interval Advance input.

Provide one flash transfer relay and flasher for each corresponding socket. Provide 2 spare terminals for each flasher circuit output. Provide 1 MMU and 1 cabinet DC power supply (shelf mounted) with all necessary harnesses wired to the appropriate cabinet/back panel termination points. Terminate unused MMU inputs. Provide BIUs with sockets and terminal facilities. BIUs 3 and 4 may be mounted in a rack separate from the back panel.

Provide a minimum of 2 sets of loop terminals and a single earth ground terminal between the 2 sets of loop wire terminals for each slot in each detector rack provided.

In cabinets with less than 16 loadbay positions, provide flash transfer relay circuits for load switches used to implement pedestrian signals that are brought out to separate terminals but not connected for flashing operation when pedestrian signals are assigned to the load switch channel.

Ensure that the flash circuit inputs and outputs are available for easy connection to allow conversion of a pedestrian movement load switch for use as an overlap (vehicle phase) movement load switch. Provide a reserved flash transfer relay circuit for four vehicle movements and all necessary flash transfer relay input and output wiring and flash circuit wiring that can be made available at each pedestrian load switch position.

Comply with the applicable tables for the type of cabinet furnished:

TS-2 Type 1 Cabinet Configurations

CABINET CONFIGURATION	LOAD SWITCH SOCKETS	FLASH RELAY SOCKET S	FLASHER SOCKETS	BIU'S REQUIRED (BACK PANEL/ DETECTOR)	DETECTOR RACK TYPE/ QUANTITY	TS-2 CABINET TYPE*
NC-1	4	2	1	1/1	1/1	4**
NC-2	8	4	1	1/1	2/1	5
NC-3	12	6	1	2/1	2/1	6
NC-3A	12	6	1	2/2	2/2	6
NC-3B	12	6	1	2/2	2/1 1/1	6
NC-4	12	6	1	†3/1	2/1	6
NC-4A	12	6	1	†3/2	2/2	6
NC-4B	12	6	1	†3/2	2/1 1/1	6
NC-5	12	6	1	‡4/1	2/1	6
NC-5A	12	6	1	‡4/2	2/2	6
NC-5B	12	6	1	‡4/2	2/1 1/1	6
NC-6	16	6	1	2/2	2/2	6
NC-6A	16	6	1	2/2	2/1 1/1	6
NC-7	16	6	1	†3/2	2/2	6
NC-7A	16	6	1	†3/2	2/1 1/1	6
NC-8	16	6	1	‡4/2	2/2	6
NC-8A	16	6	1	‡4/2	2/1 1/1	6

*See NEMA TS-2-1998, Table 7-1 for actual dimensions.

**Type 5 cabinet may be substituted for four position base mount cabinet.

† BIU 3 required along with BIU 1, BIU 2, and detector BIU(s).

‡ BIU 3 and BIU 4 required along with BIU 1, BIU 2, and detector BIU(s).

16 Position Loadbay Cabinet Phase Assignments

PHASE /OL NUMBER	MALFUNCTION MANAGEMENT UNIT CHANNEL ASSIGNMENT	ASSIGNED TO LOAD SWITCH POSITION NUMBER	ASSIGNED TO FLASH RELAY NUMBER	ASSIGNED TO FLASHER CIRCUIT/	PROGRAM FLASH COLOR
1	1	1	1	1	R
2	2	2	1	2	Y
3	3	3	2	1	R
4	4	4	2	2	R
5	5	5	3	2	R
6	6	6	3	1	Y
7	7	7	4	2	R
8	8	8	4	1	R
2 PED	9	9	-	-	D
4 PED	10	10	-	-	D
6 PED	11	11	-	-	D
8 PED	12	12	-	-	D
O/L A	13	13	5	1	R
O/L B	14	14	5	2	R
O/L C	15	15	6	1	R
O/L D	16	16	6	2	R

Provide flasher circuits and flash transfer relay outputs and inputs that are brought out to terminals which provide a convenient means of changing flash color and flash circuit at each load switch position. Ensure that changing flash color of a given phase or overlap involves no more than moving three wires. Ensure that the selected phase or overlap flash color load switch output is easily movable to connect to the normally open flash transfer relay input assigned to the phase or overlap. Ensure that the common output of the flash transfer relay circuit assigned to the phase or overlap is easily movable to the selected field terminal (input) of the phase or overlap flash color. Ensure that the non-flashed load switch output is easily moved to provide power directly to the phase or overlap field terminal for that color.

In cabinets requiring a Type 1 detector rack, route to and terminate on a conveniently located terminal block on the back panel or elsewhere in the cabinet, the eight unused detector BIU Vehicle Call inputs. Tie the 8 unused detector BIU Detector Status inputs to the logic ground.

Provide detector racks and associated detector rack BIUs that are removable and replaceable from the cabinet either as a complete assembly or separately. Ensure that disconnection and reconnection of these units is through quick disconnect type connectors.

3.3. MATERIALS – NEMA TS-2 DETECTOR CARDS AND RACKS

Furnish NEMA TS-2 multi-channel detector cards and racks.

Provide cards that sequentially scan each of its channels. Provide channels with a minimum of eight sensitivity levels.

On a multi-channel detector, ensure that it is possible to turn a channel off and disable its operation from the front panel.

Ensure that detector units meet the requirements of NEMA TS-2 Specifications except as follows:

- Class 2 vehicle output is maintained for a minimum of 4 minutes, and
- Class 3 vehicle output is maintained for a minimum of 30 minutes, maximum 120 minutes.

Where required, furnish detector cards equipped with required timing features. Provide a delay that is settable in one second increments (maximum) over the range of zero to thirty seconds. Provide an extend that is settable in 1/4 second increments (maximum) over the range of 0 to 15 seconds. Provide cards that can set both delay and extend timing for the same channel. If both timings are set, ensure that the delay operates first. After the delay condition has been satisfied, ensure that the extend timer operates normally and that it is not necessary to satisfy the delay timing for an actuation arriving during the extend portion.

Ensure that two-channel detector cards operate normally with the same loop connected to both channels.

Provide lightning and surge protection that is incorporated into the design of the detector. Ensure that each channel operates properly when used with the loop detector surge protector.

In addition to NEMA TS-2 Specifications, ensure that each channel is capable of tuning to and operating on any loop system inductance within the range of 50 to 2,000 μ h. Ensure that the channel will operate properly even on a loop system that has a single-point short to earth ground.

3.4. MATERIALS – TYPE 2070E CONTROLLERS

Furnish model 2070E controller units that conform to CALTRANS *Transportation Electrical Equipment Specifications* (TEES) (dated March 12, 2009, plus Errata 1 dated January 21, 2010 and Errata 2 dated December 5, 2014) except as required herein.

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 OS-9 release 1.3.1 or later with kernel edition #380 or later 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 2070-2E+, 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 2070-4A, Power Supply Module, 10 AMP
- MODEL 2070-7A, Async Serial Com Module (9-pin RS-232)

3.5. MEASUREMENT AND PAYMENT

Actual number of each type of controllers with cabinets furnished, installed, and accepted.

No measurement will be made of conflict monitors, malfunction management units, external electrical service disconnect, grounding systems, modems, meter bases, and workshop as these items will be considered incidental to furnishing and installing controllers with cabinets.

Payment will be made under:

Controller with Cabinet (NEMA TS-2, 2070E Controller, Type 1 Cabinet, Base Mounted) ... Each

4. VIDEO IMAGING LOOP EMULATOR DETECTOR SYSTEMS

4.1. DESCRIPTION

Design, furnish, provide training, and install video imaging loop emulator detection systems with all necessary hardware in accordance with the plans and specifications.

Unless otherwise specified in the contract, all loop emulator detection equipment will remain the property of the contractor.

4.2. MATERIALS

A. General:

Material and equipment furnished under this section must be pre-approved on the Department's QPL by the date of installation except miscellaneous hardware such as cables and mounting hardware do not need to be pre-approved.

Used equipment will be acceptable provided the following conditions have been met:

- Equipment is listed on the current QPL.
- Equipment is in good working condition.
- Equipment is to remain the property of the contractor.

Ensure that software is licensed for use by the Department and by any other agency responsible for maintaining or operating the loop emulation system. Provide the Department with a license to duplicate and distribute the software as necessary for design and maintenance support.

Design and furnish video imaging loop emulator detection systems that detect vehicles at signalized intersections by processing video images and providing detection outputs to the signal controller in real time (within 112 milliseconds of vehicle arrival).

Furnish all required camera sensor units, loop emulator processor units, hardware and software packages, cabling, poles, mast arms, harnesses, camera mounting assemblies, surge protection panels, grounding systems, messenger cable and all necessary hardware. Furnish systems that allow the display of detection zones superimposed on an image of the roadway on a Department-furnished monitor or laptop computer screen. Ensure detection zones can be defined and data entered using a simple keyboard or mouse and monitor, or using a laptop PC with software.

Provide design drawings showing design details and camera sensor unit locations for review and acceptance before installation. Provide mounting height and location requirements for camera sensor units on the design based on site survey. Design video imaging loop emulator detection systems with all necessary hardware. Indicate all necessary poles, spans, mast arms, luminaire arms, cables,

camera mounting assemblies and hardware to achieve the required detection zones where Department owned poles are not adequate to locate the camera sensor units. Do not design for the installation of poles in medians.

Obtain the Engineer's approval before furnishing video imaging loop emulator detection systems. The contractor is responsible for the final design of video imaging loop emulator detection systems. Review and acceptance of the designs by the Department does not relieve the contractor from the responsibility to provide fully functional systems and to ensure that the required detection zones can be provided.

Provide the ability to program each detection call (input to the controller) with the following functions:

- Full Time Delay – Delay timer is active continuously,
- Normal Delay – Delay timer is inhibited when assigned phase is green (except when used with TS 2 and 170/2070L controllers),
- Extend – Call is extended for this amount of time after vehicle leaves detection area,
- Delay Call/Extend Call – This feature uses a combination of full time delay and extend time on the same detection call. Ensure operation is as follows: Vehicle calls are received after the delay timer times out. When a call is detected, it is held until the detection area is empty and the programmed extend time expires. If another vehicle enters the detection area before the extend timer times out, the call is held and the extend time is reset. When the extend timer times out, the delay timer has to expire before another vehicle call can be received.

Provide the ability to program each detection zone as one of the following functions:

- Presence detector,
- Directional presence detector,
- Pulse detector,
- Directional pulse detector.

Ensure previously defined detector zones and configurations can be edited.

Provide each individual system with all the necessary equipment to focus and zoom the camera lenses without the need to enter the camera enclosure.

Provide systems that allow for the placement of at least 8 detection zones within the combined field of view of a single camera sensor unit. Provide a minimum of 8 detection outputs per camera.

Provide detection zones that can be overlapped. Ensure systems reliably detect vehicles when the horizontal distance from the camera sensor unit to the detection zone area is less than ten times the mounting height of the sensor. Ensure systems detect vehicles in multiple travel lanes.

Ensure systems can detect vehicle presence within a 98 to 102 percent accuracy (up to 2 percent of the vehicles missed and up to 2 percent of false detection) for clear, dry, daylight conditions, a 96 to 105 percent accuracy (up to 4 percent of the vehicles missed and up to 5 percent false detection) for dawn and dusk conditions, and a 96 percent accuracy (up to 4 percent of the vehicles missed) for night and adverse conditions (fog, snow, rain, etc.) using standard sensor optics and in the absence of occlusion.

Repair and replace all failed components within 72 hours.

The Department may conduct field-testing to ensure the accuracy of completed video imaging loop emulator detection systems.

B. Loop Emulator System:

Furnish loop emulator systems that receive and simultaneously process information from camera sensor units, and provides detector outputs to signal controllers.

Ensure systems provide the following:

- Operate in a typical roadside environment and meet the environmental specifications and are fully compatible with NEMA TS 1, NEMA TS 2, or Type 170/2070L controllers and cabinets,
- provide a “fail-safe” mode whereby failure of one or more of the camera sensor units or power failure of the loop emulator system will cause constant calls to be placed on the affected vehicle detection outputs to the signal controller,
- provide compensation for minor camera movement of up to 2 percent of the field of view at 400 feet without falsely detecting vehicles,
- process the video at a minimum rate of 30 times per second,
- provide separate wired connectors inside the controller cabinet for video recording each camera,
- provide remote video monitoring with a minimum refresh rate at 1 frame per second over a standard dial-up telephone line,
- provide remote video detection monitoring.

Furnish camera sensor units that comply with the following:

- have an output signal conforming to EIA RS-170 standard,
- have a nominal output impedance of 75 ohms,
- be immune to bright light sources, or have built in circuitry or protective devices to prevent damage to the sensor when pointed directly at strong light sources,
- be housed in a light colored environmental enclosure that is water proof and dust tight, and that conforms to NEMA-4 specifications or better,
- simultaneously monitor at least five travel lanes when placed at the proper mounting location with a zoom lens,
- have a sunshield attached to the environmental enclosure to minimize solar heating,
- meet FCC class B requirements for electromagnetic interference emissions,
- have a heater attached to the viewing window of the environmental enclosure to prevent ice and condensation in cold weather.

Where coaxial video cables and other cables are required between the camera sensor and other components located in the controller cabinet, furnish surge protection in the controller cabinet.

If furnishing coaxial communications cable comply with the following, as recommended by the approved loop emulator manufacturer:

- Number 20 AWG, solid bare copper conductor terminated with crimped-on BNC connectors (do not use BNC adapters) from the camera sensor to the signal controller cabinet.
- Number 22 AWG, stranded bare copper conductor terminated with crimped-on BNC connectors (do not use BNC adapters) from the camera sensor unit to the junction box, and within the signal controller cabinet.

Furnish power cable appropriately sized to meet the power requirements of the sensors. At a minimum, provide three conductor 120 VAC field power cable.

As determined during the site survey, furnish sensor junction boxes with nominal 6 x 10 x 6 inches dimensions at each sensor location. Provide terminal blocks and tie points for coaxial cable.

C. Video Imaging Loop Emulator System Support:

Furnish video imaging loop emulator systems with either a simple keyboard or a mouse with monitor and appropriate software, or with system software for use on department-owned laptop PCs. Ensure the system is Windows 2000 and Windows XP compatible.

Provide Windows 2000 and Windows XP compatible personal computer software, if needed, to provide remote video and video detection monitoring.

Ensure systems allow the user to edit previously defined detector configurations. When a vehicle is within a detection zone, provide for a change in color or intensity of the detection zone perimeter or other appropriate display changes on the Department-furnished monitor or laptop computer screen.

Provide cabling and interconnection hardware with 6-foot minimum length interconnection cable to interface with the system.

Provide all associated equipment manuals and documentation.

4.3. CONSTRUCTION METHODS

Arrange and conduct site surveys with the system manufacturer's representative and Department personnel to determine proper camera sensor unit selection and placement. Provide the Department at least 3 working days notice before conducting site surveys. Upon completion of the site surveys the Department will provide revised plans reflecting the findings of the site survey.

Before beginning work at locations requiring video imaging loop emulator detection systems, furnish system software. Upon activation of detection zones, provide detector configuration files. Ensure that up-to-date detection configuration files are furnished for various detection zone configurations that may be required for construction phasing.

Place into operation loop emulator detection systems. Configure loop emulator detection systems to achieve required detection in designated zones. Have a certified manufacturer's representative on site to supervise and assist with installation, set up, and testing of the system.

Install the necessary processing and communications equipment in the signal controller cabinet. Make all necessary modifications to install equipment, cabling harnesses, and camera sensor interface panels with surge suppression.

Perform modifications to camera sensor unit gain, sensitivity, and iris limits necessary to complete the installation.

Do not install camera sensor units on signal poles unless approved by the Engineer.

Install the necessary cables from each sensor to the signal controller cabinet along signal cabling routes. Install surge protection and terminate all cable conductors.

Relocate camera sensor units and reconfigure detection zones as necessary according to the plans for construction phases.

Provide at least 8 hours of training on the set up, operation, troubleshooting, and maintenance of the loop emulator detection system to a maximum of ten Department personnel. Arrange for training to be conducted by the manufacturer's representative at an approved site within the Division responsible for administration of the project. Thirty days before conducting training submit a detailed course curriculum, draft manuals and materials, and resumes. Obtain approval of the submittal before conducting the training. At least one week before beginning training, provide three sets of complete documentation necessary to maintain and operate the system. Do not perform training until installation of loop emulator detection systems is complete.

4.4. MEASUREMENT AND PAYMENT

Actual number of site surveys, arranged, conducted, and accepted.

Actual number of luminaire arms for video systems furnished, installed, and accepted.

Actual number of cameras without internal loop emulator processing units furnished, installed, and accepted.

Actual number of external loop emulator processing units furnished, installed, and accepted.

Actual number of camera sensor units relocated with detection zones reconfigured, installed, and accepted.

No measurement will be made of video imaging loop emulator system support or training, power and video cables, luminaire arms for mounting video systems, mounting hardware, or trenching as these items will be considered incidental to furnishing and installing video imaging loop emulator detection systems.

Payment will be made under:

Site Survey	Each
Camera without Internal Loop Emulator Processing Unit.....	Each
External Loop Emulator Processing Unit	Each
Relocate Camera Sensor Unit	Each

5. TRAFFIC SIGNAL SUPPORTS

5.1. METAL TRAFFIC SIGNAL SUPPORTS – ALL POLES

A. General:

Furnish and install metal strain poles and metal poles with mast arms, grounding systems, and all necessary hardware. The work covered by this special provision includes requirements for the design, fabrication, and installation of both standard and custom/site specifically designed metal traffic signal supports and associated foundations.

Provide metal traffic signal support systems that contain no guy assemblies, struts, or stay braces. Provide designs of completed assemblies with hardware that equals or exceeds AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals* 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 grommited, and oversized to fit around the 2" diameter grommited shaft flange plate wire access hole.

After fabrication, have steel poles, required mast arms, and all parts used in the assembly hot-dip galvanized per section 1076. Design structural assemblies with weep holes large enough and properly located to drain molten zinc during the galvanization process. Provide hot-dip galvanizing on structures that meets or exceeds ASTM Standard A-123. Provide galvanizing on hardware that meets or exceeds ASTM Standard A-153. Ensure that threaded material is brushed and retapped as necessary after galvanizing. Perform repair of damaged galvanizing that complies with the following:

Repair of GalvanizingArticle 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 *2018 STANDARD SPECIFICATIONS FOR ROADS & STRUCTURES*, hereinafter referred to as the *Standard Specifications* for submittal requirements. Furnish shop drawings for approval. Provide the copies of detailed shop drawings for each type of structure as summarized below. Ensure that shop drawings include material specifications for each component and identify welds by type and size on the detail drawing only, not in table format. **Do not release structures for fabrication until shop drawings have been approved by NCDOT.** Provide an itemized bill of materials for all structural components and associated connecting hardware on the drawings.

Comply with article 1098-1A of the *Standard Specifications* for Qualified Products List (QPL) submittals. All shop drawings must include project location description, signal inventory number(s) and a project number or work order number on the drawings.

Summary of information required for metal pole review submittal:

Item	Hardcopy Submittal	Electronic Submittal	Comments / Special Instructions
Sealed, Approved Signal Plan/Loading Diagram	1	1	All structure design information needs to reflect the latest approved signal plans
Custom Pole Shop Drawings	4 sets	1 set	Show NCDOT inventory number(s), contractor's name and relevant revision number in the title block. All drawings must have a unique <u>drawing</u> number for each project and identified for multiple pages.
Standard Pole Shop Drawings (from the QPL)	4 sets	1 set	Submit drawings on 11" x 17" format media. Show NCDOT inventory number(s), contractor's name and relevant revision number in the title block. All drawings must have a <u>unique drawing</u> number for each project and identified for multiple pages.
Structure Calculations	1 set	1 set	Not required for Standard QPL Poles
Standard Pole Foundation Drawings	1 set	1 set	Submit drawings on 11" x 17" format media. Submit a completed Standard Foundation Selection form for each pole using foundation table on Metal Pole Drawing M-8.
Custom Foundation Drawings	4 sets	1 set	Submit drawings on 11" x 17" format media. Show NCDOT inventory number(s), contractor's name and relevant revision number in the title block. All drawings must have a <u>unique drawing</u> number for each project and identified for multiple pages. If QPL Poles are used, include the corresponding QPL pole shop drawings with this submittal.
Foundation Calculations	1	1	Submit copies of LPILE input, output and pile tip deflection graph per Section 11.4 of this specification for each foundation. Not required for Standard QPL Poles
Soil Boring Logs and Report	1	1	Report should include a location plan and a soil classification report including soil capacity, water level, hammer efficiency, soil bearing pressure, soil density, etc. for each pole.

NOTE – All shop drawings and custom foundation design drawings must be sealed by a Professional Engineer licensed in the state of North Carolina. All geotechnical information must be sealed by either a Professional Engineer or geologist licensed in the state of North Carolina. Include a title block and revision block on the shop drawings and foundation drawings showing the NCDOT inventory number.

Shop drawings and foundation drawings may be submitted together or separately for approval. However, shop drawings must be approved before foundations can be reviewed.

Foundation designs will be returned without review if the associated shop drawing has not been approved. 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 6th 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 1/4" minimum thick steel with a minimum width of 4". Galvanizing is not required for both plates.

Provide 4 heavy hex nuts and 4 flat washers for each anchor bolt. For nuts, use AASHTO M291 grade 2H, DH, or DH3 or equivalent material. For flat washers, use AASHTO M293 or equivalent material.

C. Construction Methods:

Erect signal support poles only after concrete has attained a minimum allowable compressive strength of 3000 psi. Install anchor rod assemblies in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* provision.

For further construction methods, see construction methods for Metal Strain Pole, or Metal Pole with Mast Arm.

Connect poles to grounding electrodes and bond them to the electrical service grounding electrodes.

For holes in the poles used to accommodate cables, install grommets before wiring pole or arm. Do not cut or split grommets.

Attach the terminal compartment cover to the pole by a sturdy chain or cable. Ensure the chain or cable is long enough to permit the cover to hang clear of the compartment opening when the cover is removed, and is strong enough to prevent vandalism. Ensure the chain or cable will not interfere with service to the cables in the pole base.

Attach cap to pole with a sturdy chain or cable. Ensure the chain or cable is long enough to permit the cap to hang clear of the opening when the cap is removed.

Perform repair of damaged galvanizing that complies with the *Standard Specifications*, Article 1076-7 "Repair of Galvanizing."

Install galvanized wire mesh around the perimeter of the base plate to cover the gap between the base plate and top of foundation for debris and pest control.

Install a ¼" thick plate for concrete foundation tag to include: concrete grade, depth, diameter, and reinforcement sizes of the installed foundation.

5.2. 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 6th 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 6th 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.

5.3. 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.

5.4. 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:

$$N_{AVG} = \frac{(N@1' + N@2.5' + \dots + N@Deepest \text{ Boring Depth})}{\text{Total Number of N-values}}$$

$$Y = (N@1')^2 + (N@2.5')^2 + \dots + (N@Deepest \text{ Boring Depth})^2$$

$$Z = (N@1' + N@2.5' + \dots + N@Deepest \text{ Boring Depth})$$

$$N_{STD \text{ DEV}} = \left[\frac{(\text{Total Number of N-values} \times Y) - Z^2}{(\text{Total Number of N-values}) \times (\text{Total Number of N-values} - 1)} \right]^{0.5}$$

Design N-value equals lesser of the following two conditions:

$$N_{AVG} - (N_{STD \text{ DEV}} \times 0.45)$$

Or

$$\text{Average of First Four N-Values} = \frac{(N@1' + N@2.5' + N@5' + N@7.5')}{4}$$

Note: If less than 4 N-values are obtained because of criteria listed in Section 2 above, use average of N-values collected for second condition. Do not include the N-value at the deepest boring depth for above calculations if the boring is discontinued at or before the required boring depth because of criteria listed in Section 2 above. Use N-value of zero for weight of hammer or weight of rod. If N-value is greater than 50, reduce N-value to 50 for calculations.

If standard NCDOT strain poles are shown on the plans and the Contractor chooses to use standard foundations, determine a drilled pier length, “L,” for each signal pole from the Standard Foundations Chart (sheet M 8) based on the Design N-value and the predominant soil type. For each standard pole location, submit a completed “Metal Pole Standard Foundation Selection Form” signed by the Contractor’s representative. Signature on form is for verification purposes only. Include the Design N-value calculation and resulting drilled pier length, “L,” on each form.

If non-standard site-specific poles are shown on the plans, submit completed boring logs collected in accordance with Section 2 (Soil Test) above along with pole loading diagrams from the plans to the contractor-selected pole fabricator to assist in the pole and foundation design.

If one of the following occurs, the Standard Foundations Chart shown on the plans may not be used and a non-standard foundation may be required. In such case, contact the Engineer.

- The Design N-value is less than 4.
- The drilled pier length, “L”, determined from the Standard Foundations Chart, is greater than the depth of the corresponding boring.

In the case where a standard foundation cannot be used, the Department will be responsible for the additional cost of the non-standard foundation.

Foundation designs are based on level ground around the traffic signal pole. If the slope around the edge of the drilled pier is steeper than 8:1 (H:V) or the proposed foundation will be less than 10 feet from the top of an embankment slope, the Contractor is responsible for providing slope information to the foundation designer and to the Engineer so it can be considered in the design.

The “Metal Pole Standard Foundation Selection Form” may be found at:

<http://www.ncdot.gov/doh/preconstruct/highway/geotech/formdet/misc/MetalPole.pdf>

If assistance is needed, contact the Engineer.

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.

5.5. 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 6th 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 ft² (17.0 ft² without back plate)
- 4-section, 12-inch, Surface area: 32.0 ft² (21.0 ft² without back plate)
- 5-section, 12-inch, Surface area: 42.0 ft² (29.0 ft² without back plate)

The ice loading for signal heads defined above includes the additional surface area that back plates will induce. Special loading criteria may be specified in instances where back plates will not be installed on signal heads. Refer to the Loading Schedule on each Metal Pole Loading Diagram for revised signal head surface areas. The pole designer should revise ice loads accordingly in this instance. Careful examination of the plans when this is specified is important as this may impact sizing of the metal support structure and foundation design which could affect proposed bid quotes. All maximum stress ratios of 0.9 still apply.

Assume the combined minimum weight of a messenger cable bundle (including messenger cable, signal cable and detector lead-in cables) is 1.3 lbs/ft. Assume the combined minimum diameter of this cable bundle is 1.3 inches.

Ensure that designs provide a removable pole cap with stainless steel attachment screws for each pole top and mast arm end.

B. Metal Poles:

Submit design drawings for approval including pre-approved QPL pole drawings. Show all the necessary details and calculations for the metal poles including the foundation and connections. Include NCDOT inventory number on design drawings. Include as part of the design calculations the

ASTM specification numbers for the materials to be used. Provide the types and sizes of welds on the design drawings. Include a Bill of Materials on design drawings. Ensure design drawings and calculations are signed, dated, and sealed by the responsible professional engineer licensed in the state of North Carolina. Immediately bring to the attention of the Engineer any structural deficiency that becomes apparent in any assembly or member of any assembly as a result of the design requirements imposed by these specifications, the plans, or the typical drawings. Said Professional Engineer is wholly responsible for the design of all poles and arms. Review and acceptance of these designs by the Department does not relieve the said Professional Engineer of his responsibility. **Do not fabricate the assemblies until receipt of the Department's approval of the design drawings.**

For mast arm poles, provide designs with provisions for pole plates and associated gussets and fittings for mast arm attachment. As part of each mast arm attachment, provide a 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.

For each strain pole, provide two messenger cable clamps and associated hardware to attach the messenger support cable. Ensure that the diameter of the clamps is appropriately designed to be adjustable from 1'-6" inches below the top, down to 6'-6" below the top of the pole. Do not attach more than one messenger support cable to a messenger cable clamp.

Provide a grounding lug(s) in the approximate vicinity of the messenger cable clamp for bonding and grounding messenger cable. Lugs must accept #4 or #6 AWG wire to bond messenger cables to the pole in order to provide an effective ground fault circuit path. Refer to Metal Pole Standard Drawing Sheet M6 for construction details.

Design tapers for all pole shafts that begin at the base with diameters that decrease uniformly at the rate of 0.14 inch per foot of length.

Design a base plate on each pole. The minimum base plate thickness for all poles is determined by the following criteria:

Case 1 Circular or rectangular solid base plate with the upright pole welded to the top surface of base plate with full penetration butt weld, and where no stiffeners are provided. A base plate with a small center hole, which is less than 1/3 of the upright diameter, and located concentrically with the upright pole, may be considered as a solid base plate.

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

M = bending moment at the critical section of the base plate induced by one anchor bolt

P = anchoring force of each anchor bolt

D_1 = horizontal distance between the anchor bolt center and the outer face of the upright, or the difference between the bolt circle radius and the outside radius of the upright

Locate the critical section at the face of the anchor bolt and perpendicular to the bolt circle radius. The overlapped part of two adjacent critical sections is considered ineffective.

Case 2 Circular or rectangular base plate with the upright pole socketed into and attached to the base plate with two lines of fillet weld, and where no stiffeners are provided, or any base plate with a center hole that is larger in diameter than 1/3 of the upright diameter.

The magnitude of bending moment induced by the anchoring force of each anchor bolt is $M = P \times D_2$,

where P = anchoring force of each anchor bolt

D_2 = horizontal distance between the face of the upright and the face of the anchor bolt nut

Locate the critical section at the face of the anchor bolt top nut and perpendicular to the radius of the bolt circle. The overlapped part of two adjacent critical sections is considered ineffective.

If the base plate thickness calculated for Case 2 is less than Case 1, use the thickness calculated for Case 1.

The following additional owner requirements apply concerning pole base plates.

- Ensure that whichever case governs as defined above, the anchor bolt diameter is set to match the base plate thickness. If the minimum diameter required for the anchor bolt exceeds the thickness required for the base plate, set the base plate thickness equal to the required bolt diameter.
- For dual mast arm supports, or for single mast arm supports 50' or greater, use a minimum 8 bolt orientation with 2" diameter anchor bolts, and a 2" thick base plate.
- For all metal poles with mast arms, use a full penetration groove weld with a backing ring to connect the pole upright component to the base. Refer to Metal Pole Standard Drawing Sheet M4.

Ensure that designs have anchor bolt holes with a diameter 1/4 inch larger than the anchor bolt diameters in the base plate.

Ensure that the anchor bolts have the required diameters, lengths, and positions, and will develop strengths comparable to their respective poles.

Provide designs with a 6 x 12-inch hand hole with a reinforcing frame for each pole.

Provide designs with a terminal compartment with cover and screws in each pole that encompasses the hand hole and contains provisions for a 12-terminal barrier type terminal block.

For each pole, provide designs with provisions for a 1/2 inch minimum thread diameter, coarse thread stud and nut for grounding which will accommodate a #6 AWG ground wire. Ensure the lug is electrically bonded to the pole and is conveniently located inside the pole at the hand hole.

When required, design couplings on the pole for mounting pedestrian pushbuttons at a height of 42 inches above the bottom of the base. Provide mounting points consisting of 1-1/2 inch internally threaded half-couplings that comply with the NEC that are mounted within the poles. Ensure the couplings are essentially flush with the outside surfaces of the poles and are installed before any required galvanizing. Provide a threaded plug for each half coupling. Ensure that the surface of the plug is essentially flush with the outer end of the mounting point when installed and has a recessed hole to accommodate a standard wrench.

C. Mast Arms:

Design all arm plates and necessary attachment hardware, including bolts and brackets as required by the plans.

Design for grommets holes on the arms to accommodate the cables for the signals if specified.

Design arms with weatherproof connections for attaching to the shaft of the pole.

Always use a full penetration groove weld with a backing ring to connect the mast arm to the pole. Refer to Metal Pole Standard Drawing Sheet M5.

Capacity of tapped flange plate must be sufficient to develop the full capacity of the connecting bolts. In all cases the flange plate of both arm and shaft must be at least as thick as the arm connecting bolts are in diameter.

5.6. 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".

5.7. MEASUREMENT AND PAYMENT

Actual number of metal strain signal poles (without regard to height or load capacity) furnished, installed and accepted.

Actual number of metal poles with single mast arms furnished, installed, and accepted.

Actual number of metal poles with dual mast arms furnished, installed, and accepted.

Actual number of soil tests with SPT borings drilled furnished and accepted.

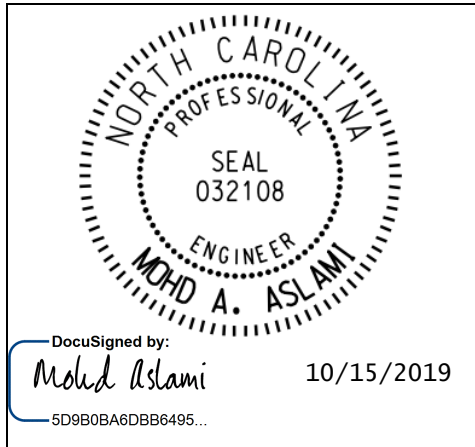
Actual volume of concrete poured in cubic yards of drilled pier foundation furnished, installed and accepted.

Actual number of designs for mast arms with metal poles furnished and accepted.

No measurement will be made for foundation designs prepared with metal pole designs, as these will be considered incidental to designing signal support structures.

Payment will be made under:

Metal Strain Signal Pole	Each
Metal Pole with Single Mast Arm	Each
Metal Pole with Dual Mast Arm.....	Each
Soil Test	Each
Drilled Pier Foundation.....	Cubic Yard
Mast Arm with Metal Pole Design	Each



**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

I-5700**Signals and Intelligent Transportation Systems****Project Special Provisions**

Prepared By: A. J. Skuce

October-19

This Seal Applies to Sections 1- 6 Only.

Contents

1. ITS PROJECT SCOPE	3
1.1. DESCRIPTION.....	3
A. General.....	3
B. Scope	3
2. CCTV FIELD EQUIPMENT	5
2.1. DESCRIPTION.....	5
2.2. MATERIAL	5
A. General.....	5
B. Camera and Lens	5
C. Camera Housing	6
D. Pan and Tilt Unit.....	7
E. Video Ethernet Encoder	7
F. Control Receiver/Driver.....	7
G. CCTV Camera Attachment to Pole	8
H. CCTV Equipment Cabinet.....	8
I. Surge Suppression.....	9
2.3. CONSTRUCTION METHODS.....	9
A. General.....	9
B. CCTV Installation with CCTV Equipment Cabinet	9
C. CCTV Installation with Traffic Signal Cabinet	10
2.4. MEASUREMENT AND PAYMENT.....	10
3. ELECTRICAL SERVICE	11
3.1. DESCRIPTION.....	11
3.2. MATERIAL	11

A.	<i>Meter Base/Disconnect Combination Panel</i>	11
B.	<i>Equipment Cabinet Disconnect</i>	12
C.	<i>3-Wire Copper Service Entrance Conductors</i>	12
D.	<i>3-Wire Copper Feeder Conductors</i>	12
E.	<i>Grounding System</i>	13
F.	<i>Wood Poles and Posts</i>	13
3.3.	CONSTRUCTION METHODS.....	13
A.	<i>General</i>	13
B.	<i>Meter Base/Disconnect Combination Panel</i>	13
C.	<i>Equipment Cabinet Disconnect</i>	13
D.	<i>3-Wire Copper Service Entrance Conductors</i>	13
E.	<i>3-Wire Copper Feeder Conductors</i>	13
F.	<i>Grounding System</i>	14
G.	<i>Wood Poles and Posts</i>	14
3.4.	MEASUREMENT AND PAYMENT	14
4.	COMMUNICATIONS EQUIPMENT	15
4.1.	DESCRIPTION.....	15
4.2.	MATERIAL	15
A.	<i>General</i>	15
B.	<i>Ethernet Edge Switch</i>	15
C.	<i>Outdoor-Rated Ethernet Cable</i>	20
4.3.	CONSTRUCTION METHODS.....	21
A.	<i>General</i>	21
B.	<i>Ethernet Edge Switch</i>	21
C.	<i>Outdoor-Rated Ethernet Cable</i>	21
4.4.	MEASUREMENT AND PAYMENT	22
5.	CCTV WOOD POLES	23
5.1.	DESCRIPTION.....	23
5.2.	MATERIAL	23
A.	<i>CCTV Wood Pole</i>	23
5.3.	CONSTRUCTION METHOD	23
5.4.	MEASUREMENT AND PAYMENT.....	23
6.	CCTV INTEGRATION AND TESTING	24
6.1.	DESCRIPTION.....	24
A.	<i>CCTV Camera Field Test</i>	24
B.	<i>30-Day Observation Period</i>	24
6.2.	MEASUREMENT AND PAYMENT.....	25

1. ITS PROJECT SCOPE

1.1.Description

A. General

The following Project Special Provisions apply to the ITS plans (ITS sheets 1-13) and the Signal communications plans (SCP sheets 1-11)

1. CCTV Field Equipment
2. Electrical Service
3. Communications Equipment
4. CCTV Wood Poles
5. CCTV integration and Testing
6. CCTV Metal Poles

Conform to these Project Special Provisions, Project Plans, and the 2018 *Standard Specifications for Roads and Structures* (also referred to hereinafter as the “Standard Specifications”). The current edition of these specifications and publications in effect on the date of advertisement will apply.

In the event of a conflict between these Project Special Provisions and the Standard Specifications, these Project Special Provisions govern.

B. Scope

The scope of the ITS work on this project includes:

1. Relocate and replace existing NCDOT ITS fiber-optic cable along I-40 from east of Airport Blvd. to West of I-540.
2. Relocate and replace existing NCTA fiber-optic cable along Airport Blvd. from Slater Rd. to I-40 and along I-40. From Airport Blvd. to West of I-540.
3. Installing temporary wireless communications for the Town of Cary traffic signals on Airport Blvd. during roadway construction.
4. Installing new fiber-optic cable for signal communications for the Town of Cary traffic signals on Airport Blvd. after roadway construction is complete.
5. Remove and replace the existing NCDOT ITS CCTV camera at I-40 and Airport Blvd. including a new:
 - Wood Pole
 - Electrical Service
 - CCTV Camera Assembly
 - CCTV Camera Cabinet
 - Field Ethernet Edge Switch
 - Fiber-Optic Drop Cable connection to the ITS trunk line on I-40

New NCDOT ITS CCTV camera is to be integrated with the State Traffic Operations Center existing ITS Network.

6. Remove and replace the existing Town of Cary CCTV camera on Airport Blvd. at I-40 including a new:

- Metal Pole with Foundation
- CCTV Camera Assembly
- Ethernet Cable connection to the existing Town of Cary Ethernet Switch in signal cabinet 05-1726

New Town of Cary CCTV Camera is to be integrated with the existing Town of Cary Signal System Network.

2. CCTV FIELD EQUIPMENT

2.1. Description

Furnish and install High Definition (1080p) CCTV field equipment described in these Project Special Provisions. Furnish equipment that is compatible, interoperable, and completely interchangeable with existing equipment currently in use by the Town of Cary or the STOC. Ensure that the equipment is fully compatible with all features of the existing video management software currently in use by the Town of Cary or the STOC.

2.2. Material

A. General

Furnish and install a new CCTV camera assembly at the locations shown on the Plans. This assembly consists of the following:

7. Dome CCTV camera that contains in a single enclosed unit the following:
 - a. CCTV color digital signal processing camera unit with zoom lens, filter, control circuit, and accessories
 - b. Motorized pan, tilt, and zoom
 - c. All necessary cable, connectors and incidental hardware to make a complete and operable system
 - d. Built-in video encoder capable of H.264/MPEG-4 AVC compression for video-over-IP transmission.
8. Lightning arrestors installed in-line between the CCTV camera and the equipment cabinet components.
9. A NEMA Type 4 enclosure constructed of aluminum with a clear acrylic dome or approved equal Camera Unit housing.

B. Camera and Lens

1. Cameras

Furnish new Complementary Metal-Oxide-Semiconductor (CMOS) sensor-equipped color cameras. Furnish cameras that meet the following minimum requirements:

- Video format:NTSC compatible resolution, user selectable up to a maximum of 1920x1080 (1080p),
- Focus:Automatic with manual override, Electronic Image Stabilization (EIS),
- White balance:Automatic through the lens with manual override,
- Shutter:Electronic shutter with manual control from 1/2 of a second to 1/30,000th of a second,
- Overexposure protection:The camera must have built-in circuitry or a protection device to

prevent any damage to the camera when pointed at strong light sources, including the sun,

- Sensitivity: 0.6 lux at 90% scene reflectance
- Input/Output Connection: Single 10BASE-T/100BASE-T compatible outdoor-rated Cat6 cable for video, control, and Power over Ethernet; IP66-rated RJ45 connector,
- Power: High Power over Ethernet (High PoE), 74W max

2. Zoom Lens

Furnish each camera with a motorized zoom lens that is integrated in a high-performance dome system, or approved equivalent, with automatic iris control and manual override. Furnish lenses that meet the following optical specifications:

- Aperture f/1.6 – f/2.9,
- Focal length: 4.45 mm (wide) and 89 mm (tele.), minimum,
- Horizontal viewing angle: 55.4° (wide) and 2.9° (tele), minimum,
- Zoom 30X optical, 12X digital, minimum
- Preset positioning: 64 Presets, minimum.

The lens must be capable of both automatic and remote manual control iris and focus override operation. The lens must be equipped for remote control of zoom and focus, including automatic movement to any of the preset zoom and focus positions. Mechanical or electrical means must be provided to protect the motors from overrunning in extreme positions. The operating voltages of the lens must be compatible with the outputs of the camera control.

C. Camera Housing

Furnish new dome style enclosure for the CCTV assemblies. The enclosures must be equipped with a sunshield and a strip heater and be fabricated from corrosion resistant aluminum and finished in a neutral color of weather resistant enamel. The enclosure must meet or exceed NEMA 4X and IP66 ratings. The viewing area of the enclosure must be constructed of clear acrylic, polycarbonate, or an approved equivalent.

Furnish removable dome enclosures that are secured to the camera housing using stainless steel set screws. Ensure that camera housing assembly is completely sealed with a rubber O-ring gasket to prevent dust and moisture intrusion.

Environmental Operating Conditions: -50°F to 122°F, 10-100% RH (condensing) humidity.

D. Pan and Tilt Unit

Equip each new dome style assembly with a pan and tilt unit. The pan and tilt unit must be integral to the high performance integrated dome system. The pan and tilt unit must be rated for outdoor operation, provide dynamic braking for instantaneous stopping, prevent drift, and have minimum backlash. The pan and tilt units must meet or exceed the following specifications:

- Pan:..... Continuous 360 Degrees,
- Tilt:..... Up/down 180 degrees minimum,
- Motors: Two-phase induction type,
continuous duty, instantaneous
reversing,
- Preset Positioning:..... 64 PTZ presets per camera.

E. Video Ethernet Encoder

Furnish cameras with a built-in digital video Ethernet encoder to allow video-over-IP transmission. The encoder units must be built into the camera housing and require no additional equipment to transmit encoded video over IP networks.

Encoders must have the following minimum features:

- Network Interface: Ethernet 10/100Base-T (RJ-45 connector)
- Protocols: IPv4, IPv6, HTTP, HTTPS, SSL, QoS, FTP, SMTP, UPnP, SNMP v2c/v3, DNS, NTP, RTSP, RTP, TCP, UDP, IGMP, and DHCP,
- Security: SSL, SSH, 802.1x, HTTPS encryption with password controlled browser interface
- Video Streams: Minimum 2 simultaneous streams, user configurable
- Compression: H.264 (MPEG-4 Part 10/AVC)
- Resolution Scalable; NTSC-compatible 320x176 to 1920x1080 (HDTV 1080p, 16:9 aspect ratio)
- Frame Rate: 1-30 FPS programmable (full motion)
- Bandwidth 30 kbps – 6 Mbps, configurable depending on resolution
- Edge Storage: SD/SDHC/SDXC slot supporting up to 64GB memory card

F. Control Receiver/Driver

Provide each new camera unit with a control receiver/driver that is integral to the CCTV dome assembly. The control receiver/driver will receive serial asynchronous data initiated from a camera control unit, decode the command data, perform error checking, and drive the pan/tilt unit, camera controls, and motorized lens. As a minimum, the control receiver/drivers must provide the following functions:

- Zoom in/out
- Automatic focus with manual override

- Tilt up/down
- Automatic iris with manual override
- Pan right/left
- Minimum 64 preset positions for pan, tilt, and zoom

In addition, each control receiver/driver must accept status information from the pan/tilt unit and motorized lens for preset positioning of those components. The control receiver/driver will relay pan, tilt, zoom, and focus positions from the field to the remote camera control unit. The control receiver/driver must accept “goto” preset commands from the camera control unit, decode the command data, perform error checking, and drive the pan/tilt and motorized zoom lens to the correct preset position. The preset commands from the camera control unit will consist of unique values for the desired pan, tilt, zoom, and focus positions.

G. CCTV Camera Attachment to Pole

At locations shown in the Plans where new CCTV cameras are to be installed on new metal poles or wood poles, furnish an attachment assembly for the CCTV camera unit. Submit shop drawings for review and approval by the Engineer prior to installation.

Furnish CCTV attachments that allow for the removal and replacement of the CCTV enclosure as well as providing a weatherproof, weather tight, seal that does not allow moisture to enter the enclosure.

Furnish a CCTV Camera Attachment Assembly that is able to withstand wind loading at a maximum wind speed of 130mph and gust factor of +11mph and can support a minimum camera unit dead load of 45 pounds (20.4 kg).

H. CCTV Equipment Cabinet

Furnish a new 336S CCTV cabinet to house CCTV control and communications equipment as shown on the plans. The cabinets must consist of a cabinet housing, removable 19-inch EIA mounting cage, and power distribution assembly (PDA #3 as described in the CALTRANS TEES). Provide pole-mounted version of the 336S CCTV cabinet, if applicable.

The cabinet housing must conform to sections 6.2.2 (Housing Construction), 6.2.3 (Door Latches & Locks), 6.2.4 (Ventilation), and 6.2.5 (Hinges & Door Catches) of the CALTRANS TEES. Do not equip the cabinet housings with a police panel. The cabinet cage must conform to section 6.3 of the CALTRANS TEES.

Terminal blocks on the PDA #3 Assembly have internal wiring for the Model 200 switch pack sockets. Do not use terminal blocks on PDA #3 as power terminals for cabinet devices. Do not furnish cabinet with “Input Panels” described in section 6.4.7.1 of the TEES. Do furnish cabinet with “Service Panels” as described in section 6.4.7.1 of the TEES. Use service panel #2.

Furnish terminal blocks for power for cabinet CCTV and communications devices as needed to accommodate the number of devices in the cabinet. Do not furnish cabinets with C1, C5, or C6 harness, input/output file, monitor or model units or switch packs.

Furnish all conduits, shelving, mounting adapters, and other equipment as necessary to route cabling, mount equipment, and terminate conduit in equipment cabinet.

The CCTV Cabinet shall contain at a minimum,

- Pull-out shelf drawer capable of supporting a 40-pound device or component when fully extended. Minimum interior 13"x16"x1"
- Stationary shelf for shelf-mounting the Ethernet edge switch
- Two (2) fluorescent lighting fixtures with UL-listed ballast
- Thermostats
- 24 VDC power supply
- 120 VAC outlets for tools and equipment
- Power strip along vertical rail.
- Surge protection device(s) to protect the CCTV and communications equipment from electrical surges and over voltages.

I. Surge Suppression

Protect all equipment at the top of the pole with grounded metal oxide varistors connecting each power conductor to ground.

2.3. Construction Methods

A. General

Mount CCTV camera units at a sufficient height to adequately see traffic in all directions and as approved by the Engineer. The maximum attachment height is 45 feet above ground level.

Mount the CCTV camera unit such that a minimum 5 feet of clearance is maintained between the camera and the top of the pole.

Mount CCTV camera on the side of pole nearest intended field of view. Avoid occluding the view with the pole.

Furnish all tools, equipment, materials, supplies, and hardware necessary to install a fully operational HD CCTV camera system as depicted in the Plans. Ground all equipment as called for in the Standard Specifications, these Project Special Provisions, and the Plans.

Electrically bond each camera and pan/tilt/zoom mechanism and its housing to the CCTV camera attachment assembly using a number 6 AWG braided copper conductor.

Obtain approval of the camera locations and orientation from the Engineer prior to installing the CCTV camera assemblies.

Contact the Town of Cary Traffic Signal System Supervisor, Wesley Vo, at (919) 460-3148 to coordinate the return of existing Town of Cary CCTV equipment and the placement of the new Town of Cary metal pole and CCTV camera.

B. CCTV Installation with CCTV Equipment Cabinet

Install new Type 336S CCTV camera cabinets as shown in the Plans. Install the electrical service conductors from the meter service. Install Power over Ethernet (PoE) injector in CCTV equipment cabinet and run an outdoor-rated Cat6 Ethernet cable up the interior of the steel pole to the CCTV

assembly. For wood poles, run the cable to the CCTV assembly as shown on the plans. Install a level concrete technician pad measuring a minimum 4 inches thick, 24 inches wide and 36 inches long at the front door of the CCTV equipment cabinet. Take all precautions necessary to ensure the Ethernet cable is not damaged during storage and installation. Do not pull the cable over or around obstructions or along the ground. Install camera equipment in the cabinet.

For pole mounted cabinets, use stainless steel banding or other method approved by the Engineer to mount cabinet to pole. Install cabinet so that the height to the middle of the enclosure is 4 feet from ground level. Avoid mounting cabinets where they will overhang and encroach upon an adjacent sidewalk or pedestrian path. Where a minor overhang of the sidewalk or pedestrian path cannot be reasonably avoided, ensure that a minimum of 4 feet of clear sidewalk width will remain once the cabinet is installed. Do not mount cabinets above pedestrian pushbuttons or where they will hinder access to pedestrian pushbuttons. No risers shall enter the top or sides of the cabinet. Have the Engineer approve the proposed mounting position prior to attaching the CCTV cabinet to the pole.

Provide real world GPS coordinates for all CCTV equipment cabinets installed under this project.

C. CCTV Installation with Traffic Signal Cabinet

At locations shown in the Plans, mount the CCTV Ethernet surge protection, CCTV power injector and CCTV cabling in a traffic signal cabinet. Using Cat6 Ethernet patch cord, connect the Ethernet edge switch to the Power Over Ethernet injector. Connect the Ethernet patch cord to the Power Over Ethernet injector to the Ethernet surge protection device. Connect the Ethernet surge protection device to the camera.

2.4. Measurement and Payment

CCTV camera assembly will be measured and paid as the actual number of CCTV assemblies furnished, installed, integrated, and accepted. No separate measurement will be made for patch cables, connectors, CCTV camera attachment assemblies, POE Injectors, conduit, condulets, grounding equipment, surge protectors, CCTV control software, or any other equipment or labor required to install the CCTV assembly.

CCTV Equipment Cabinet will be measured and paid as the actual number of CCTV Equipment Cabinets furnished, installed, and accepted. No separate measurement will be made for hardware, fasteners, stainless steel bands and brackets required to mount CCTV Equipment Cabinets to a pole as shown in these plans as such work will be considered incidental to furnishing and installing the CCTV Equipment Cabinets.

Removal of the existing CCTV Camera, cabinet, wood pole, metal pole, footing and any other existing CCTV equipment will be considered incidental to furnishing and installing a new CCTV Camera Assembly and/or Equipment Cabinet.

Payment will be made under:

Pay Item	Pay Unit
CCTV Camera Assembly	Each
CCTV Equipment Cabinet	Each

3. ELECTRICAL SERVICE

3.1. DESCRIPTION

Install new electrical service equipment at locations shown in the Plans. The first item of work on this project is the installation of all electrical service poles and meter base/disconnect combination panels to expedite the power service connections. Comply with the National Electrical Code (NEC), the National Electrical Safety Code (NESC), the Standard Specifications, the Project Special Provisions, and all local ordinances. All work involving electrical service shall be coordinated with the appropriate utility company and the Engineer.

3.2. MATERIAL

A. Meter Base/Disconnect Combination Panel

Furnish and install new meter base/disconnect combination panels. Provide meter base/disconnect combination panels that have a minimum of four (4) spaces in the disconnect. Furnish a single pole 15A circuit breaker at CCTV locations. Furnish each with a minimum of 10,000 RMS symmetrical amperes short circuit current rating in a lockable NEMA 3R enclosure. Ensure meter base/ disconnect combination panel is listed as meeting UL Standard UL-67 and marked as being suitable for use as service equipment. Ensure circuit breakers are listed as meeting UL-489. Fabricate enclosure from galvanized steel and electrostatically apply dry powder paint finish, light gray in color, to yield a minimum thickness of 2.4 mils. All exterior surfaces must be powder coated steel. Provide ground bus and neutral bus with a minimum of four terminals and a minimum wire capacity range of number 12 through number 3 AWG.

Furnish NEMA Type 3R combinational panel rated 100 Ampere minimum for overhead service or 200 Ampere for underground service that meets the requirements of the local utility. Provide meter base with sockets' ampere rating based on sockets being wired with a minimum of 167 degrees F insulated wire. Furnish 4 terminal, 600-volt, single phase, 3-wire meter bases that comply with the following:

- Line, Load, and Neutral Terminals accept 4/0 AWG and smaller Copper/Aluminum wire
- With or without horn bypass
- Made of galvanized steel
- Listed as meeting UL Standard US-414
- Overhead or underground service entrance specified.

Furnish 1.25" watertight hub for threaded rigid conduit with meter base.

At the main service disconnect, furnish and install UL-approved lightning arrestors that meet the following requirements:

Type of design	Silicon Oxide Varistor
Voltage	120/240 Single Phase, 3 wire
Maximum current	100,000 amps
Maximum energy	3000 joules per pole
Maximum number of surges	Unlimited
Response time one milliamp test	5 nanoseconds
Response time to clamp 10,000 amps	10 nanoseconds
Response time to clamp 50,000 amps	25 nanoseconds
Leak current at double the rated voltage	None
Ground wire	Separate

B. Equipment Cabinet Disconnect

Provide new equipment cabinet disconnects. Furnish single pole 15A circuit breaker at CCTV locations. Furnish panels that have a minimum of four (4) spaces in the disconnect. Furnish circuit breakers with a minimum of 10,000 RMS symmetrical amperes short circuit current rating in a lockable NEMA 3R enclosure. Ensure meter base/ disconnect combination panel is listed as meeting UL Standard UL-67 and marked as being suitable for use as service equipment. Ensure circuit breakers are listed as meeting UL-489. Fabricate enclosure from galvanized steel and electrostatically apply dry powder paint finish, light gray in color, to yield a minimum thickness of 2.4 mils. All exterior surfaces must be powder coated steel. Provide ground bus and neutral bus with a minimum of four terminals and a minimum wire capacity range of number 12 through number 3 AWG.

C. 3-Wire Copper Service Entrance Conductors

Furnish 3-wire stranded copper service entrance conductors with THWN rating. Provide conductors with black, red, and white insulation that are intended for power circuits at 600 Volts or less and comply with the following:

- Listed as meeting UL Standard UL-83
- Meets ASTM B-3 and B-8 or B-787 standards.

D. 3-Wire Copper Feeder Conductors

Furnish 3-wire stranded copper feeder conductors with THWN rating for supplying power to CCTV field equipment cabinets. Provide conductors with black or red, white, and green insulation that are intended for power circuits at 600 Volts or less and comply with the following:

- Listed as meeting UL Standard UL-83
- Meets ASTM B-3 and B-8 or B-787 standards.

E. Grounding System

Furnish 5/8"x10' copper clad steel grounding electrodes (ground rods), #4 AWG solid bare copper conductors, and irreversible compression kits for grounding system installations. Comply with the NEC, Standard Specifications, these Project Special Provisions, and the Plans.

F. Wood Poles and Posts

For overhead service, furnish 40-foot Class 3 wood poles for mounting of electrical service equipment.

For underground service, furnish 6" x 6" x 8' wood pedestals for mounting of electrical service equipment.

3.3. CONSTRUCTION METHODS**A. General**

Permanently label cables at all access points using nylon tags labeled with permanent ink. Ensure each cable has a unique identifier. Label cables immediately upon installation. Use component name and labeling scheme approved by the Engineer.

B. Meter Base/Disconnect Combination Panel

Install meter base/disconnect combination panels with lightning arrestors. At all new CCTV locations, route the feeder conductors from the meter base/disconnect to the CCTV equipment cabinet in conduit. Provide rigid galvanized conduit for above ground and PVC for below ground installations.

C. Equipment Cabinet Disconnect

Install equipment cabinet disconnects and circuit breakers as called for in the Plans. Install THWN stranded copper feeder conductors as shown in Plans between the electrical service disconnect and the equipment cabinet disconnect. Route the conductors from the equipment cabinet disconnect to the equipment cabinet in rigid galvanized steel conduit. Bond the equipment cabinet disconnect in accordance with the NEC. Ensure that the grounding system complies with the grounding requirements of these Project Special Provisions, the Standard Specifications and the Plans.

D. 3-Wire Copper Service Entrance Conductors

Furnish and install 3-wire THWN stranded copper service entrance conductors in 1.25-inch rigid galvanized risers. Install a waterproof hub on top of the electrical service disconnect for riser entrance/exit. Size the conductors as required. Comply with the Standard Specifications and Standard Drawings and all applicable electrical codes.

E. 3-Wire Copper Feeder Conductors

Install 3-wire THWN stranded copper feeder conductors to supply 120 VAC to the CCTV field equipment cabinets. Comply with the Standard Specifications and Standard Drawings and all applicable electrical codes.

F. Grounding System

Install ground rods. Mechanically crimp the #4 AWG grounding conductor to ground rods using an irreversible compression tool. Test the system to ensure a ground resistance of 20-ohms or less is achieved. Drive additional ground rods as necessary or as directed by the Engineer to achieve the proper ground resistance.

G. Wood Poles and Posts

Install wood poles and wood posts for electrical service equipment in compliance with all requirements of Section 1720-3 of the Standard Specifications.

3.4. MEASUREMENT AND PAYMENT

Meter Base/Disconnect Combination Panel will be measured and paid as the actual number of complete and functional meter base/disconnect combination panel service locations furnished, installed and accepted. Breakers, lightning arrestors, service entrance conductors, exposed vertical conduit runs, equipment cabinet disconnects, and any remaining hardware, fittings, and conduit bodies to connect the electrical service to the cabinet will be considered incidental to meter base/disconnect combination panels.

No measurement will be made for installing wood poles or wood posts for mounting electrical service equipment as these will be incidental to furnishing and installing meter base/disconnect combination panels.

No measurement will be made for installing Equipment Cabinet Disconnect as these will be incidental to furnishing and installing the electrical service.

3-Wire Copper Feeder Conductors will be measured and paid as the actual linear feet of 3-wire THWN stranded copper feeder conductors furnished, installed and accepted. Payment is for all three conductors. Measurement will be for the actual linear footage of combined conductors after all terminations are complete. No separate payment will be made for each individual conductor. No separate payment will be made for different wire sizes. No payment will be made for excess wire in the cabinets.

Grounding System will be measured and paid as the actual number of grounding systems for electrical service furnished, installed, and accepted. Grounding electrodes, grounding conductors, irreversible compression kits, and any remaining hardware and connections to establish the grounding system will be considered incidental.

Payment will be made under:

Pay Item	Pay Unit
Meter Base/Disconnect Combination Panel	Each
3-Wire Copper Feeder Conductors	Linear Foot
Grounding System.....	Each

4. COMMUNICATIONS EQUIPMENT

4.1. Description

Furnish, install, and fully integrate new communications equipment as called for in the Plans.

4.2. Material

A. General

Furnish equipment for Ethernet communications that complies with IEEE standard 802. Furnish equipment that is fully compatible and interoperable with the existing network hardware and software it is being integrated with.

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

B. Ethernet Edge Switch

1. General

Furnish and install a hardened, field Ethernet edge switch (hereafter “edge switch”) for ITS devices as specified below. Ensure that the edge switch is fully compatible, interoperable, and completely interchangeable and functional within the existing Statewide Traffic Operations Center (STOC) communications network.

Contact the Division 5 Regional ITS Engineer to arrange for the programming of the new Field Ethernet Switches with the necessary network configuration data, including but not limited to, the Project IP Address, Default Gateway, Subnet Mask and VLAN ID information. Provide a minimum five (5) days working notice to allow the Division to program the new devices.

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. Ensure the edge switch provides wire-speed, fast Ethernet connectivity at transmission rates of 1000 megabits per second from each remote ITS device location to the routing switches.

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.

2. Compatibility Acceptance

The Engineer has the authority to require the Contractor to submit a sample Field Ethernet Switch and Field Ethernet Transceiver along with all supporting documentation, software and testing procedures to allow a compatibility acceptance test to be performed prior to approving the proposed Field Ethernet Switch and Field Ethernet Transceiver for deployment. **The Compatibility Acceptance testing will ensure that the proposed device is 100% compatible and interoperable with the existing NCDOT ITS network, monitoring software and Traffic Operations Center network hardware.** Allow fifteen (15) working days for the Compatibility Acceptance Testing to be performed

3. 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.
- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
- IEEE 802.3ad Ethernet Link Aggregation
- IEEE 802.3i for 10BASE-T (10 Mbit/s over Fiber-Optic)
- IEEE 802.3ab for 1000BASE-T (1Gbit/s over Ethernet)
- IEEE 802.3z for 1000BASE-X (1 Gbit/s Ethernet over Fiber-Optic)

4. 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 & 3 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-1 & RMON-2) 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.

5. Physical Features:

Ports: Provide 10/100/1000 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 100/1000 Base X ports capable of transmitting data at 100/1000 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., 10/100/1000 Base) and duplex (i.e., full or half). Ensure that all 10/100/1000 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.

6. 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, 148,800 packets per second for 100 megabits per second and 1,488,000 packets per second for 1000 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 & 3 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:

<ul style="list-style-type: none"> - Part 1: Statistics - Part 2: History 	<ul style="list-style-type: none"> - Part 3: Alarm - Part 9: Event
---	--
- Provide support for the following RMON–2 groups, at a minimum:

<ul style="list-style-type: none"> - Part 13: Address Map - Part 16: Layer Host 	<ul style="list-style-type: none"> - Part 17: Layer Matrix - Part 18: User History
---	--
- 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-1&2) 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.

7. Electrical Specifications:

Ensure that the edge switch operates and 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. 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.

8. 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 61850-3 (electric utility substations)
- IEEE 61800-3 (variable speed drive systems)
- IEC 61000-6-2 (generic industrial)
- EMF – FCC Part 15 CISPR (EN5502) Class A

9. 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 6 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

10. Single Fiber SFP Module

Furnish Single Fiber SFP module that is rated to transmit and receive Ethernet data at a distance up to 25 km at 1310 or 1550 nanometers over single mode fiber.

Furnish SFP modules with LC connectors.

C. Outdoor-Rated Ethernet Cable

Furnish CAT6 Ethernet cable that is suitable for outdoor installation that and meets or exceeds the following standards:

- 4-pair shielded twisted pair cable
- 23 AWG (minimum) solid bare copper conductor
- Meets or exceeds CAT6A specifications
- High-density polyethylene insulation, PVC jacket
- Ascending / Descending Sequential Foot Markings
- Compliant with EIA/TIA standards
- UL/CSA listed
- UV Stabilized PE Jacket
- Gel Filled
- Meets TIA/EIA 568B.2 Networking Standard
- Supports 10/100/1000/10,000Mbps
- Mean Power Sum for Equal Level Far End Crosstalk (ELFEXT): 45dB/kft (minimum) at 772kHz
- Worst Pair Power Sum for ELFEXT: 40dB/kft (minimum) at 772kHz
- Mean Power Sum for Near-end Crosstalk (NEXT): 42dB/kft (minimum) at 772 kHz
- Operating Temperature: Rated from -10 to +60 Celsius
- Average mutual capacitance: 90nf/mile (maximum)

Copper clad aluminum cable is not allowed.

The cable must be factory tested on reels for each pair's mutual capacitance, crosstalk loss, insulation resistance, and conductor resistance. Furnish the Engineer with a certified factory report

for each reel showing compliance with these Project Special Provisions, the factory test results, and the manufactured date of the cable. The contractor shall not use Ethernet cable manufactured more than one year before the date of installation.

Provide RJ-45 connectors with gold conductors and terminate according EIA/TIA 568 A/568-B standards. Provide connectors with eight contacts. Furnish connectors appropriately rated for the cable being installed.

4.3. Construction Methods

A. General

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

All cables for each piece of hardware installed shall be clearly labeled, using a label convention approved by the Engineer. All cabling shall be manufacturer assembled and without any adapters, unless otherwise approved by the Engineer.

B. Ethernet Edge Switch

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 Regional ITS Engineer a minimum of 5 days prior to installation for the most current edge switch IP Address, VLAN, subnet mask, default gateway and configuration files.

Mount the edge switch inside the equipment 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.

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 has connectors on both ends, primarily used for interconnecting termination or patching facilities and/or equipment.

C. Outdoor-Rated Ethernet Cable

Install Ethernet cable in conduits, risers, and on aerial messenger cable at locations shown in the Plans. Pull 36 inches of additional cable slack into controller cabinets and in junction boxes.

Ethernet cables shall not be spliced. All Ethernet cables shall be labeled with waterproof, smear resistant labels that denote the equipment cabinets or housing they are run from and the device and identifier for that device they are connected.

The contractor shall not exceed 80 percent of the manufacturer's maximum pulling tension when installing underground Ethernet cable. Use a clutch device (dynamometer) so as not to exceed the

allowable pulling tension if the cable is pulled by mechanical means. Do not use a motorized vehicle to generate cable-pulling forces.

Keep tension on the cable reel and the pulling line at the start of each pull. Do not release the tension in the cable if the pulling operation is halted. Restart the pulling operation by gradually increasing the tension until the cable is in motion.

4.4. MEASUREMENT AND PAYMENT

Ethernet Edge Switch will be measured and paid as the actual number of Ethernet edge switches furnished, installed, and accepted.

Ethernet Cable will be measured and paid as linear feet of outdoor rated Ethernet cable furnished, installed, and accepted. Lengths of Ethernet cable installed will be determine using the sequential foot markings for each segment of cable installed and terminated.

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 payment will be made for Single Fiber SFP Modules as these will be considered incidental to the installation and integration of the Ethernet Edge Switch.

No separate payment will be made for cable routing within field cabinets as this will be considered incidental to equipment installation and integration.

No measurement will be made for terminating and testing of the cable, connectors, cable and identification markers, as these will be considered incidental to the installation of the Ethernet cable.

Payment will be made under:

Pay Item	Pay Unit
Ethernet Edge Switch.....	Each
Ethernet Cable.....	Linear Feet

5. CCTV WOOD POLES

5.1. Description

Furnish and install wood poles with grounding systems and all necessary hardware in accordance with Section 1720 of the Standard Specifications.

5.2. Material

Material, equipment, and hardware furnished under this section shall be pre-approved on the Department's QPL. Refer to Subarticles 1082-3(F) Treated Timber and Lumber – Poles and 1082-4(G) Preservative Treatment - Poles.

A. CCTV Wood Pole

Unless otherwise specified in the Plans, furnish Class 3 or better wood poles, to mount CCTV cameras and cabinets, that are a minimum of 60' long to permit the CCTV camera to be mounted 45 feet above the ground at the pole and a minimum 5 feet from the top of the pole.

5.3. Construction Method

Mark final pole locations and receive approval before installing poles. Comply with all requirements of Section 1720-3 of the Standard Specifications.

5.4. Measurement and Payment

CCTV Wood Pole will be measured and paid as the actual number of 60' wood poles furnished, installed, and accepted.

No measurement will be made for installing grounding systems, including lightning air terminals, as these will be incidental to furnishing and installing CCTV wood poles

Payment will be made under:

Pay Item	Pay Unit
CCTV Wood Pole	Each

6. CCTV INTEGRATION AND TESTING

6.1. Description

Once all hardware for the new metal pole and CCTV camera assembly has been installed, test the new camera locally to ensure functionality. Perform these tests in the presence of the Engineer or a designated representative. After successfully testing the new camera, integrate it with the Town of Cary Signal System. **Work is not complete until the new CCTV camera is operational on the Town of Cary's network and the 30-day observation period is complete.**

Once all hardware for the new wood pole and CCTV camera assembly has been installed, test the new camera locally to ensure functionality. Perform these tests in the presence of the Engineer or a designated representative. After successfully testing the new camera, integrate it with the State Traffic Operations Center (STOC). **Work is not complete until the new CCTV camera is operational on the STOC's existing network and the 30-day observation period is complete.**

A. CCTV Camera Field Test

Verify that each CCTV camera can be controlled locally at the camera site. The test should exercise all camera functionality as noted below:

- Pan 360 degrees left and right
- Tilt 180 degrees up and down
- Zoom In / Zoom Out
- Focus near / Focus far
- Auto-focus
- Iris open / Iris close
- Auto-iris
- Record and run presets

The Contractor should supply a Laptop or PDA loaded with the appropriate CCTV control software and a portable color monitor for use during this test.

In addition, the field test will include inspection of the cabinets, electrical service, grounding system, wire & cabling, and all other components installed at each CCTV site.

B. 30-Day Observation Period

Upon completion of all project work, the successful completion of the CCTV Camera Field Test and the correction of all known deficiencies, including minor installation items, a 30-day Observation Period will commence. This Observation Period will consist of a 30-day period of normal operation without any failures. The purpose of this period is to ensure that all components of the system function in accordance with these Project Special Provisions over an extended length of time.

Respond to system or component failures (or reported failures) that occur during the 30-day Observation Period within 24 hours. Correct said failures within 48 hours. Failures that cannot be corrected within 48 hours will suspend the timing of the 30-day Observation Period beginning at the time when the failure occurred. After the cause of such failures has been corrected, timing of the 30-day Observation Period will resume. Failures that necessitate a redesign of any major component

will terminate the Observation Period. Once the components have been redesigned or replaced, the 30-Day Observation Period will be restarted from zero. Failures in any of the components exceeding a total of three (3) occurrences will terminate the 30-day Observation Period. Once the failures have been corrected, the 30-day Observation Period will be restarted from zero.

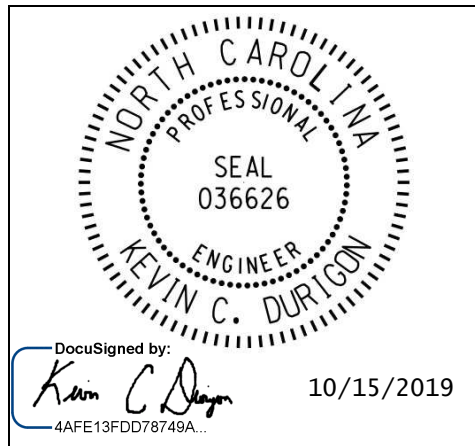
All documentation must be completed prior to the end of the 30-day Observation Period. The 30-day Observation Period will not be considered part of the contract time. Final acceptance will occur upon the successful completion of the 30-day Observation Period and after all documentation requirements have been fully satisfied.

The system major components are:

- CCTV Camera Assembly on Metal Pole (Town of Cary Signal System)
- CCTV Camera Assembly on Wood Pole (NCDOT State Traffic Operations Center)

6.2. Measurement and Payment

There will be no direct payment for integration, testing and 30-day observation period work covered in this section. Payment at contract unit prices for the various items in the contract will be full compensation for all work covered in this section.



**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

I-5700

**Signals and Intelligent Transportation Systems
Project Special Provisions**

This Seal Applies to Section 7 Only.

Contents

7. CCTV METAL POLES	27
7.1. CCTV METAL POLES	27
A. General:	27
B. Materials:	28
C. Construction Methods:	30
D. Design:	31
7.2. DRILLED PIER FOUNDATIONS FOR METAL POLES	32
A. Description:	33
B. Soil Test and Foundation Determination:	33
C. Drilled Pier Construction:	34
7.3. MEASUREMENT AND PAYMENT	34

7. CCTV METAL POLES

7.1. CCTV Metal poles

A. General:

Furnish and install a new 40-foot tapered CCTV metal pole, grounding system, and all necessary hardware. The work covered under this special provision includes requirements for the design, fabrication, and installation of custom designed CCTV metal poles and associated foundations.

Comply with applicable sections of the *2018 STANDARD SPECIFICATIONS FOR ROADS & STRUCTURES*, hereinafter referred to as the *Standard Specifications*. Provide designs of completed assemblies with hardware equaling or exceeding AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals* 6th Edition, 2013 (hereinafter 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.

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 "General Requirements" of the *Standard Specifications* for submittal requirements. Furnish shop drawings for approval. Provide copies of detailed shop drawings as summarized below. Ensure shop drawings include material specifications for each component. Ensure shop drawings 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.** Ensure shop drawings contain an itemized bill of materials for all structural components and associated connecting hardware.

Comply with article 1098-1A "General Requirements" of the *Standard Specifications* for Qualified Products List (QPL) submittals. All shop drawings must include project location description, CCTV asset inventory number(s), and project number or work order number.

Summary of information required for metal pole review submittal:

Item	Hardcopy Submittal	Electronic Submittal	Comments / Special Instructions
Sealed, Approved ITS Plan/Loading Diagram	1	1	All structure design information needs to reflect the latest approved ITS plans
Pole Shop Drawings	4 sets	1 set	Submit drawings on 11" x 17" format media Show NCDOT asset inventory number(s) and relevant revision number in or above the title block. All drawings must have a <u>unique drawing number</u> for each project and identified for multiple pages.
Structure Calculations	1 set	1 set	
Foundation Drawings	4 sets	1 set	Submit drawings on 11" x 17" format media. Show NCDOT asset inventory number(s) and relevant revision number in or above the title block. All drawings

			must have a <u>unique drawing number</u> for each project and identified for multiple pages.
Foundation Calculations	1	1	Submit LPILE input, output and pile tip deflection graph per Section 7.2 of this specification for each foundation.
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 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 designs showing the NCDOT asset inventory number(s).

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 shall include the following: Engineer's summary, boring location maps, soil classification per AASHTO Classification System, and hammer efficiency. 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:

Refer to Metal Pole Standard Drawing Sheets M2 through M3 for fabrication details.

Fabricate CCTV metal pole from coil or plate steel to meet the requirements of ASTM A 595 Grade A tubes. For structural steel shapes, plates and bars use, as a minimum, A572 Gr 50, AASHTO M270 Gr 50, ASTM A709 Gr 50, or an approved equivalent. Provide pole shafts of round or near round (18 sides or more) cross-section, or multi-sided tubular cross-section with no less than six sides, having a uniform linear taper of 0.14 in/ft. Construct shafts from one piece of single-ply plate or coil, eliminating circumferential weld splices. Hot-dip galvanize in accordance with AASHTO M 111 or an approved equivalent. For anchor base fabrication, conform to the applicable bolt pattern and orientation as shown on Metal Pole Standard Drawing Sheet M2.

Use the submerged arc process or other NCDOT previously approved process suitable for shafts, to continuously weld pole shafts along their entire length. The longitudinal seam weld shall be finished flush to the outside contour of the base metal. Ensure shaft has no circumferential welds except at the lower end joining the shaft to the pole base. Use full penetration groove welds with backing ring for all tube-to-transverse-plate connections in accordance with 6th Edition AASHTO. Provide welding that conforms to Article 1072-18 of the *Standard Specifications*, except no field welding on any part of the pole will be permitted unless approved by a qualified engineer.

After fabrication, hot-dip galvanize steel poles and assembly components per section 1076 of the *Standard Specifications*. 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 threaded material is brushed and re-tapped as necessary after galvanizing. Perform repair of damaged galvanizing that complies with the following *Standard Specifications* article:

Repair of Galvanizing Article 1076-7

Ensure metal poles permit cables to be installed inside poles. For holes in poles used to accommodate cables, provide full-circumference grommets.

Ensure all hardware is galvanized steel or stainless steel. The Contractor is responsible for ensuring the Designer/Fabricator specifies connecting hardware and/or materials that prevent dissimilar metal corrosive reaction.

For each structural bolt and other steel hardware, hot-dip galvanizing shall conform to the requirements of AASHTO M 232 (ASTM A-153).

Ensure each anchor rod is 2-inch minimum diameter and 60-inch length. Provide 10-inch minimum thread projection at the top of the rod, and 8-inch minimum at the bottom of the rod. Use anchor rod assembly and drilled pier foundation materials complying with SP09_R005, hereinafter referred to as *Foundations and Anchor Rod Assemblies for Metal Poles*.

Provide a circular anchor bolt lock plate securing the anchor bolts at the embedded end with two (2) washers and two (2) nuts. Provide a base plate template matching the bolt circle diameter of the anchor bolt lock plate. Construct plates and templates from 1/4-inch minimum thick steel with a minimum width of 4 inches. Hot-dip galvanizing is not required for both plates.

Ensure designs have anchor bolt holes with a diameter 1/4-inch larger than the anchor bolt diameters in the base plate.

Provide four (4) heavy hex nuts and four (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. Ensure anchor bolts have required diameters, lengths, and positions, and will develop strengths comparable to their respective poles.

Furnish hand hole covers attached to the pole by a sturdy chain or cable approved by the Engineer. Ensure chain or cable is long enough to permit cover to hang clear of the compartment opening when cover is removed and is strong enough to prevent vandalism. Ensure chain or cable will not interfere with service to cables in the pole shaft.

Have poles permanently stamped above the base hand hole with the identification tag details as shown on Metal Pole Standard Drawing Sheet M2.

Provide a 2-inch hole equipped with an associated coupling and weather head approximately 5 feet below the top of the pole to accommodate passage of CCTV cables from inside the pole to the CCTV camera.

Provide a 2-inch hole equipped with an associated coupling and conduit fittings/bodies approximately 18 inches above the base of the pole to accommodate passage of CCTV cables from CCTV cabinet to inside of pole. Refer to Metal Pole Standard Drawing Sheet M3 for fabrication details.

For each pole, provide a 1/2-inch minimum thread diameter, coarse thread stud and nut for grounding which will accommodate #4 AWG ground wire. Ensure 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 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 chain or cable is long enough to permit cap to hang clear of the pole-top opening when cap is removed.

C. Construction Methods:

CCTV metal poles may be erected and fully loaded after concrete has attained a minimum allowable compressive strength of 3,000 psi. Final approval of foundation is contingent upon concrete achieving a compressive strength of 4,500 psi strength as required by *Foundations and Anchor Rod Assemblies for Metal Poles* provision.

Install CCTV metal poles, hardware, and fittings as shown on the manufacturer's installation drawings. Ensure the installed pole, when fully loaded, is within 0.5 degrees of vertical.

Connect poles to grounding electrodes and bond them to the electrical service grounding electrodes.

For holes in the poles used to accommodate cables, install full-circumference grommets before wiring pole. Do not cut or split grommets.

Attach hand hole covers to the pole by a sturdy chain or cable. Ensure chain or cable is long enough to permit cover to hang clear of the opening when cover is removed, and is strong enough to prevent vandalism. Ensure chain or cable will not interfere with service to cables in the pole.

Attach cap to pole with a sturdy chain or cable. Ensure chain or cable is long enough to permit cap to hang clear of the opening when cap is removed.

When field drilling is necessary for wire or cable entrances into the pole, comply with the following requirements:

- Do not drill holes within 2 inches of any welds.
- Do not drill any holes larger than 3 inches in diameter without checking with the ITS & Signals Structure Engineers.
- Avoid drilling multiple holes along the same cross section of tube shafts.
- Install rubber grommets in all field drilled holes that wire, or cable will directly enter unless holes are drilled for installation of weather heads or couplings.
- Treat the inside of the drilled holes, and repair all galvanized surfaces in accordance with Section 1076-7 of the latest edition of the *Standard Specification*.
- Cap or plug any existing field drilled holes that are no longer used with rubber, aluminum, or stainless-steel hole plugs.

Perform repair of damaged galvanizing that complies with the *Standard Specifications*, Article 1076-7 "Repair of Galvanizing."

Install a 1/4-inch thick plate for concrete foundation tag to include the following information: concrete grade, depth, diameter, and reinforcement sizes of the installed foundation. Refer to standard drawing M7 for further details.

Install galvanized wire mesh to cover the gap between the base plate and top of foundation for debris and pest control. Refer to standard drawing M7 for further details.

Immediately notify the Engineer of any structural deficiency that becomes apparent in any assembly, or member of any assembly, because of the design requirements imposed by these specifications, the plans, or the typical drawings.

D. Design:

Calculate all stresses using applicable equations from Section 5 of 6th Edition AASHTO. The Maximum allowable stress ratio for all CCTV metal pole designs is 0.9.

Ensure allowable pole deflection does not exceed that allowed per 6th Edition AASHTO. Ensure maximum deflection at the top of the pole does not exceed 2.0 percent of the pole height.

Design a base plate for 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, 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 (1) anchor bolt

P = anchoring force of each anchor bolt

D₁ = 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 (2) 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 (2) 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

D₂ = 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 (2) 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 all metal poles, 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 M3.

Ensure anchor bolts have the required diameters, lengths, and positions, allowing development strengths comparable to their respective poles.

The Professional Engineer is wholly responsible for the design of all poles. Review and acceptance of these designs by the Department does not relieve the said Professional Engineer of his or her responsibility.

7.2. Drilled Pier Foundations for Metal Poles

Analysis procedures and formulas shall be based on AASHTO 6th Edition, latest ACI-318 code and the Drilled Shafts: Construction Procedures and Design Methods FHWA-NHI-10-016 manual. Design methods based on engineering publications or research papers must have prior approval from NCDOT. The Department reserves the right to accept or reject any method used for the analysis.

Use the following Safety Factors for the foundation design:

- 1.0 x Service (Unfactored) Loads for LPILE Shaft Lateral Deflection
- 1.3 x Torsion (Unfactored) Load for Drilled Shaft Concrete and Steel Strength
- $(1.3 / 1.33)$ x Torsion (Unfactored) Load for Shaft Soil-to-Concrete Torsion Capacity
- $(2.0 / 1.33)$ x Axial (Unfactored) Load for Shaft Axial Capacity in Soil

Ensure deflection at top of foundation does not exceed 1 inch for worst-case lateral load.

Use LPILE Plus V6.0 or later for lateral analysis. Submit inputs, results and corresponding graphs with the design calculations.

Calculate skin friction 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 2.5 feet for cohesive soils when calculating skin friction.

Assume a hammer efficiency of 0.70 unless value is provided.

Design foundations to carry the maximum capacity of each metal pole.

When poor soil conditions are encountered, which could create an excessively large foundation design, consideration may be given to allow 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, the Contractor should have 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.

Provide concrete foundation identification tag per Standard M7 drawing.

A. Description:

Design, furnish and install foundations for CCTV metal poles with all necessary hardware in accordance with the plans and specifications.

Design all CCTV pole foundations using actual soil conditions at each pole location. Perform soil test in accordance with article “B” Soil Test and Foundation Determination of this special provision.

B. Soil Test and Foundation Determination:

1. General:

Drilled piers are reinforced concrete sections, cast-in-place against in situ, undisturbed soil. Drilled piers are of straight shaft type and vertical.

Some drilled piers for supporting metal poles may require wing walls to resist torsional rotation. Based upon this provision and the results of the required soil test, a drilled pier length requirement may be determined and constructed in accordance with the plans.

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 CCTV 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-inch intervals.
- A total of 50 blows have been applied with < 3-inch penetration.

Describe each CCTV pole location along the project corridor in a manner that is easily discernible to both the Contractor’s Designer and NCDOT reviewers. If a CCTV pole is at an intersection, label the boring the “Intersection of (Route or SR #), (Street Name) and (Route or SR #), (Street Name), _____ County, Asset Inventory No. _____”. Label borings with “B- N, S, E, W, NE, NW, SE or SW” corresponding to the quadrant location within the intersection.

If the CCTV pole location is located between intersections, provide a coordinate location and offset, or milepost number and offset. Pole numbers should be made available to the geotechnical drilling 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 or pole locations. For each boring, submit a legible (handwritten 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 the water table and a general description of the soil types encountered using the AASHTO Classification System.

Borings that cannot be easily correlated to their specific pole location will be returned to the Contractor for clarification, or if approved by the Engineer, the foundation may be designed using the worst-case soil condition obtained as part of this project.

3. Foundation Design:

Design foundations based upon site-specific soil test information collected in accordance with Section 2 (Soil Test) above. Design drilled piers for side resistance in accordance with Section 4.6 of the 2002 AASHTO *Standard Specifications for Highway Bridges, 17th Edition*. Use computer software LPILE version 6.0 or later manufactured by Ensoft, Inc. to analyze drilled piers. Use 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 resulting in horizontal lateral movement less than 1 inch at top of the pier, and horizontal rotational movement less than 1 inch at the edge of pier. Submit 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 and install anchor rod assemblies in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles provision*.

7.3. Measurement and Payment

Actual number of CCTV Metal Poles (40-foot) 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.

No measurement will be made for CCTV Metal Pole designs and foundation designs, as these will be considered incidental to CCTV Metal Poles and Drilled Pier Foundations.

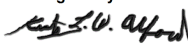
Payment will be made under:

Pay Item	Pay Unit
CCTV Metal Pole (40-foot).....	Each
Soil Test.....	Each
Drilled Pier Foundation.....	Cubic Yard

Project Special Provisions Structures

Maintenance and Protection of Traffic Beneath Proposed Structure at Station 44+35.96 -L- Left & Right -----	(08-13-04)	ST-2
Steel Reinforced Elastomeric Bearings -----	(06-22-16)	ST-2
Disc Bearings -----	(02-03-14)	ST-3
Thermal Sprayed Coatings (Metallization) -----	(12-01-17)	ST-7
Elastomeric Concrete -----	(02-11-19)	ST-9
Foam Joint Seals -----	(09-27-12)	ST-11
Optional Precast Reinforced Concrete Box Culvert at Station 33+31.33 -L-, 53+39.00 -L-, 29+90.00 -Y3-, & 86+76.00 -Y- -----	(12-12-13)	ST-14
Submittal of Working Drawings -----	(06-28-17)	ST-22
Falsework and Formwork -----	(04-05-12)	ST-28
Crane Safety -----	(06-20-19)	ST-34
Grout for Structures -----	(12-01-17)	ST-35
Asbestos Assessment for Bridge Demolition and Renovation Activities -----	(12-30-15)	ST-36
FAA Notice of Proposed Construction -----	(SPECIAL)	ST-38



DocuSigned by:

 F245838930BF40E...

9/16/2019

MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH (8-13-04)
PROPOSED STRUCTURE AT STATION 44+35.96 -L- LEFT AND RIGHT

1.0 GENERAL

Maintain traffic on I-40 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 1/2 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.

STEEL REINFORCED ELASTOMERIC BEARINGS

(6-22-16)

The 2018 Standard Specifications shall be revised as follows:

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

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

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

DISC BEARINGS**(2-3-14)****1.0 GENERAL**

This item consists of furnishing, fabrication and installation of disc bearings in accordance with AASHTO LRFD Bridge Design Specifications, the Standard Specifications, the recommendations of the manufacturer, the details shown on the plans and as specified herein. Disc Bearings consist of a polyether urethane structural element (elastomeric disc) confined by upper and lower steel bearing plates. Equip disc bearings with a shear restriction mechanism (shear pin) to prevent movement of the disc. Supply disc bearings as fixed bearings and guided expansion bearings as designated by the Contract Documents.

Fixed disc bearings allow rotation but no longitudinal or transverse movement in the bearing plane. Fixed bearings consist of a steel sole plate, an elastomeric disc, a shear pin, a steel upper bearing plate, a steel lower bearing plate, a steel masonry plate, a preformed bearing pad, anchor bolts, nuts and washers.

Guided expansion disc bearings allow rotation and only longitudinal movement in the bearing plane. Guided expansion disc bearings consist of a steel sole plate, a polished stainless steel sheet welded to the bottom of the sole plate within the sliding region, a steel upper bearing plate, a layer of virgin polytetrafluoroethylene (PTFE) material bonded to the top and sides of the upper plate within the sliding regions, guide bars welded to the bottom of the sole plate surrounding the sliding region to restrict transverse movement, polished stainless steel sheets welded to the sides of the guide bars within the sliding regions, an elastomeric disc, a shear pin, a steel lower bearing plate, a steel masonry plate, a preformed bearing pad, anchor bolts, nuts, washers, pipe sleeves, a closure plate, grout and various sizes of standard pipe, and any other necessary material as detailed on the plans. Align the stainless steel sheet on the bottom of the sole plate with the PTFE material on the top of the upper bearing plate. Align the PTFE material on the sides of the upper bearing plate with the stainless steel sheets on the sides of the guide bars.

2.0 MATERIALS

Use disc bearings produced by the same manufacturer.

Use AASHTO M270 Grade 50W (345W) or Grade 50 (345) for all steel plates except the stainless steel sheets in the disc bearings. Clean, coat, and seal the plates in the disc bearing assemblies except for the areas with special facings and the areas that come in contact with the elastomer disc, in accordance with the Special Provision for "Thermal Sprayed Coatings (Metallization)". The surfaces shall be coated to a thickness of 8 mils minimum on all external parts. Repair surfaces that are abraded or damaged after the application of metallizing in accordance with the Special Provision for "Thermal Sprayed Coatings (Metallization)".

Provide anchor bolts and nuts in accordance with the Standard Specifications.

When the maximum plan dimension of the sheet is 12" or less, provide a stainless steel sheet in expansion disc bearings that is at least 16 gage or 1/16". When the maximum plan

dimension is greater than 12", provide a stainless steel sheet that is at least 11 gage or 1/8". Ensure that all stainless steel sheets are in conformance with ASTM A240/A167 Type 304 and polished to a minimum #8 mirror surface finish.

Blast clean the surfaces of the steel sole plate and the steel guide bars that will be attached to the stainless steel sheets to a near white condition in accordance with the Standard Specifications. Position and clamp the back of the stainless steel sheets in contact with the steel sole plate and the steel guide bars. Apply the stainless steel sheets to the blast cleaned surfaces of the steel sole plate and the steel guide bars as soon as possible after blasting and before any visible oxidation of the blast cleaned surfaces occurs. Weld the stainless steel sheets continuously around the perimeter using a tungsten inert gas, wire-fed welder.

For the PTFE sheets bonded to the top and side sliding surfaces of the steel upper bearing plate, used as mating surfaces for the stainless steel sheets attached to the steel sole plate and the guide bars, provide an unfilled virgin PTFE sheet (recessed) or a glass-fiber filled PTFE sheet, resulting from skiving billets formed under hydraulic pressure and heat. Provide resin that conforms to the requirements of ASTM D4894 or D4895.

To bond the PTFE sheets and the steel upper bearing plate, use heat cured high temperature epoxy capable of withstanding temperature of -320°F to 500°F.

Weld the guide bars in expansion bearings to the bottom of the sole plate. Alternatively, integrate the guide bars and sole plate from the same piece of steel, ensuring that the required dimensions are provided. Provide 1/16" clearances between the stainless steel sheets attached to the side sliding surfaces of the guide bars and the PTFE sheet attached to the side sliding surface of the steel upper bearing plate.

Mold the polyether urethane structural element (elastomeric disc) from a polyether urethane compound. The top and bottom surfaces of the disc shall be roughened. Ensure that the physical properties of the polyether urethane conform to the following requirements:

Physical Property	ASTM Test Method	Requirements	
		Min.	Max.
Hardness, Type D Durometer	D2240	60	64
Tensile Stress psi At 100% elongation At 200% elongation	D412	2000 3700	-----
Tensile Strength psi	D412	5000	-----
Ultimate Elongation %	D412	220	-----
Compression Set % 22 hrs. at 158°F	D395	-----	40

3.0 DESIGN

Design the disc bearings for the loads and movements shown on the contract plans. However, use the anchor bolt size, length, spacing and masonry plate thickness as shown on the contract plans and provide an overall bearing height within ½ inch of the bearing assembly height shown on the contract plans. Either combine and cast the sole plate and upper bearing plate (for fixed bearings), the sole plate and guide bars (for expansion bearings), and the lower bearing plate and masonry plate (for fixed and expansion bearings) as a single unit or weld together prior to the installation of the disc.

Ensure access and removal of anchor bolt nut is not in conflict with the upper bearing plate, guide bars or sole plate.

When designing the bearings, use the following allowable bearing stresses:

On polyether urethane structural element: 5000 psi

On PTFE Sliding Surface, filled or unfilled PTFE (recessed): 3500 psi

Submit eight sets of shop drawings and one set of design calculations for review, comments and acceptance. Have a North Carolina Registered Professional Engineer check and seal the shop drawings and design calculations.

After the Engineer reviews the drawings and, if necessary, corrections are made, submit one 22" x 34" reproducible set of the working drawings.

4.0 SAMPLING AND TESTING**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**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.

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.

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)

(12-1-2017)

1.0 DESCRIPTION

Apply a thermal sprayed coating (TSC) and sealer to metal surfaces in accordance with the Thermal Sprayed Coatings (Metallization) Program and as specified herein when called for on the plans or by other Special Provisions. Use only Arc Sprayed application methods to apply TSC. The Engineer must approve other methods of application.

The Thermal Sprayed Coatings (Metallization) Program is available on the Materials and Tests Unit website.

2.0 QUALIFICATIONS

Only use NCDOT approved TSC Contractors meeting the requirements outlined in the Thermal Sprayed Coatings (Metallization) Program.

3.0 MATERIALS

Use only materials meeting the requirements of Section 7 of the Thermal Sprayed Coatings (Metallization) Program.

4.0 SURFACE PREPARATION AND TSC APPLICATION

Surface preparation of TSC surfaces shall meet the requirements of Section 8 of the Thermal Sprayed Coatings (Metallization) Program. Apply TSC with the alloy to the thickness specified on the plans or as required by Thermal Sprayed Coatings (Metallization) Program.

5.0 INSPECTION AND TESTING

The TSC Contractor must conduct inspections and tests listed in the Thermal Sprayed Coatings (Metallization) Program.

6.0 REPAIRS

Perform all shop repairs in accordance with the procedures outlined in the Thermal Sprayed Coatings (Metallization) Program.

Repairs associated with field welding shall be made by removing the existing metallizing by blast or power tool cleaning. Affected areas shall be addressed as follows:

- For Marine Environments, incorporate a minimum surface preparation in accordance with SSPC SP-11 (Power Tool Cleaning to Bare Metal) and require an approved epoxy mastic coating applied in accordance with the manufacturer's recommendation. Apply a minimum of two (2) coats at a rate of 5-7 (WFT) per coat to the affected area.
- For Non-Marine Environments, incorporate a minimum surface preparation in accordance with SSPC SP-11 (Power Tool Cleaning to Bare Metal) and require an approved organic zinc-rich coating applied in accordance with the manufacturer's recommendation. Apply a minimum of two (2) coats at a rate of 5-7 (WFT) per coat to the affected area.
 1. Minor localized areas less than or equal to 0.1 ft² with exposed substrate shall be repaired as outlined above for marine and non-marine environments.
 2. Large localized areas greater than 0.1 ft² with exposed substrate shall require the Contractor to submit a detailed repair procedure to the Engineer for review and approval.
- Repair methods for areas where the substrate has not been exposed shall be mutually agreed upon between the Contractor and TSC Contractor as approved by the Engineer.

7.0 TWELVE MONTH OBSERVATION PERIOD

All TSC materials applied under the Thermal Sprayed Coatings (Metallization) Program shall be evaluated twelve (12) months after project acceptance for defective materials and workmanship.

8.0 BASIS OF PAYMENT

The contract price bid for the metal component to which the TSC is applied will be full compensation for the thermal sprayed coating.

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

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

MATERIALS

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

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

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

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

PREQUALIFICATION

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

North Carolina Department of Transportation
Materials and Tests Unit
1801 Blue Ridge Road
Raleigh, NC 27607

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

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

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

INSTALLATION

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

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

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

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

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

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

FIELD SAMPLING

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

BASIS OF PAYMENT

No separate payment will be made for elastomeric concrete. The lump sum contract price bid for "Foam Joint Seals" or "Preformed Silicone Expansion Joint Seal" will be full compensation for furnishing and placing the Elastomeric Concrete.

FOAM JOINT SEALS

(9-27-12)

1.0 SEALS

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

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

TEST	TEST METHOD	REQUIREMENT
Tensile strength	ASTM D3575-08, Suffix T	110 – 130 psi
Compression Set	ASTM D1056 Suffix B, 2 hr recovery	10% - 16%
Water Absorption	ASTM D3575	< 0.03 lb/ft ²
Elongation at Break	ASTM D3575	180% - 210%
Tear Strength	ASTM D624 (D3575-08, Suffix G)	14 – 20 pli
Density	ASTM D3575-08, Suffix W, Method A	1.8 – 2.2 lb/ft ³
Toxicity	ISO-10993.5	Pass (not cytotoxic)

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

2.0 BONDING ADHESIVE

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

TEST	TEST METHOD	REQUIREMENT
Tensile strength	ASTM D638	3000 psi (min.)
Compressive strength	ASTM D695	7000 psi (min.)
Hardness	Shore D Scale	75-85 psi
Water Absorption	ASTM D570	0.25% by weight max.
Elongation to Break	ASTM D638	5% (max.)
Bond Strength	ASTM C882	2000 psi (min.)

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

3.0 SAWING THE JOINT

The joint opening shall be initially formed to the width shown on the plans including the blockout for the elastomeric concrete.

The elastomeric concrete shall have sufficient time to cure such that no damage can occur to the elastomeric concrete prior to sawing to the final width and depth as specified in the plans.

When sawing the joint to receive the foam seal, always use a rigid guide to control the saw in the desired direction. To control the saw and to produce a straight line as indicated on the

plans, anchor and positively connect a template or a track to the bridge deck. Do not saw the joint by visual means such as a chalk line. Fill the holes used for holding the template or track to the deck with an approved, flowable non-shrink, non-metallic grout.

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

The desired depth is the depth of the seal plus 1/4" above the top of the seal plus approximately 1" below the bottom of the seal. An irregular bottom of sawed joint is permitted as indicated on the plans. Grind exposed corners on saw cut edges to a 1/4" chamfer.

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

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

4.0 PREPARATION OF SAWED JOINT FOR SEAL INSTALLATION

The elastomeric concrete shall cure a minimum of 24 hours prior to seal installation.

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

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

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

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

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

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

5.0 SEAL INSTALLATION

Install the joint seal according to the manufacturer's procedures and recommendations and as recommended below. Do not install the joint seal if the ambient air or surface temperature

is below 45°F. Have a manufacturer's certified trained factory representative present during the installation of the first seal of the project.

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

Begin installation by protecting the top edges of the concrete deck adjacent to the vertical walls of the joint as a means to minimize clean up. After opening both cans of the bonding agent, stir each can using separate stirring rods for each component to prevent premature curing of the bonding agent. Pour the two components, at the specified mixing ratio, into a clean mixing bucket. Mix the components with a low speed drill (400 rpm max.) until a uniform gray color is achieved without visible marbling. Apply bonding agent to both sides of the elastomeric concrete as well as both sides of the joint seal, making certain to completely fill the grooves with epoxy. With gloved hands, compress the joint seal and with the help of a blunt probe, push the seal into the joint opening until the seal is recessed approximately 1/4" below the surface. When pushing down on the joint seal, apply pressure only in a downward direction. Do not push the joint seal into the joint opening at an angle that would stretch the material. Seals that are stretched during installation shall be removed and rejected. Once work on placing a seal begins, do not stop until it is completed. Clean the excess epoxy from the top of the joint seal immediately with a trowel. Do not use solvents or any cleaners to remove the excess epoxy from the top of the seal. Remove the protective cover at the joint edges and check for any excess epoxy on the surface. Remove excess epoxy with a trowel, the use of solvents or any cleaners will not be allowed.

The installed system shall be watertight and will be monitored until final inspection and approval. Do not place pavement markings on top of foam joint seals.

6.0 BASIS OF PAYMENT

Payment for all foam joint seals will be at the lump sum contract price bid for "Foam Joint Seals". Prices and payment will be full compensation for furnishing all material, including elastomeric concrete, labor, tools and equipment necessary for installing these units in place and accepted.

OPTIONAL PRECAST REINFORCED CONCRETE
BOX CULVERT AT STATION 33+31.33 -L-, 53+39.00 -L-,
29+90.00 -Y3-, & 86+76.00 -Y-

(12-12-13)

GENERAL

This Special Provision covers the design, fabrication and construction of precast reinforced concrete box culverts intended for the conveyance of storm water.

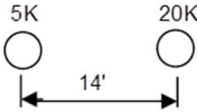
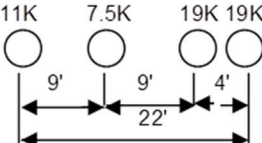
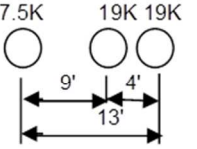
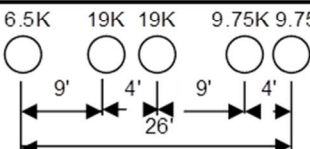
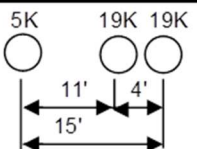
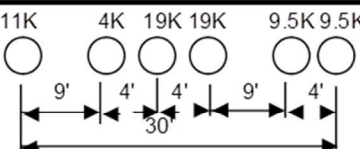
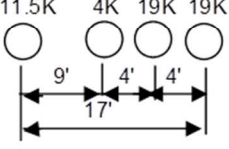
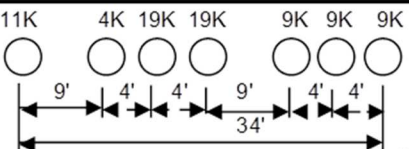
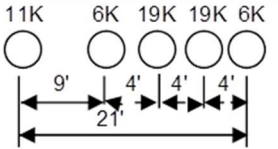
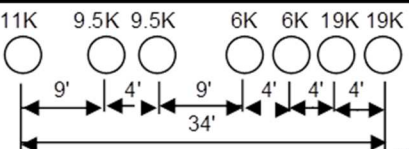
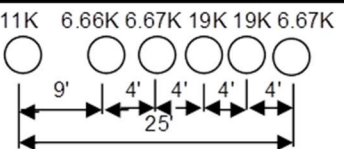
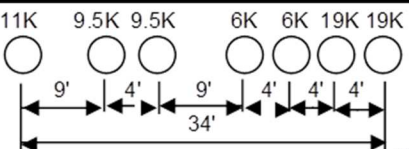
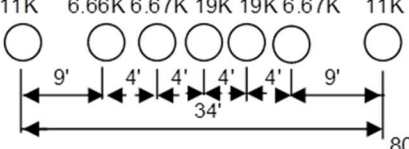
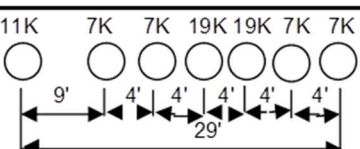
If the option is indicated on the plans, the submittal for a precast reinforced box culvert in lieu of a cast-in-place culvert is permitted. Design the precast culvert sections in accordance with ASTM C1577 or the current edition of the AASHTO LRFD Bridge Design Specifications. Rate all sizes of precast reinforced concrete box culverts in accordance with the current edition of the AASHTO Manual for Bridge Evaluation. Ensure the culvert rates for the AASHTO design loads and North Carolina's legal loads (see Section 2.0 for North Carolina's legal loads). Provide the size and number of barrels as indicated on the plans. Detail the culvert with cast-in-place wings walls and footings. Precast wing walls and footings will not be allowed. Provide a precast box culvert that meets the requirements of Section 1077 and any other applicable parts of the Standard Specifications.

The design and rating of the precast and cast-in-place members is the responsibility of the Contractor and is subject to review, comments and approval. Submit two sets of detailed plans and rating sheets for review. Include all details in the plans, including the size and spacing of the required reinforcement necessary to build the precast box and cast-in-place members. Have a North Carolina Registered Professional Engineer check and seal the plans, rating sheets and design calculations. After the plans, rating sheets and design calculations are reviewed and, if necessary, the corrections made, submit one set of plans and rating sheets on 22" x 34" sheets to become part of the contract plans.

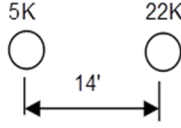
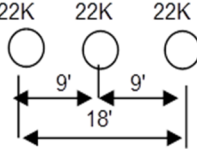
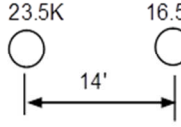
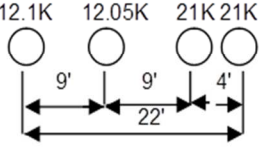
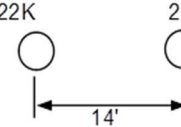
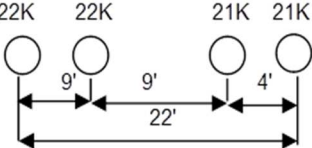
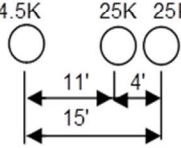
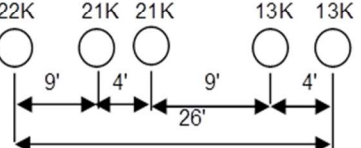
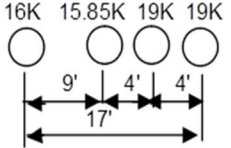
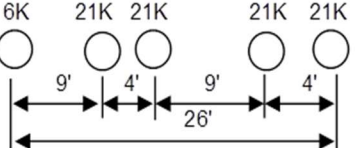
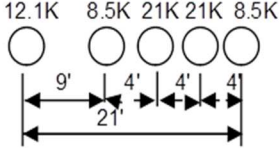
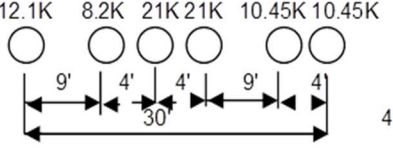
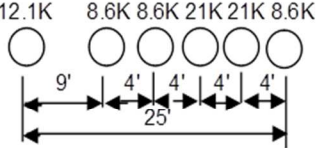
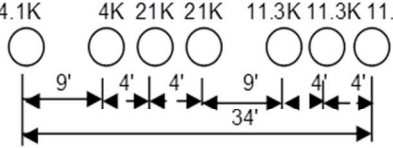
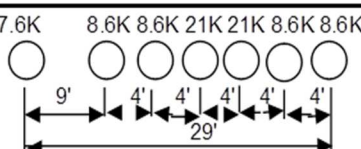
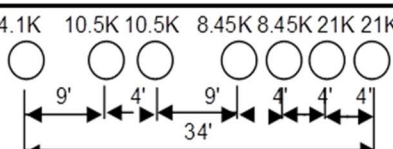
If the span, rise and design earth cover for the precast reinforced concrete box culvert are identical to a previously approved submittal, the Contractor may request the previously approved design calculations and plans be considered as the submittal for review and approval. However, a set of plans and rating sheets will need to be submitted to become part of the contract plans.

NORTH CAROLINA'S LEGAL LOADS

Apply the following legal loads to all structures carrying interstate traffic:

SINGLE VEHICLE(SV)			TRUCK TRACTOR SEMI-TRAILER(TTST)		
REF. #	SCHEMATIC		REF. #	SCHEMATIC	
SH			25K 12.5 TON	T4A	
S3A			45.5K 22.75 TON	T5B	
S3C			43K 21.5 TON	T6A	
S4A			53.5K 26.75 TON	T7A	
S5A			61K 30.5 TON	T7B	
S6A			69K 34.5 TON		
S7A			80K 40 TON		
S7B			77K 38.5 TON		

Apply the following legal loads to all structures carrying non-interstate traffic:

SINGLE VEHICLE (SV)			TRUCK TRACTOR SEMI-TRAILER (TTST)		
REF. #	SCHEMATIC		REF. #	SCHEMATIC	
SNSH			TNAGRIT3		
SNGARBS2			TNT4A		
SNAGRIS2			TNAGRIT4		
SNCOTTS3			TNAGT5A		
SNAGGRS4			TNAGT5B		
SNS5A			TNT6A		
SNS6A			TNT7A		
SNS7B			TNT7B		

PRECAST REINFORCED CONCRETE BOX SECTIONS

The precast reinforced concrete box culvert sections shall match the size and hydraulic opening indicated in the contract plans.

Design

Design Fill – The design earth cover is reported on the plans as the elevation difference between the point of maximum fill and the bottom of the top slab.

Placement of Reinforcement – Provide a 1 inch concrete cover over the reinforcement subject to the provisions of Section F. Extend the inside reinforcement into the tongue portion of the joint and the outside reinforcement into the groove portion of the joint. Detail the clear distance of the end wires so it is not less than 1/2 inch or more than 2 inches from the ends of the box section. Assemble reinforcement per the requirements of ASTM C1577 or the approved design. The exposure of the ends of the wires used to position the reinforcement is not a cause for rejection.

Laps and Spacing – Use lap splices for the transverse reinforcement. Detail the transverse wires so that the center to center spacing is not less than 2 inches or more than 4 inches. Do not detail the longitudinal wires with a center to center spacing of more than 8 inches.

Joints

Produce the precast reinforced concrete box section with tongue and groove ends. Design and form these ends of the box section so, when the sections are laid together, they make a continuous line of box sections with a smooth interior free of appreciable irregularities in the flowline, all compatible with the permissible variations given in Section F. The internal joint formed at the tongue and groove ends of the precast units shall be sealed with either bitumen/butyl sealant or closed-cell neoprene material. The internal joint material shall be installed in accordance with the manufacturer's recommendations. The material shall be shown on the shop drawings when they are submitted for review.

Seal the external joint with an outside sealer wrap conforming to ASTM C877 that is at least 12 inches wide and covers the joint on both the sides and the top of the box section. Use ConWrap CS-212 from Concrete Sealants, Inc., EZ-Wrap from Press-Seal Gasket Corporation, Seal Wrap from Mar-Mac Manufacturing Co., Inc., Cadilloc External Pipe Joint from Cadilloc, or an approved equal for the outside sealer wrap. If the outside sealer wrap is not applied in a continuous strip along the entire joint, a 12 inch minimum lap of the outside sealer wrap is permitted. Before placing the outside sealer wrap, clean and prime the area receiving the outside sealer wrap in accordance with the sealer wrap manufacturer recommendations. The joint wrap manufacturer installation recommendations shall be included with shop drawings submitted for review. The external joint wrap shall be installed in pieces, as indicated on Figure 1 below:

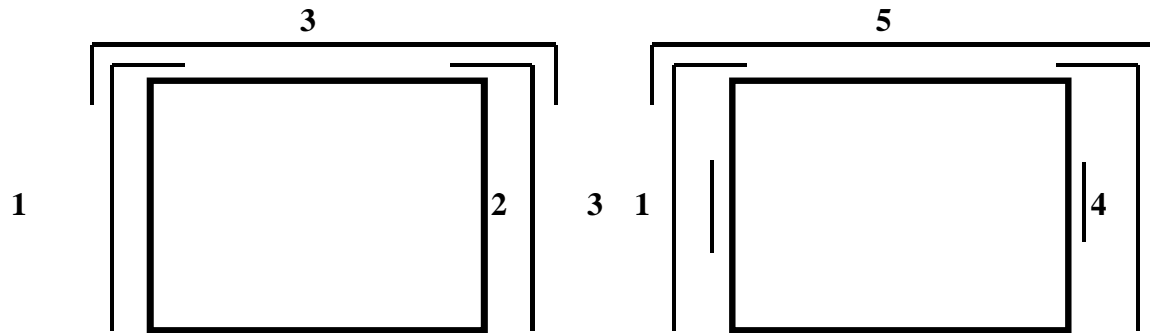


Figure 1

Cover the external joint sealer with a 3 foot strip of filter fabric conforming to Type 4 requirements in Section 1056 of the Standard Specifications.

Place multiple lines of a precast reinforced concrete box culvert such that the longitudinal joint between the sections has a minimum width of 3 inches. Fill the joint between multiple lines of precast box sections with Class A concrete. Use Class A concrete that meets the requirements listed in the Standard Specifications except that Field Compressive Strength Specimens are not required.

Manufacture

Manufacture precast reinforced concrete box culvert sections by either the wet cast method or dry cast method.

Mixture – In addition to the requirements of Section 1077 of the Standard Specifications, do not proportion the mix with less than 564 lb/yd³ of portland cement.

Strength – Concrete shall develop a minimum 28-day compressive strength of 5000 psi. Movement of the precast sections should be minimized during the initial curing period. Any damage caused by moving or handling during the initial curing phase will be grounds for rejection of that precast section.

Air Entrainment – Air entrain the concrete in accordance with Section 1077 - 5(A) of the Standard Specifications. For dry cast manufacturing, air entrainment is not required.

Testing – Test the concrete in accordance with the requirements of Section 1077 - 5(B).

Handling – Handling devices or holes are permitted in each box section for the purpose of handling and placing. Submit details of handling devices or holes for approval and do not cast any concrete until approval is granted. Remove all handling devices flush with concrete surfaces as directed. Fill holes in a neat and workmanlike manner with an approved non-metallic non-shrink grout, concrete, or hole plug.

Physical Requirements

Acceptability of precast culvert sections is based on concrete cylinders made and tested in accordance with ASTM C31 and ASTM C39.

Permissible Variations

Flatness – All external surfaces shall be flat, true, and plumb. Irregularities, depressions, or high spots on all external surfaces shall not exceed 1/2 inch in 8 feet.

Internal Dimensions – Produce sections so that the internal and haunch dimensions do not vary more than 1/4 inch from the plan dimensions.

Adjacent Sections - Internal, external, and haunch dimensions for connecting sections shall not vary more than 1/2 inch.

Length of Tongue and Groove – The minimum length of the tongue shall be 4 inches. The minimum length of the groove shall be 4 inches. The dimensions of the tongue and groove shall not vary more than 1/4 inch from the plan dimensions.

Slab and Wall Thickness – Produce sections so that the slab and wall thickness are not less than that shown on the plans by more than 5% or 3/16 inch, whichever is greater. A thickness more than that required on the plans is not a cause for rejection.

Length of Opposite Surfaces – Produce sections so that variations in laying lengths of two opposite surfaces of the box section meet the requirements of ASTM C1577, Section 11.3.

Length of Section – Produce sections so that the underrun in length of a section is not more than 1/2 inch in any box section.

Position of Reinforcement – Produce sections so that the maximum variation in the position of the reinforcement is $\pm 3/8$ inch for slab and wall thicknesses of 5 inches or less and $\pm 1/2$ inch for slab and wall thicknesses greater than 5 inches. Produce sections so that the concrete cover is never less than 5/8 inch as measured to the internal surface or the external surface. The preceding minimum cover limitations do not apply at the mating surfaces of the joint.

Area of Reinforcement – Use the design steel shown on the plans for the steel reinforcement. Steel areas greater than those required are not cause for rejection. The permissible variation in diameter of any wire in finished fabric is prescribed for the wire before fabrication by either AASHTO M32 or M225.

Marking

Each section shall be match-marked in order of intended installation as indicated on the approved shop drawings. Ensure that pieces fit together neatly and in a workmanlike manner. In order to ensure a good, neat field fit, the Department will

verify assembly of the first five adjacent sections or 20% of the total culvert length, whichever is greater, at the producer's facility and match-mark the pieces. This will require that a minimum of three adjacent sections of the culvert be fitted at the production yard at a time and then match-marked. Once three sections have been match-marked, the first section may be removed for shipment and a fourth section set for marking. Continue in a progressive manner until all sections have been properly match-marked. The producer shall document the GO-NO-GO dimensional measurements of each box culvert section produced through the post-pour inspection process.

Clearly mark each section of the box culvert in accordance with ASTM C1577, Section 15. The information requirements of Section 15.1 shall be clearly marked on the inner surface of each section.

Construction

Pre-installation Meeting – A pre-installation meeting is required prior to installation. Representatives from the Contractor, the precast box manufacturer, and the Department should attend this meeting. The precast box manufacturer representative shall be on site during installation.

Foundation – Foundation for precast box culvert shall meet the requirements of Section 414 of the Standard Specifications. In addition, Type VI foundation material shall be encapsulated in filter fabric conforming to Type 4 requirements in Section 1056 of the Standard Specifications. The filter fabric shall be placed perpendicular to the culvert barrel. Provide sufficient overhang beyond the excavation to allow a minimum lap of 3 feet when the foundation material is placed and fabric wrapped on top. Perpendicular sections of fabric shall be continuous. A minimum lap of 2 feet shall be provided between sections of fabric.

Installation – Sections shall be placed at the beginning of the outlet end of the culvert with the groove end being laid upgrade. Tongue sections shall be laid into the groove sections. Positive means shall be provided to pull each section firmly into the previously placed section so that the joints are tightly homed. Use a "come-along", box pullers or other approved methods to create a positive means of joining box sections. Construction equipment shall not have direct contact with the box section. The load of the box shall be suspended by lifting device during joining procedure.

Backfill – Complete backfill in accordance with Section 414 of the Standard Specifications.

BASIS OF PAYMENT

Any additional cost of redesigning will be paid for by the Contractor if Precast Reinforced Concrete Culvert is used in lieu of the cast-in-place culvert shown on the plans. Except for Foundation Conditioning Material and Culvert Excavation, payment for the Precast Box Culvert will be a lump sum amount equal to the payment that would be allowed for

construction of a Cast-in-Place Box Culvert. Plan quantities and unit bid prices will be used to compute the lump sum amount. Such price and payment will be full compensation for all work covered by this Special Provision, the plans and applicable parts of the Standard Specifications and will include, but not be limited to, furnishing all labor, materials (including all filter fabric), equipment and other incidentals necessary to complete this work. Such price and payment will also be full compensation for concrete, reinforcing steel, labor, equipment and all other related materials necessary for the completion of the barrel section, and the construction of the headwalls, leveling pad, end curtain walls, wings and wing footings.

SUBMITTAL OF WORKING DRAWINGS

(6-28-17)

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.

ADDRESSES AND CONTACTS

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

Via US mail:

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

Via other delivery service:

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

Raleigh, NC 27699-1581

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

Raleigh, NC 27610

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

Submittals may also be made via email.

Send submittals to:

jlbolden@ncdot.gov (James Bolden)

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

eomile@ncdot.gov (Emmanuel Omile)

mrorie@ncdot.gov (Madonna Rorie)

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

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

Via US mail:

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

Via other delivery service:

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

Via Email: EastGeotechnicalSubmittal@ncdot.gov

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

Via US mail or other delivery service:

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

Via Email: WestGeotechnicalSubmittal@ncdot.gov

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

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

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

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

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

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

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

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
<hr/>			

Arch Culvert Falsework	5	0	Plan Note, SN Sheet & “Falsework and Formwork”
Box Culvert Falsework ⁷	5	0	Plan Note, SN Sheet & “Falsework and Formwork”
Cofferdams	6	2	Article 410-4
Foam Joint Seals ⁶	9	0	“Foam Joint Seals”
Expansion Joint Seals (hold down plate type with base angle)	9	0	“Expansion Joint Seals”
Expansion Joint Seals (modular)	2, then 9	0	“Modular Expansion Joint Seals”
Expansion Joint Seals (strip seals)	9	0	“Strip Seals”
Falsework & Forms ² (substructure)	8	0	Article 420-3 & “Falsework and Formwork”
Falsework & Forms (superstructure)	8	0	Article 420-3 & “Falsework and Formwork”
Girder Erection over Railroad	5	0	Railroad Provisions
Maintenance and Protection of Traffic Beneath Proposed Structure	8	0	“Maintenance and Protection of Traffic Beneath Proposed Structure at Station ____”
Metal Bridge Railing	8	0	Plan Note
Metal Stay-in-Place Forms	8	0	Article 420-3
Metalwork for Elastomeric Bearings ^{4,5}	7	0	Article 1072-8
Miscellaneous Metalwork ^{4,5}	7	0	Article 1072-8
Disc Bearings ⁴	8	0	“Disc Bearings”
Overhead and Digital Message Signs (DMS) (metalwork and foundations)	13	0	Applicable Provisions

Placement of Equipment on Structures (cranes, etc.)	7	0	Article 420-20
Precast Concrete Box Culverts	2, then 1 reproducible	0	“Optional Precast Reinforced Concrete Box Culvert at Station ____”
Prestressed Concrete Cored Slab (detensioning sequences) ³	6	0	Article 1078-11
Prestressed Concrete Deck Panels	6 and 1 reproducible	0	Article 420-3
Prestressed Concrete Girder (strand elongation and detensioning sequences)	6	0	Articles 1078-8 and 1078-11
Removal of Existing Structure over Railroad	5	0	Railroad Provisions
Revised Bridge Deck Plans (adaptation to prestressed deck panels)	2, then 1 reproducible	0	Article 420-3
Revised Bridge Deck Plans (adaptation to modular expansion joint seals)	2, then 1 reproducible	0	“Modular Expansion Joint Seals”
Sound Barrier Wall (precast items)	10	0	Article 1077-2 & “Sound Barrier Wall”
Sound Barrier Wall Steel Fabrication Plans ⁵	7	0	Article 1072-8 & “Sound Barrier Wall”
Structural Steel ⁴	2, then 7	0	Article 1072-8
Temporary Detour Structures	10	2	Article 400-3 & “Construction, Maintenance and Removal of Temporary Structure at Station ____”
TFE Expansion Bearings ⁴	8	0	Article 1072-8

FOOTNOTES

1. References are provided to help locate the part of the contract where the submittals are required. References in quotes refer to the provision by that name. Articles refer to the *Standard Specifications*.
2. Submittals for these items are necessary only when required by a note on plans.

3. Submittals for these items may not be required. A list of pre-approved sequences is available from the producer or the Materials & Tests Unit.
4. The fabricator may submit these items directly to the Structures Management Unit.
5. The two sets of preliminary submittals required by Article 1072-8 of the *Standard Specifications* are not required for these items.
6. Submittals for Fabrication Drawings are not required. Submittals for Catalogue Cuts of Proposed Material are required. See Section 5.A of the referenced provision.
7. Submittals are necessary only when the top slab thickness is 18" or greater.

GEOTECHNICAL SUBMITTALS

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

FALSEWORK AND FORMWORK

(4-5-12)

1.0 DESCRIPTION

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

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

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

2.0 MATERIALS

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

3.0 DESIGN REQUIREMENTS

A. Working Drawings

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

1. Wind Loads

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

Table 2.2 - Wind Pressure Values

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

2. Time of Removal

The following requirements replace those of Article 3.4.8.2.

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

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

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

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

B. Review and Approval

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

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

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

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

4.0 CONSTRUCTION REQUIREMENTS

All requirements of Section 420 of the Standard Specifications apply.

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

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

A. Maintenance and Inspection

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

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

B. Foundations

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

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

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

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

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

5.0 REMOVAL

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

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

6.0 METHOD OF MEASUREMENT

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

7.0 BASIS OF PAYMENT

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

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

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

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

CRANE SAFETY SUBMITTAL LIST

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.

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.

Crane Inspections: Inspection records for all cranes shall be current and readily accessible for review upon request.

Certifications: Crane operators shall be certified by the National Commission for the Certification of Crane Operators (NCCCO) or the National Center for Construction Education and Research (NCCER). Other approved nationally accredited programs will be considered upon request. In addition, crane operators shall have a current CDL medical card. Submit a list of crane operator(s) and include current certification for each type of crane operated (small hydraulic, large hydraulic, small lattice, large lattice) and medical evaluations for each operator.

GROUT FOR STRUCTURES

(12-1-17)

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, decks, end bent caps, or bent caps. Mix and place grout in accordance with the manufacturer’s recommendations, the applicable sections of the Standard Specifications and this provision.

MATERIAL REQUIREMENTS

Unless otherwise noted on the plans, use a Type 3 Grout in accordance with Section 1003 of the Standard Specifications.

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

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

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.

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)****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

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.

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

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

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

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.

FAA NOTICE OF PROPOSED CONSTRUCTION**(SPECIAL)**

The Contractor shall coordinate with the Federal Aviation Administration to ensure that design and construction activities associated with the bridge replacement do not adversely affect the operations of the Raleigh-Durham International Airport.

The Contractor shall file a separate Notice of Proposed Construction or Alteration information (FAA Form 7460-1) with the Federal Aviation Administration for temporary construction equipment that will be taller than the permanent structure(s). This notice needs to be filed with the FAA at least 90 days prior to commencement of construction.

The Contractor shall file notice of Actual Construction or Alteration forms (FAA Form 7460-2) within 5 days after construction reaches its final height.

The Contractor shall obtain a separate permit from Raleigh-Durham International Airport based on the Height Zoning Ordinance after approval is granted from the Federal Aviation Administration. Additional information may be found on the Raleigh-Durham International Airport website:

<https://www.rdu.com/airport-authority/environmental-programs/height-zoning/>

PROJECT SPECIAL PROVISION

(10-18-95) (Rev. 3-21-17))

Z-1a

PERMITS

The Contractor's attention is directed to the following permits, which have been issued to the Department of Transportation by the authority granting the permit.

<u>PERMIT</u>	<u>AUTHORITY GRANTING THE PERMIT</u>
Dredge and Fill and/or Work in Navigable Waters (404)	U. S. Army Corps of Engineers
Water Quality (401)	Division of Environmental Management, DEQ State of North Carolina
Buffer Certification	Division of Environmental Management, DEQ 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 *2018 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 restricted waters, wetlands or buffer zones, provided that activities outside those areas is done in such a manner as to not affect the restricted waters, wetlands or buffer zones.

P-2
U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT

Action Id. SAW-2015-01934 County: Wake U.S.G.S. Quad: NC-Cary

GENERAL PERMIT (REGIONAL AND NATIONWIDE) VERIFICATION

Permittee: NCDOT
Phillip Harris
Address: 1598 Mail Service Center
Raleigh, NC 27699
Telephone Number: 919-707-6000
E-mail: pharris@ncdot.gov

Size (acres)	<u>N/A</u>	Nearest Town	<u>Morrisville</u>
Nearest Waterway	<u>Crabtree Creek</u>	River Basin	<u>Neuse</u>
USGS HUC	<u>03020201</u>	Coordinates	Latitude: <u>35.824</u> Longitude: <u>-78.8146</u>

Location description: The project site is the existing interchange at interstate 40 and Airport Blvd., near the town of Morrisville, Wake County, North Carolina.

Description of projects area and activity: This verification authorizes the use of multiple GP31's for permanent impacts to 611 linear feet of stream channel, 365 linear feet of permanent stream bank stabilization, 377 linear feet of temporary stream channel impacts from construction access, and 0.417 acre of permanent wetland impacts from fill and mechanized clearing for upgrades to an existing interchange NCDOT TIP I-5700. Mitigation is required for this proposal.

Applicable Law(s): ☒ Section 404 (Clean Water Act, 33 USC 1344)
☐ Section 10 (Rivers and Harbors Act, 33 USC 403)

Authorization: **RGP198200031 NC DOT Bridges Widening Projects, Interchange Improvements**

SEE ATTACHED NWP GENERAL, REGIONAL, AND/OR SPECIAL CONDITIONS

Your work is authorized by the above referenced permit provided it is accomplished in strict accordance with the enclosed Conditions, your application signed and dated 8/2/2019, and additional information received on September 17, 2019, and the enclosed plans entitled "TIP Project: I-5700" dated 5/2/2019. Any violation of the attached conditions or deviation from your submitted plans may subject the permittee to a stop work order, a restoration order, a Class I administrative penalty, and/or appropriate legal action.

This verification will remain valid until the expiration date identified below unless the nationwide authorization is modified, suspended or revoked. If, prior to the expiration date identified below, the nationwide permit authorization is reissued and/or modified, this verification will remain valid until the expiration date identified below, provided it complies with all requirements of the modified nationwide permit. If the nationwide permit authorization expires or is suspended, revoked, or is modified, such that the activity would no longer comply with the terms and conditions of the nationwide permit, activities which have commenced (i.e., are under construction) or are under contract to commence in reliance upon the nationwide permit, will remain authorized provided the activity is completed within twelve months of the date of the nationwide permit's expiration, modification or revocation, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend or revoke the authorization.

Activities subject to Section 404 (as indicated above) may also require an individual Section 401 Water Quality Certification. You should contact the NC Division of Water Resources (telephone 919-807-6300) to determine Section 401 requirements.

For activities occurring within the twenty coastal counties subject to regulation under the Coastal Area Management Act (CAMA), prior to beginning work you must contact the N.C. Division of Coastal Management **Morehead City, NC, at (252) 808-2808.**

This Department of the Army verification does not relieve the permittee of the responsibility to obtain any other required Federal, State or local approvals/permits. If there are any questions regarding this verification, any of the conditions of the Permit, or the Corps of Engineers regulatory program, please contact **James Lastinger** at **919-554-4884 ext 32** or **James.C.Lastinger@usace.army.mil**.

Corps Regulatory Official: LASTINGER.JAME Digitally signed by
LASTINGER.JAMES.C.136364240 Date: 10/31/2019
Expiration Date of Verification: 12/31/2021 S.C.1363642400
Date: 2019.10.31 15:00:54 -04'00'

P-3

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 the Customer Satisfaction Survey located at http://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0

Copy furnished:

SPECIAL CONDITIONS

- a. In order to compensate for impacts associated with this permit, mitigation shall be provided in accordance with the provisions outlined on the most recent version of the attached Compensatory Mitigation Responsibility Transfer Form. The requirements of this form, including any special conditions listed on this form, are hereby incorporated as special conditions of this permit authorization.
- b. 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.

Action ID Number: SAW-2015-01934 County: Wake

Permittee: NCDOT, Phillip Harris

Project Name: I-5700

Date Verification Issued: 10/31/2019

Project Manager: James Lastinger

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: James Lastinger
Raleigh Regulatory Office
U.S Army Corps of Engineers
3331 Heritage Trade Drive, Suite 105
Wake Forest, North Carolina 27587
or
James.C.Lastinger@usace.army.mil**

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

DEPARTMENT OF THE ARMY
Wilmington District, Corps of Engineers
69 Darlington Avenue
Wilmington, North Carolina 28403-1343
April 30, 2015

Regional General Permit No. 198200031

Name of Permittee: North Carolina Department of Transportation

Effective Date: April 30, 2015

Expiration Date: April 30, 2020

**DEPARTMENT OF THE ARMY
REGIONAL GENERAL PERMIT**

A regional general permit (RGP) to perform work in or affecting navigable waters of the United States and waters of the United States, upon recommendation of the Chief of Engineers, pursuant to Section 10 of the Rivers and Harbors Act of March 3, 1899 (33 U.S.C. 403), and Section 404 of the Clean Water Act (33 U.S.C. 1344), is hereby modified and re-issued by authority of the Secretary of the Army by the

District Commander
U.S. Army Engineer District, Wilmington
Corps of Engineers
69 Darlington Avenue
Wilmington, North Carolina 28403-1343

TO AUTHORIZE THE DISCHARGE OF DREDGED OR FILL MATERIAL IN WATERS OF THE UNITED STATES (U.S.), INCLUDING WETLANDS, ASSOCIATED WITH MAINTENANCE, REPAIR, AND CONSTRUCTION PROJECTS CONDUCTED BY THE VARIOUS DIVISIONS OF THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION (NCDOT) INCLUDING THE NCDOT DIVISION OF HIGHWAYS, RAIL, BICYCLE/PEDESTRIAN, ECT.

Activities authorized are:

a. Construction, maintenance, and repair of bridges, to include work on the approaches, where permanent impacts resulting in a loss of waters of the U.S. will be less than or equal to 500 linear feet (lf) of stream and/or one (1) acre of wetland/non-tidal open water for each single and complete linear project*.

b. Best-fit widening projects that have undergone interagency review and completed the current interagency Merger Process, which merges the requirements of the National Environmental Policy Act (NEPA) with those found within Section 404 of the Clean Water Act (CWA).

While there is no impact threshold for these widening projects, the Corps has the discretion to require an individual permit if it determines that the proposed impacts will have more than a minimal impact on the aquatic environment or on other environmental factors, or if the project would normally require an Environmental Impact Statement (EIS) under current Federal Highway Administration (FHWA) guidelines. Best-fit projects may include a small amount of new location roadway for components such as interchanges or intersections, provided the new location portion has been concurred upon by the merger team.

c. Minor widening projects, such as paving and/or widening secondary roads, or interchange improvements, when permanent impacts which result in a loss of waters of the U.S. from installation and/or extension of culverts and/or pipes will be less than or equal to 500 lf of stream and/or one (1) acre of wetland/non-tidal open water for each single and complete linear project*.

d. Stream relocation(s) associated with projects identified in a-c above. Stream relocation lengths are to be evaluated independently and are not included within each respective maximum limit threshold for the authorized actions stated above.

***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 U.S. (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 this RGP. 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.

Generally, off-site detours are preferred to avoid and minimize impacts to the human and natural environment. However, if an off-site detour is considered impracticable, then an on-site detour may be considered as a necessary component of the actions described above. Impacts from the detour may be considered temporary and may not require compensatory mitigation if the impacted area is restored to its pre-project condition after construction is complete. If the construction of a detour (on-site or off-site) includes standard undercutting methods, removal of all material and backfilling with suitable material is required.

1. Special Conditions.

a. The applicant must submit a pre-construction notification (PCN) with specified attachments to the District Engineer and receive written verification from the Corps that the proposed work complies with this RGP prior to commencing any activity authorized by this RGP.

b. If the project will not impact a designated “Area of Environmental Concern” (AEC) in the twenty (20) counties of North Carolina covered by the North Carolina Coastal Area Management Act (CAMA), then a consistency submission is not required. If the project will impact a designated AEC and meets the definition of “development”, then the applicant must

obtain the required CAMA permit. Development activities 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).

The twenty (20) CAMA counties in North Carolina include Beaufort, Bertie, Brunswick, Camden, Carteret, Chowan, Craven, Currituck, Dare, Gates, Hertford, Hyde, New Hanover, Onslow, Pamlico, Pasquotank, Pender, Perquimans, Tyrrell, and Washington.

c. Discharges into Waters of the U.S. designated by either the North Carolina Division of Marine Fisheries (NCDMF) or the North Carolina Wildlife Resources Commission (NCWRC) as anadromous fish spawning areas are prohibited during the period between February 1 and June 30, without prior written approval from NCDMF, NCWRC, National Marine Fisheries Service (NMFS), and the Corps. Discharges into waters of the U.S. designated by NCDMF as primary nursery areas and discharges into waters of the U.S. designated by NCWRC as primary nursery areas in inland waters shall be coordinated with NCDMF (per existing agreement with NCDMF) and NCWRC prior to being authorized by this RGP. Coordination with NCDMF and NCWRC may result in a required construction moratorium during periods of significant biological productivity or critical life stages.

The applicant should contact:

**NC Division of Marine Fisheries
3441 Arendell Street
Morehead City, NC 28557
Telephone 252-726-7021
or 800-682-2632**

**North Carolina Wildlife Resources Commission
Habitat Conservation Program Manager
1721 Mail Service Center
Raleigh, NC 27699-1721
Telephone (919) 733-7638**

d. This permit does not authorize the use of culverts in areas designated as anadromous fish spawning areas by the NCDMF or the NCWRC.

e. Waters of the U.S. designated as sturgeon spawning areas are excluded during the period between February 1 and June 30, without prior written approval from NMFS.

f. If the project is located within the twenty (20) counties of North Carolina designated as coastal counties by CAMA, then all pipe and culvert inverts will be buried at least one foot below normal bed elevation when they are placed within the Public Trust AEC and/or the Estuarine Waters AEC as designated by CAMA. If the project is not located within the twenty (20) counties of North Carolina designated as coastal counties by CAMA, then culvert inverts will be buried at least one foot below the bed of the stream for culverts greater than 48 inches in diameter. 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 potential for destabilization of the channel and head cutting upstream should be considered in the placement of the culvert. A waiver from the depth specifications in this condition may be requested in writing. The waiver will only be issued if it can be demonstrated that the impacts of complying with this condition would result in more adverse impacts to the aquatic environment. Culverts placed in wetlands do not have to be buried.

g. No work shall be authorized by this RGP within the twenty coastal counties, as defined by the NCDCM, without prior consultation with NOAA Fisheries. For each activity reviewed by the Corps where it is determined that the activity may affect Essential Fish Habitat (EFH) for federally managed species, an EFH Assessment shall be prepared by the applicant and forwarded to the Corps and NOAA Fisheries for review and comment prior to authorization of work.

h. Discharges of dredged or fill material into waters of the U.S., including wetlands, must be minimized or avoided to the maximum extent practicable.

i. No activity may result in substantial permanent disruption of the movement of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area. 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. It is acceptable to use rock vanes at culvert outlets to ensure, enhance, or maintain aquatic passage. Pre-formed scour holes are acceptable when designed for velocity reduction. The width, height, and gradient of a proposed opening 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 gauge data, if available. In the absence of such data, bankfull flow can be used as a comparable level. Where adjacent floodplain is available, flows exceeding bank-full should be accommodated by installing culverts at the floodplain elevation, if practicable. If multiple culverts are used, the construction of floodplain benches and/or sills to maintain base flow is required, if practicable.

j. Upon completion of any work authorized by this RGP, all temporary fills (to include culverts, etc.) will be completely removed from waters of the U.S. and the areas will be restored to preconstruction conditions, to include pre-project elevations and contours, restoring natural hydrology and stream corridors, and reestablishing native vegetation/riparian corridors. This work will be completed within 60 days of completion of project construction. If this timeframe occurs while a required moratorium of this permit is in effect, the temporary fill shall be removed in its entirety within 60 days of the moratorium end date. If vegetation cannot be planted due to the time of the year, all disturbed areas will be seeded with a native mix appropriate for the impacted area, and vegetation will be planted in the fall. A native seed mix may contain non-invasive small grain annuals (e.g. millet and rye grain) to ensure adequate cover while native vegetation becomes established. The PCN must include a restoration plan showing how all temporary fills and structures will be removed and how the area will be restored to pre-project conditions.

k. All activities authorized by this RGP shall, to the extent practicable, be conducted "in the dry", with barriers installed between work areas and aquatic habitat to protect that habitat from sediment, concrete, and other pollutants. Where concrete is utilized, measures will be taken to prevent live or fresh concrete, including bags of uncured concrete, from coming into contact with waters of the U.S. until the concrete has cured/hardened. All water in the work area that has been in contact with concrete shall only be returned to waters of the U.S. when it no longer poses a threat to aquatic organisms (concrete is set and cured).

l. In cases where new alignment approaches are to be constructed and the existing approach fill in waters of the U.S. is to be abandoned and no longer maintained as a roadway, the

abandoned fill shall be removed and the area will be restored to preexisting wetland/stream conditions and elevations, to include restoring natural hydrology and stream corridors, and reestablishing native vegetation/riparian corridors, to the extent practicable. This activity may qualify as compensatory mitigation credit for the project and will be assessed on a case-by-case basis in accordance with Special Conditions "q" and "r" below. A restoration plan detailing this activity will be required with the submittal of the PCN.

m. 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. 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).

n. The project must be implemented and/or conducted so that all reasonable and practicable measures to ensure that equipment, structures, fill pads, and work associated with the project do not adversely affect upstream and/or downstream reaches. Adverse effects include, but are not limited to, channel instability, flooding, and/or shoreline/streambank erosion. During construction, the permittee shall routinely monitor for these effects, cease all work if/when detected, take initial corrective measures to correct actively eroding areas, and notify the Corps immediately. Permanent corrective measures may require additional authorization from the Corps.

o. All PCNs will describe sedimentation and erosion control structures and measures proposed for placement in waters of the U.S. To the extent practicable, structures and measures should be depicted on maps, surveys or drawings showing location and impacts to jurisdictional wetlands and streams. In addition, appropriate soil and erosion control measures must be established and maintained during construction. All fills, temporary and permanent, must be adequately stabilized at the earliest practicable date to prevent erosion of fill material into adjacent waters or wetlands.

p. Before discharging dredged or fill material into waters of the U.S. in the twenty-five (25) mountain counties of North Carolina, the applicant will submit a PCN to the NCWRC and the Corps concurrently. The PCN shall summarize alternatives to conducting work in mountain trout waters considered during the planning process, detail why alternatives were or were not selected, and contain a compensatory mitigation plan for all unavoidable adverse impacts to mountain trout waters. For proposals where a bridge is replaced with a culvert, the PCN must also include details of any on-site evaluations that were conducted to determine that installation of a culvert will not adversely affect passage of fish or other aquatic biota at the project site. This information must include factors such as the proposed slope of the culvert and determinations of how the slope will be expected to allow or impede passage, the necessity of baffles and/or sills to ensure passage, design considerations to ensure that expected baseflow will be maintained for passage and that post-construction velocities will not prevent passage, site conditions that will or will not allow proper burial of the culvert, existing structures (e.g., perched culverts, waterfalls, etc.) and/or stream patterns up and downstream of the culvert site that could affect passage and bank stability, and any other considerations regarding passage. The level of detail for this information should be based on site conditions (i.e., culverts on a slope over 3% will most likely

require more information than culverts on a slope that is less than 1%, etc.). Also, in order to evaluate potential impacts, describe bedforms that will be impacted by the proposed culvert – e.g., pools, glides, riffles, etc. The NCWRC will respond both to the proponent and directly to the Corps.

The twenty-five (25) designated trout counties of North Carolina include Alleghany, Caldwell, Watauga, Ashe, Mitchell, Wilkes, Avery, Burke, Stokes, Surry, Buncombe, Henderson, Polk, Cherokee, Jackson, Rutherford, Clay, Macon, Swain, Graham, Madison, Transylvania, Haywood, McDowell, and Yancey.

The applicant may contact NCWRC at:

North Carolina Wildlife Resources
Commission
Ms. Marla Chambers
Western NCDOT Permit Coordinator
206 Charter Street
Albemarle, NC 28001
Office: 704-982-9181

q. Compensatory mitigation will be required for permanent impacts resulting in a loss of waters of the U.S., including wetlands, from culverts/pipes and associated fill. Mitigation will also be required for stream relocation projects. The applicant will attach a proposed mitigation plan to the PCN. Mitigation proposals will be in accordance with currently approved Wilmington District and/or Corps-wide mitigation regulations and guidance. The Corps Project Manager will make the final determination concerning the appropriate amount and type of mitigation.

r. Stream relocation(s) associated with projects may be authorized under this RGP. As stated above, mitigation will be required for all relocation projects. If the stream relocation is conducted in accordance with the requirements stated below in 1-5, the relocated segment of stream may* be considered toward reducing the amount of compensatory mitigation required. A relocation plan must be submitted with the PCN that addresses all factors required within the current Wilmington District, Corps of Engineers Stream Mitigation Guidelines, which can include, but may not be limited to:

(1) The relocated stream has pattern, profile, and dimension based on natural channel design. If natural channel design construction is not possible due to site constraints, the relocated stream must have pattern, profile, and dimension similar to, or better than, the existing stream. Note that site constraints do not include those situations where NCDOT chooses not to acquire additional adjacent property that is available for purchase.

(2) The new stream meets the current buffer requirements as stated in current District stream mitigation guidance. If the required buffer widths cannot be obtained, a project-by-project decision will be completed to determine if additional compensatory mitigation is required.

(3) The new location allows the relocated stream to remain stable (e.g., in a

valley vs. on a slope, no bends that will impact stability, etc.).

(4) There is no loss of channel for any reason (e.g., old channel is 200' and new channel is 150' = 50' channel loss; part of the new channel is put in a culvert; the new channel (sides and bottom) is hardened with concrete, rip rap, etc.).

(5) The Corps will determine if monitoring and reporting will be required for a specific project and the parameters of any required monitoring and reporting. If monitoring is required, a monitoring plan must be included with the PCN and meet current requirements.

All relocation plans must clearly depict both the existing channel and the proposed (relocated) channel.

* Conducting stream relocation(s) in accordance with 1-5 above may not fully compensate for the impact and may require additional compensatory mitigation. The Corps Project Manager will determine if the proposed amount of mitigation is adequate on a project-by-project basis.

If stream relocation cannot be conducted in accordance with 1-5 above, mitigation at a 2:1 ratio will typically be required unless: (1) the applicant provides a Stream Quality Assessment Worksheet or NCSAM documentation (when available) that supports a different mitigation ratio; (2) the Corps Project Manager determines that the relocated stream, while not in full compliance with 1-5 above, warrants partial mitigation, or; (3) the Corps determines that the existing stream is an excellent quality stream, in which case a 3:1 mitigation ratio may be required. The Corps Project Manager will make the final determination concerning the appropriate amount and type of mitigation.

If the Corps determines that the proposed stream relocation is of such a magnitude that it cannot be authorized by this RGP, an Individual Permit will be required.

s. The applicant shall sign and return the compliance certificate that is attached to the RGP verification letter.

t. In the event that any Federal agency maintains an objection or any required State authorization is outstanding, no notice to proceed will be given until objections are resolved and State authorizations are issued.

u. The Corps may place additional special conditions, limitations, or restrictions on any verification of the use of RGP 31 on a project-by-project basis.

2. General Conditions.

a. Except as authorized by this RGP or any Corps approved modification to this RGP, no excavation, fill or mechanized land-clearing activities shall take place within waters or wetlands, at any time in the construction or maintenance of this project. This permit does not authorize temporary placement or double handling of excavated or fill material within waters or wetlands outside the permitted area. This prohibition applies to all borrow and fill activities connected with this project.

b. Authorization under this RGP does not obviate the need to obtain other federal, state, or local authorizations.

c. All work authorized by this RGP must comply with the terms and conditions of the applicable CWA Section 401 Water Quality Certification for this RGP issued by the NCDWR.

d. The permittee shall employ all sedimentation and erosion control measures necessary to prevent an increase in sedimentation or turbidity within waters and wetlands outside the permit area. This shall include, but is not limited to, the immediate installation of silt fencing or similar appropriate devices around all areas subject to soil disturbance or the movement of earthen fill, and the immediate stabilization of all disturbed areas. Additionally, the project must remain in full compliance with all aspects of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statutes Chapter 113A Article 4).

e. The activities authorized by this RGP must not interfere with the public's right to free navigation on all navigable waters of the U.S. No attempt will be made by the permittee to prevent the full and free use by the public of all navigable waters at or adjacent to the authorized work for a reason other than safety.

f. The permittee understands and agrees that, if future operations by the U.S. 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 U.S. No claim shall be made against the U.S. on account of any such removal or alteration.

g. The permittee, upon receipt of a notice of revocation of this permit or upon its expiration before completion of the work will, without expense to the U.S. and in such time and manner as the Secretary of the Army or his authorized representative may direct, restore the affected water of the U.S. to its former conditions.

h. The permittee will allow the Wilmington District Engineer or his representative to inspect the authorized activity at any time deemed necessary to assure that the activity is being performed or maintained in strict accordance with the Special and General Conditions of this permit.

i. This RGP does not grant any property rights or exclusive privileges.

j. This permit does not authorize any injury to the property or rights of others.

k. This RGP does not authorize the interference with any existing or proposed federal project.

l. In issuing this permit, the Federal Government does not assume any liability for the following:

(1) Damages to the permitted project or uses thereof as a result of other permitted

or unpermitted activities or from natural causes.

(2) Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the U.S. in the public interest.

(3) Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

(4) Design or construction deficiencies associated with the permitted work.

(5) Damage claims associated with any future modification, suspension, or revocation of this permit.

m. Authorization provided by this RGP may be modified, suspended or revoked in whole or in part if the Wilmington District Engineer, acting for the Secretary of the Army, determines that such action is in the best public interest. The term of this RGP shall be five (5) years unless subject to modification, suspension or revocation. Any modification, suspension or revocation of this authorization will not be the basis for any claim for damages against the U.S. Government.

n. This RGP does not authorize any activity, which the District Engineer determines, after any necessary investigations, will adversely affect:

(1) Rivers named in Section 3 of the Wild and Scenic Rivers Act (15 U.S.C. 1273), those proposed for inclusion as provided by Sections 4 and 5 of the Act, and wild, scenic and recreational rivers established by state and local entities.

(2) Sites included in or determined eligible for listing in the National Registry of Natural Landmarks.

(3) NOAA designated marine sanctuaries, National Estuarine Research Reserves, and coral reefs.

(4) Submerged Aquatic Vegetation (SAV) as defined by the N.C. Division of Marine Fisheries at 15A NCAC 03I .0101(4)(i)).

o. Endangered Species.

(1) No activity is authorized under this RGP 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 this RGP which "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed.

(2) Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal permittees (and when FHWA is the lead federal agency) 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 RGP activity, or whether additional ESA consultation is necessary.

(3) Non-federal permittees must submit a PCN 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 PCN 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 PCN 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 that 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.

(4) As a result of formal or informal consultation with the U.S. Fish and Wildlife Service (USFWS) or NMFS, the district engineer may add species-specific endangered species conditions to the RGP.

(5) Authorization of an activity by a RGP 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 USFWS or the NMFS, the ESA prohibits any person subject to the jurisdiction of the U.S. 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.

(6) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the USFWS 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.

p. The permittee is responsible for obtaining any “take” permits required under the USFWS’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 USFWS to determine if such “take” permits are required for a particular activity.

q. For proposed activities the sixteen counties listed below, applicants must provide a

copy of the PCN to the USFWS, 160 Zillicoa Street, Asheville, North Carolina 28801. This PCN must be sent concurrently to the USFWS and the Corps Project Manager for that specific county.

Counties with tributaries that drain to designated critical habitat that require notification to the Asheville USFWS: Avery, Cherokee, Forsyth, Graham, Haywood, Henderson, Jackson, Macon, Mecklenburg, Mitchell, Stokes, Surry, Swain, Transylvania, Union and Yancey.

Applicants may contact the appropriate USFWS office listed below or the US Army Corps of Engineers:

US Fish and Wildlife Service
Asheville Field Office
160 Zillicoa Street
Asheville, NC 28801
Telephone: (828) 258-3939

Asheville USFWS 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 USFWS Office counties: all counties east of and including Richmond, Montgomery, Randolph, Guilford, and Rockingham Counties.

r. Permittees are advised that development activities in or near a floodway may be subject to the National Flood Insurance Program that prohibits any development, including fill, within a floodway that results in any increase in base flood elevations. This RGP does not authorize any activity prohibited by the National Flood Insurance Program.

s. The permittee must make every reasonable effort to perform the work authorized herein in a manner so as to minimize any adverse impact on fish, wildlife and natural environmental values.

t. All activities authorized by this RGP that involve the use of riprap material for bank stabilization, the following measures shall be applied:

(1) Filter cloth must be placed underneath the riprap as an additional requirement of its use in North Carolina waters.

(2) The placement of riprap shall be limited to the areas depicted on submitted work plan drawings and not be placed in a manner that prevents or impedes fish passage.

(3) The riprap material shall be clean and free from loose dirt or any pollutant

except in trace quantities that will not have an adverse environmental effect.

(4) It shall be of a size sufficient to prevent its movement from the authorized alignment by natural forces under normal conditions.

(5) The riprap material shall consist of clean rock or masonry material such as, but not limited to, granite, marl, or broken concrete.

(6) A waiver from the specifications in this general condition may be requested in writing. The waiver will only be issued if it can be demonstrated that the impacts of complying with this condition will result in greater adverse impacts to the aquatic environment.

u. The permittee must install and maintain, at his expense, any signal lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, on authorized facilities. For further information, the permittee should contact the U.S. Coast Guard Marine Safety Office at (910) 772-2191.

v. The permittee must maintain any structure or work authorized by this permit in good condition and in conformance with the terms and conditions of this permit. The Permittee is not relieved of this requirement if the Permittee abandons the structure or work. Transfer in fee simple of the work authorized by this permit will automatically transfer this permit to the property's new owner, with all of the rights and responsibilities enumerated herein. The permittee must inform any subsequent owner of all activities undertaken under the authority of this permit and provide the subsequent owner with a copy of the terms and conditions of this permit.

w. At his sole discretion, any time during the processing cycle, the Wilmington District Engineer may determine that this RGP will not be applicable to a specific proposal. In such case, the procedures for processing an individual permit in accordance with 33 CFR 325 will be available.

x. The activity must comply with applicable FEMA approved state or local floodplain management requirements.

y. All fill material placed in waters or wetlands shall be generated from an upland source and will be clean and free of any pollutants except in trace quantities. Metal products, organic materials (including debris from land clearing activities), or unsightly debris will not be used.

z. All excavated material will be disposed of in approved upland disposal areas.

aa. Historic Properties.

(1) 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 (NRHP), the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(2) Federal permittees (or when FHWA is the lead federal agency) should follow their own procedures for complying with the requirements of Section 106 of the NHPA. 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 this RGP activity, or whether additional Section 106 consultation is necessary.

(3) Non-federal permittees must submit a PCN 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 NRHP, including previously unidentified properties. For such activities, the PCN 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 (SHPO) or Tribal Historic Preservation Officer (THPO), as appropriate, and the NRHP (see 33 CFR 330.4(g)). When reviewing PCNs, district engineers will comply with the current procedures for addressing the requirements of Section 106 of the NHPA. 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.

(4) The district engineer will notify the prospective permittee within 45 days of receipt of a complete PCN 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.

(5) 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 will 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.

bb. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the NRHP.

cc. There will be no unreasonable interference with navigation or the right of the public to riparian access by the existence or use of activities authorized by this RGP.

dd. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

ee. This RGP will not be applicable to proposed construction when the Wilmington District Engineer determines that the proposed activity will significantly affect the quality of the human environment and determines that an EIS must be prepared.

ff. Activities which have commenced (i.e. are under construction) or are under contract to commence in reliance upon this general permit will remain authorized provided the activity is completed within twelve months of the date of the general permit's expiration, modification, or revocation. Activities completed under the authorization of this general permit which were in effect at the time the activity was completed continue to be authorized by the general permit.

BY AUTHORITY OF THE SECRETARY OF THE ARMY:

A handwritten signature in black ink, appearing to read 'K. P. Landers Sr.', with a stylized flourish at the end.

Kevin P. Landers Sr.
Colonel, U. S. Army
District Commander

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
LINDA CULPEPPER
Director



August 14, 2019
Wake County
NCDWR Project No. 20191029
I-40 & SR 3015 Interchange
TIP No. I-5700

APPROVAL of 401 WATER QUALITY CERTIFICATION and NEUSE BUFFER AUTHORIZATION, with ADDITIONAL CONDITIONS

Mr. Philip S. Harris, III, P.E., CPM
Natural Environment Section Head
Project Development and Environmental Analysis
North Carolina Department of Transportation
1598 Mail Service Center
Raleigh, North Carolina, 27699-1598

Dear Mr. Harris:

You have our approval, in accordance with the conditions listed below, for the following impacts for the purpose of interchange improvements at I-40 and SR 3015 in Wake County:

Wetland Impacts in the Neuse River Basin

Site	Permanent Fill (ac)	Excavation (ac)	Mechanized Clearing (ac)	Total Wetland Impact (ac)
3B	0	0.005	0	0.005
4	0	0	0.006	0.006
8B	0.300	0	0.070	0.370
10B	0	0	0.030	0.030
10C	0	0	0.006	0.006
Total	0.300	0.005	0.112	0.417

Total Wetland Impact for Project: 0.417 acres.



Stream Impacts in the Neuse River Basin

Site	Permanent Impact to Intermittent Stream (linear ft)	Temporary Impact to Intermittent Stream (linear ft)	Permanent Impact to Perennial Stream (linear ft)	Temporary Impact to Perennial Stream (linear ft)	Total Stream Impact (linear ft)
1	0	0	20	15	35
2A	26	12	0	0	38
2B	40	10	0	0	50
3A	0	0	98	15	113
3B	0	0	15	33	48
4B	0	0	23	20	43
5A	0	0	10	20	30
5C	0	0	155	53	208
5D	0	0	14	38	52
5E	0	0	249	20	269
6	10	10	0	0	20
7	20	24	0	0	44
8A	0	0	121	0	121
9	45	17	0	0	62
10A	0	0	57	17	74
11	0	0	45	23	68
11A	0	0	28	10	38
12	40	0	0	0	40
Total	181	73	835	264	1353

Total Stream Impact for Project: 1353 linear feet.

DWR Perennial Stream Mitigation Required: 428 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)
1A	634	N/A	0	N/A
1B	261	N/A	195	N/A
2A	2889	N/A	0	N/A
2B	1108	3324	50	75
3A	4098	N/A	919	N/A
3B	1357	N/A	367	N/A
3C	1348	4044	1929	2893
4B	605	N/A	414	N/A
5	2867	8601	1390	2085
5A	1699	N/A	1753	N/A
5C	9315	N/A	1967	N/A
5D	2009	N/A	1115	N/A
5E	9400	28200	3633	5450
8A	4932	N/A	4741	N/A
9	3303	N/A	2362	N/A
10A	4014	N/A	2654	N/A
11	3629	N/A	1937	N/A
11A	3478	N/A	2449	N/A
Totals	56946	44169	27875	10503

Total Buffer Impact for Project: 84821 square feet.

* n/a = Site Impact Allowable; no mitigation required



The project shall be constructed in accordance with your application received August 2, 2019. After reviewing your application, we have decided that these impacts are covered by General Water Quality Certification Number 4135. This certification corresponds to the General Permit 31 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 General Certification and any additional conditions listed below.

Conditions of Certification:

- * 1. Compensatory mitigation for impacts to 14723 square feet of protected riparian buffers in Zone 1 and 7002 square feet of protected riparian buffers in Zone 2 shall be required. We understand that you have chosen to perform compensatory mitigation for impacts to protected buffers through use of the Marks Creek Mitigation Site. Mitigation for unavoidable impacts to Neuse Riparian Buffers shall be provided via deduction of 54672 square feet of Buffer Restoration Credits at the Marks Creek Mitigation Site in accordance with 15A NCAC 2B.0295, as stated in your application and the included debit ledger.
- * 2. Compensatory mitigation for 428 linear feet of permanent impact to perennial streams is required. We understand that you have chosen to perform compensatory mitigation for impacts to streams through use of the Jeffrey's Warehouse Mitigation Site. Mitigation for unavoidable impact to Neuse Basin perennial streams shall be provided via deduction of this amount at the Jeffrey's Warehouse Mitigation Site in accordance with 15A NCAC 2H.0506, as stated in your application and the included debit ledger.
- 3. 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)]
- 4. If multiple pipes or barrels are required, they shall be designed to mimic natural stream cross section as closely as possible including pipes or barrels at flood plain elevation and/or sills where appropriate. Widening the stream channel should be avoided. Stream channel widening at the inlet or outlet end of structures typically decreases water velocity causing sediment deposition that requires increased maintenance and disrupts aquatic life passage. [15A NCAC 02H.0506(b)(2)]
- 5. Riprap shall not be 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)]
- 6. For all 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)]



7. The stream channel shall be excavated no deeper than the natural bed material of the stream, to the maximum extent practicable. Efforts must be made to minimize impacts to the stream banks, as well as to vegetation responsible for maintaining the stream bank stability. Any applicable riparian buffer impact for access to stream channel shall be temporary and be revegetated with native riparian species. [15A NCAC 02H.0506(b)(2)]
8. All stormwater runoff shall be directed as sheetflow through stream buffers at non-erosive velocities, unless otherwise approved by this certification. [15A NCAC 2B.0233]
9. 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]
10. Pursuant to 15A NCAC 2B.0233(6), 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.
11. All portions of the proposed project draining to 303(d) listed impaired watersheds 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.
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. 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)]
- * 16. 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)]
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. All fill slopes located in jurisdictional wetlands shall be placed at slopes no flatter than 3:1, unless otherwise authorized by this certification. [15A NCAC 02H.0506(b)(2)]
24. 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)]
25. The outside buffer, wetland or water boundary located within the construction corridor approved by this authorization, including all non-commercial borrow and waste sites associated with the project, 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]
26. 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.
27. 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)]
- * 28. 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)]
29. Native riparian vegetation (ex. list herbaceous, 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.0233 (10)] & [15A NCAC 02B.0506(b)(2)]
30. 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)]
31. 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)]:
- 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*.
 - 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.
 - 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*.
 - The reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act.



32. Sediment and erosion control measures shall not be placed in wetlands or surface waters, or within 5 feet of the top of bank, without prior approval from DWR. [15A NCAC 02H.0506(b)(3) and (c)(3)]

33. When applicable, all construction activities shall be performed and maintained in full compliance with G.S. Chapter 113A Article 4 (Sediment and Pollution Control Act of 1973). Regardless of applicability of the Sediment and Pollution Control Act, all projects shall incorporate appropriate Best Management Practices for the control of sediment and erosion so that no violations of state water quality standards, statutes, or rules occur. [15A NCAC 02H .0506 (b)(3) and (c)(3) and 15A NCAC 02B .0200]

34. Design, installation, operation, and maintenance of all sediment and erosion control measures shall be equal to or exceed the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*, or for linear transportation projects, the *NCDOT Sediment and Erosion Control Manual*.

All devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) sites, including contractor-owned or leased borrow pits associated with the project. Sufficient materials required for stabilization and/or repair of erosion control measures and stormwater routing and treatment shall be on site at all times.

For borrow pit sites, the erosion and sediment control measures shall be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*. Reclamation measures and implementation shall comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act and the Mining Act of 1971.

If the project occurs in waters or watersheds classified 303(d) impaired, then the sedimentation and erosion control designs shall comply with the requirements set forth in 15A NCAC 04B .0124, *Design Standards in Sensitive Watershed*. [15A NCAC 02H.0506(b)(3) and (c)(3); GC 4135]

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. Bill F. Lane, 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 919-707-3873.

Sincerely,

DocuSigned by:

Amy Chapman

9C9886312DCD474

Linda Culpepper, Director
Division of Water Resources

Electronic copy only distribution:

James Lastinger, US Army Corps of Engineers, Raleigh Field Office
Heather Montague, Division 5 Environmental Officer
Chris Rivenbark, NC Department of Transportation
Deanna Riffey, NC Department of Transportation
File Copy



**STATE OF NORTH CAROLINA
DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER RESOURCES**

WATER QUALITY GENERAL CERTIFICATION NO. 4135

GENERAL CERTIFICATION FOR PROJECTS ELIGIBLE FOR US ARMY CORPS OF ENGINEERS

- **NATIONWIDE PERMIT NUMBER 14 (LINEAR TRANSPORTATION PROJECTS), AND**
- **REGIONAL GENERAL PERMIT 198200031 (NCDOT BRIDGES, WIDENING PROJECTS, INTERCHANGE IMPROVEMENTS)**

Water Quality Certification Number 4135 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 Regulations in 15A NCAC 02H .0500 and 15A NCAC 02B .0200 for the discharge of fill material to surface waters and wetland areas as described in 33 CFR 330 Appendix A (B) (14) of the US Army Corps of Engineers regulations and Regional General Permit 198200031.

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.

Effective date: December 1, 2017

Signed this day: December 1, 2017

By

A handwritten signature in black ink, appearing to read 'Linda Culpepper', is written over a horizontal line.

for Linda Culpepper
Interim Director

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 Resources (DWR):

- a) If any of the conditions of this Certification (listed below) cannot be met; or
- b) Any temporary or permanent impacts to wetlands, open waters and/or streams, except for construction of a driveway to a single family residential lot that is determined to not be part of a larger common plan of development, as long as the driveway involves a travel lane of less than 25 feet and total stream impacts of less than 60 feet, including any topographic/slope stabilization or in-stream stabilization needed for the crossing; or
- c) Any stream relocation or stream restoration; or
- d) Any high-density project, as defined in 15A NCAC 02H .1003(2)(a) and by the density thresholds specified in 15A NCAC 02H .1017, which:
 - i. Disturbs one acre or more of land (including a project that disturbs less than one acre of land that is part of a larger common plan of development or sale); and
 - ii. Has permanent wetland, stream or open water impacts; and
 - iii. Is proposing new built-upon area; and
 - iv. Does not have a stormwater management plan reviewed and approved under a state stormwater program¹ or a state-approved local government stormwater program².

Projects that have vested rights, exemptions, or grandfathering from state or locally-implemented stormwater programs and projects that satisfy state or locally-implemented stormwater programs through use of community in-lieu programs **require written approval**; or

- e) Any permanent impacts to waters, or to wetlands adjacent to waters, designated as: ORW (including SAV), HQW (including PNA), SA, WS-I, WS-II, or North Carolina or National Wild and Scenic River.
- f) Any permanent impacts to waters, or to wetlands adjacent to waters, designated as Trout except for driveway projects that are below threshold (b) above provided that:
 - i. The impacts are not adjacent to any existing structures
 - ii. All conditions of this General Certification can be met, including adherence to any moratoriums as stated in Condition #10; and
 - iii. A *Notification of Work in Trout Watersheds Form* is submitted to the Division at least 60 days prior to commencement of work; or
- g) Any permanent impacts to coastal wetlands [15A NCAC 07H .0205], or Unique Wetlands (UWL); or
- h) Any impact associated with a Notice of Violation or an enforcement action for violation(s) of NC Wetland Rules (15A NCAC 02H .0500), NC Isolated Wetland Rules (15A NCAC 02H .1300), NC Surface Water or Wetland Standards (15A NCAC 02B .0200), or State Regulated Riparian Buffer Rules (15A NCAC 02B .0200); or

¹ e.g. Coastal Counties, HQW, ORW, or state-implemented Phase II NPDES

² e.g. Delegated Phase II NPDES, Water Supply Watershed, Nutrient-Sensitive Waters, or Universal Stormwater Management Program

- * i) Any impacts to subject water bodies and/or state regulated riparian buffers along subject water bodies in the Neuse, Tar-Pamlico, or Catawba River Basins or in the Randleman Lake, Jordan Lake or Goose Creek Watersheds (or any other basin or watershed with State Regulated Riparian Area Protection Rules [Buffer Rules] in effect at the time of application) *unless*:
 - i. The activities are listed as “EXEMPT” from these rules; or
 - ii. A Buffer Authorization Certificate is issued by the NC Division of Coastal Management (DCM); or
 - iii. A Buffer Authorization Certificate or a Minor Variance is issued by a delegated or designated local government implementing a state riparian buffer program pursuant to 143-215.23

Activities included in this General Certification that do not meet one of the thresholds listed above do not require written approval.

I. ACTIVITY SPECIFIC CONDITIONS:

- * 1. If this Water Quality Certification is used to access residential, commercial or industrial building sites, then all parcels owned by the applicant that are part of the single and complete project authorized by this Certification must be buildable without additional impacts to streams or wetlands. If required in writing by DWR, the applicant shall provide evidence that the parcels are buildable without requiring additional impacts to wetlands, waters, or state regulated riparian buffers. [15A NCAC 02H .0506(b)(4) and (c)(4)]
- 2. For road and driveway construction purposes, this Certification shall only be utilized from natural high ground to natural high ground. [15A NCAC 02H .0506(b)(2) and (c)(2)]
- * 3. Deed notifications or similar mechanisms shall be placed on all lots with retained jurisdictional wetlands, waters, and state regulated riparian buffers within the project boundaries in order to assure compliance with NC Wetland Rules (15A NCAC 02H .0500), NC Isolated Wetland Rules (15A NCAC 02H .1300), and/or State Regulated Riparian Buffer Rules (15A NCAC 02B .0200). These mechanisms shall be put in place at the time of recording of the property or individual parcels, whichever is appropriate. [15A NCAC 02H .0506(b)(4) and (c)(4)]
- 4. For the North Carolina Department of Transportation, compliance with the NCDOT’s individual NPDES permit NCS000250 shall serve to satisfy this condition. All other high-density projects that trigger threshold item (d) above shall comply with one of the following requirements: [15A NCAC 02H .0506(b)(5) and (c)(5)]

P-30
GC4135

- a. Provide a completed Stormwater Management Plan (SMP) for review and approval, including all appropriate stormwater control measure (SCM) supplemental forms and associated items, that complies with the high-density development requirements of 15A NCAC 02H .1003. Stormwater management shall be provided throughout the entire project area in accordance with 15A NCAC 02H .1003. For the purposes of 15A NCAC 02H .1003(2)(a), density thresholds shall be determined in accordance with 15A NCAC 02H .1017.
- b. Provide documentation (including calculations, photos, etc.) that the project will not cause degradation of downstream surface waters. Documentation shall include a detailed analysis of the hydrological impacts from stormwater runoff when considering the volume and velocity of stormwater runoff from the project built upon area and the size and existing condition of the receiving stream(s).

Exceptions to this condition require application to and written approval from DWR.

II. GENERAL CONDITIONS:

- * 1. When written authorization is required, the plans and specifications for the project are incorporated into the authorization by reference and are an enforceable part of the Certification. Any modifications to the project require notification to DWR and may require an application submittal to DWR with the appropriate fee. [15A NCAC 02H .0501 and .0502]
2. No waste, spoil, solids, or fill of any kind shall occur in wetlands or waters beyond the footprint of the impacts (including temporary impacts) as authorized in the written approval from DWR; or beyond the thresholds established for use of this Certification without written authorization. [15A NCAC 02H .0501 and .0502]

No removal of vegetation or other impacts of any kind shall occur to state regulated riparian buffers beyond the footprint of impacts approved in a Buffer Authorization or Variance or as listed as an exempt activity in the applicable riparian buffer rules. [15A NCAC 02B .0200]

- * 3. In accordance with 15A NCAC 02H .0506(h) and Session Law 2017-10, compensatory mitigation may be required for losses of greater than 300 linear feet of perennial streams and/or greater than one (1) acre of wetlands. Impacts associated with the removal of a dam shall not require mitigation when the removal complies with the requirements of Part 3 of Article 21 in Chapter 143 of the North Carolina General Statutes. Impacts to isolated and other non-404 jurisdictional wetlands shall not be combined with 404 jurisdictional wetlands for the purpose of determining when impact thresholds trigger a mitigation requirement. For linear publicly owned and maintained transportation projects that are not determined to be part of a larger common plan of development by the US Army Corps of Engineers, compensatory mitigation may be required for losses of greater than 300 linear feet per perennial stream.

P-31
GC4135

Compensatory stream and/or wetland mitigation shall be proposed and completed in compliance with G.S. 143-214.11. For applicants proposing to conduct mitigation within a project site, a complete mitigation proposal developed in accordance with the most recent guidance issued by the US Army Corps of Engineers Wilmington District shall be submitted for review and approval with the application for impacts.

4. All activities shall be in compliance with any applicable State Regulated Riparian Buffer Rules in Chapter 2 of Title 15A.
5. When applicable, all construction activities shall be performed and maintained in full compliance with G.S. Chapter 113A Article 4 (Sediment and Pollution Control Act of 1973). Regardless of applicability of the Sediment and Pollution Control Act, all projects shall incorporate appropriate Best Management Practices for the control of sediment and erosion so that no violations of state water quality standards, statutes, or rules occur. [15A NCAC 02H .0506(b)(3) and (c)(3) and 15A NCAC 02B .0200]

Design, installation, operation, and maintenance of all sediment and erosion control measures shall be equal to or exceed the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*, or for linear transportation projects, the *NCDOT Sediment and Erosion Control Manual*.

All devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) sites, including contractor-owned or leased borrow pits associated with the project. Sufficient materials required for stabilization and/or repair of erosion control measures and stormwater routing and treatment shall be on site at all times.

For borrow pit sites, the erosion and sediment control measures shall be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*. Reclamation measures and implementation shall comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act and the Mining Act of 1971.

If the project occurs in waters or watersheds classified as Primary Nursery Areas (PNAs), SA, WS-I, WS-II, High Quality Waters (HQW), or Outstanding Resource Waters (ORW), then the sedimentation and erosion control designs shall comply with the requirements set forth in 15A NCAC 04B .0124, *Design Standards in Sensitive Watersheds*.

6. Sediment and erosion control measures shall not be placed in wetlands or waters except within the footprint of temporary or permanent impacts authorized under this Certification. Exceptions to this condition require application to and written approval from DWR. [15A NCAC 02H .0501 and .0502]
7. Erosion control matting that incorporates plastic mesh and/or plastic twine shall not be used along streambanks or within wetlands. Exceptions to this condition require application to and written approval from DWR. [15A NCAC 02B .0201]

P-32
GC4135

8. An NPDES Construction Stormwater Permit (NCG010000) is required for construction projects that disturb one (1) or more acres of land. The NCG010000 Permit allows stormwater to be discharged during land disturbing construction activities as stipulated in the conditions of the permit. If the 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. [15A NCAC 02H .0506(b)(5) and (c)(5)]

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. [15A NCAC 02H .0506(b)(5) and (c)(5)]

9. All work in or adjacent to streams 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 to and written approval from DWR. [15A NCAC 02H .0506(b)(3) and (c)(3)]
10. If activities must occur during periods of high biological activity (e.g. 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. [15A NCAC 02H .0506 (b)(2) and 15A NCAC 04B .0125]

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) shall be implemented. Exceptions to this condition require written approval by the resource agency responsible for the given moratorium. A copy of the approval from the resource agency shall be forwarded to DWR.

Work within a designated trout watershed of North Carolina (as identified by the Wilmington District of the US Army Corps of Engineers), or identified state or federal endangered or threatened species habitat, shall be coordinated with the appropriate WRC, USFWS, NMFS, and/or DMF personnel.

11. Culverts 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. The dimension, pattern, and profile of the stream above and below a pipe or culvert shall 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 shall be such as to pass the average historical low flow and spring flow without adversely altering flow velocity. [15A NCAC 02H .0506(b)(2) and (c)(2)]

Placement of culverts and other structures in streams shall be below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20% 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.

If multiple pipes or barrels are required, they shall be designed to mimic the existing stream cross section as closely as possible including pipes or barrels at flood plain elevation and/or sills where appropriate. Widening the stream channel shall be avoided.

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 (e.g. rock ladders, cross vanes, etc.). Notification, including supporting documentation to include a location map of the culvert, culvert profile drawings, and slope calculations, shall be provided to DWR 60 calendar 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, including supporting documentation such as, a location map of the culvert, geotechnical reports, photographs, etc. shall be provided to DWR a minimum of 60 calendar days prior to the installation of the culvert. If bedrock is discovered during construction, then DWR 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 to and written approval from DWR.

Installation of culverts in wetlands shall ensure continuity of water movement and be designed to adequately accommodate high water or flood conditions. When roadways, causeways, or other fill projects are constructed across FEMA-designated floodways or wetlands, openings such as culverts or bridges shall 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 shall be used where practicable instead of rip-rap or other bank hardening methods.

12. Bridge deck drains shall not discharge directly into the stream. Stormwater shall be directed across the bridge and pre-treated through site-appropriate means to the maximum extent practicable (e.g. grassed swales, pre-formed scour holes, vegetated buffers, etc.) before entering the stream. Exceptions to this condition require application to and written approval from DWR. [15A NCAC 02H .0506(b)(5)]

13. Application of fertilizer to establish planted/seeded vegetation within disturbed riparian areas and/or wetlands shall be conducted at agronomic rates and shall comply with all other Federal, State and Local regulations. Fertilizer application shall be accomplished in a manner that minimizes the risk of contact between the fertilizer and surface waters. [15A NCAC 02B .0200 and 15A NCAC 02B .0231]
14. If concrete is used during 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. [15A NCAC 02B .0200]
15. All proposed and approved temporary fill and culverts shall be removed and the impacted area shall be returned to natural conditions within 60 calendar days after the temporary impact is no longer necessary. The impacted areas shall be restored to original grade, including each stream's original cross sectional dimensions, planform pattern, and longitudinal bed profile. For projects that receive written approval, no temporary impacts are allowed beyond those included in the application and authorization. All temporarily impacted sites shall be restored and stabilized with native vegetation. [15A NCAC 02H .0506(b)(2) and (c)(2)]
16. All proposed and approved temporary pipes/culverts/rip-rap pads etc. in streams shall be installed 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* or the *North Carolina Department of Transportation Best Management Practices for Construction and Maintenance Activities* so as not to restrict stream flow or cause dis-equilibrium during use of this Certification. [15A NCAC 02H .0506(b)(2) and (c)(2)]
17. Any rip-rap 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 be placed 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 or in a manner that precludes aquatic life passage. [15A NCAC 02H .0506(b)(2)]
18. Any rip-rap used for stream or shoreline stabilization shall be of a size and density to prevent movement by wave, current action, or stream flows and shall 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. [15A NCAC 02H .0506(b)(2)]
19. Applications for rip-rap groins proposed in accordance with 15A NCAC 07H .1401 (NC Division of Coastal Management General Permit for construction of Wooden and Rip-rap Groins in Estuarine and Public Trust Waters) shall meet all the specific conditions for design and construction specified in 15A NCAC 07H .1405.

P-35
GC4135

20. All mechanized equipment operated near surface waters shall be inspected and maintained regularly to prevent contamination of surface waters from fuels, lubricants, hydraulic fluids, or other toxic materials. Construction shall be staged in order to minimize the exposure of equipment to surface waters to the maximum extent practicable. Fueling, lubrication and general equipment maintenance shall be performed in a manner to prevent, to the maximum extent practicable, contamination of surface waters by fuels and oils. [15A NCAC 02H .0506(b)(3) and (c)(3) and 15A NCAC 02B .0211 (12)]
21. Heavy equipment working in wetlands shall be placed on mats or other measures shall be taken to minimize soil disturbance. [15A NCAC 02H .0506(b)(3) and (c)(3)]
22. In accordance with 143-215.85(b), the applicant shall report any petroleum spill of 25 gallons or more; any spill regardless of amount that causes a sheen on surface waters; any petroleum spill regardless of amount occurring within 100 feet of surface waters; and any petroleum spill less than 25 gallons that cannot be cleaned up within 24 hours.
- * 23. If an environmental document is required under the State Environmental Policy Act (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. If an environmental document is required under the National Environmental Policy Act (NEPA), then this General Certification is not valid until a Categorical Exclusion, the Final Environmental Assessment, or Final Environmental Impact Statement is published by the lead agency. [15A NCAC 01C .0107(a)]
24. This General Certification does not relieve the applicant of the responsibility to obtain all other required Federal, State, or Local approvals before proceeding with the project, including those required by, but not limited to, Sediment and Erosion Control, Non-Discharge, Water Supply Watershed, and Trout Buffer regulations.
25. The applicant 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 DWR 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 DWR may revoke or modify a written authorization associated with this General Water Quality Certification. [15A NCAC 02H .0507(d)]
26. The permittee shall require its contractors and/or agents to comply with the terms and conditions of this permit in the construction and maintenance of this project, and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this Certification. A copy of this Certification, including all conditions shall be available at the project site during the construction and maintenance of this project. [15A NCAC 02H .0507 (c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

P-36
GC4135

- * 27. 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 a certificate of completion (available on the DWR website <https://edocs.deq.nc.gov/Forms/Certificate-of-Completion>). [15A NCAC 02H .0502(f)]
- 28. 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. [15A NCAC 02H .0507(c)]
- 29. If the property or project is sold or transferred, the new permittee shall be given a copy of this Certification (and written authorization if applicable) and is responsible for complying with all conditions. [15A NCAC 02H .0501 and .0502]

III. GENERAL CERTIFICATION ADMINISTRATION:

- * 1. 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. An applicant for a CAMA permit under Article 7 of Chapter 113A of the General Statutes for which a Water Quality Certification is required shall only make one payment to satisfy both agencies; the fee shall be as established by the Secretary in accordance with 143-215.3D(e)(7).
- 2. This Certification neither grants nor affirms any property right, license, or privilege in any waters, or any right of use in any waters. This Certification does not authorize any person to interfere with the riparian rights, littoral rights, or water use rights of any other person and this Certification does not create any prescriptive right or any right of priority regarding any usage of water. This Certification shall not be interposed as a defense in any action respecting the determination of riparian or littoral rights or other rights to water use. No consumptive user is deemed by virtue of this Certification to possess any prescriptive or other right of priority with respect to any other consumptive user regardless of the quantity of the withdrawal or the date on which the withdrawal was initiated or expanded.
- 3. This Certification grants permission to the Director, an authorized representative of the Director, or DWR staff, upon the presentation of proper credentials, to enter the property during normal business hours. [15A NCAC 02H .0502(e)]
- 4. This General Certification shall expire on the same day as the expiration date of the corresponding Nationwide Permit 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. This General Certification is rescinded when the US Army Corps of Engineers reauthorizes any of the corresponding Nationwide Permits and/or Regional General Permits or when deemed appropriate by the Director of the Division of Water Resources.

P-37
GC4135

5. 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.
- * 6. The Director of the North Carolina Division of Water Resources may require submission of a formal application for Individual Certification for any project in this category of activity if it is deemed in the public's best interest or 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 water or downstream waters are precluded.

History Note: Water Quality Certification (WQC) Number 4135 issued December 1, 2017 replaces WQC Number 4088 issued March 3, 2017; WQC 3886 issued March 12, 2012; 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.

DENOTES TEMPORARY
IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN
SURFACE WATER

-Y5- PC Sta. 10+31.53

-Y5- POT Sta. 10+00.00

-Y5- PT Sta. 11+74.93

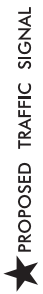
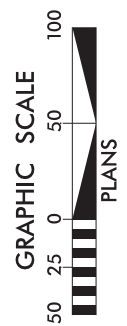
MATCHLINE -L- STA. 26+00.00 SEE SHT. 5

-Y5- POT Sta. 12+94.44

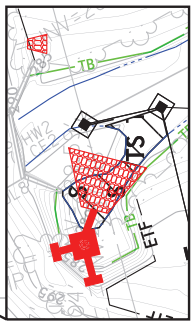
-L- POC Sta. 21+34.46

-L- PT Sta. 22+38.78

CULVERT #2 TWO BARRELS		
	NORTH	EAST
CUL1	767148.95	2052518.25
CUL2	767144.33	2052512.96
CUL3	767143.64	2052512.15
CUL4	767138.93	2052506.95
CE1	767144.39	2052513.01
HW1	767143.86	2052512.58
CUL5	767069.89	2052651.60
CUL6	767065.54	2052646.14
CUL7	767064.53	2052645.56
CUL8	767060.05	2052639.88
CE2	767064.73	2052645.45
HW2	767065.15	2052645.59



SEE SHTS. 15 & 16 FOR -L- PROFILE
SEE SHT. 19 FOR -Y5- PROFILE



SITE 1 - IMPACT ZOOM-IN
(SCALE: 1" = 50')

LEGEND

DENOTES EXCAVATION IN WETLAND

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 5 OF 27

	NORTH	EAST	ELEV.
CUL.1	767996.90	2053907.59	282.77
CUL.2	767992.17	2053899.10	280.63
CUL.3	767991.64	2053898.27	280.99
CUL.4	767986.83	2053889.93	280.97
CUL.5	767986.36	2053888.99	280.42
CUL.6	767981.56	2053880.63	281.31
CE1	767989.21	2053894.66	281.02
CE2	767989.54	2053894.66	281.02
CE3	767989.54	2053894.66	281.02
CE4	767989.54	2053894.66	281.02
CE5	767989.54	2053894.66	281.02
CE6	767989.54	2053894.66	281.02
CE7	767989.54	2053894.66	281.02
CE8	767989.54	2053894.66	281.02
CE9	767989.54	2053894.66	281.02
CE10	767989.54	2053894.66	281.02
CE11	767989.54	2053894.66	281.02
CE12	767989.54	2053894.66	281.02
CE13	767989.54	2053894.66	281.02
CE14	767989.54	2053894.66	281.02
CE15	767989.54	2053894.66	281.02
CE16	767989.54	2053894.66	281.02
CE17	767989.54	2053894.66	281.02
CE18	767989.54	2053894.66	281.02
CE19	767989.54	2053894.66	281.02
CE20	767989.54	2053894.66	281.02
CE21	767989.54	2053894.66	281.02
CE22	767989.54	2053894.66	281.02
CE23	767989.54	2053894.66	281.02
CE24	767989.54	2053894.66	281.02
CE25	767989.54	2053894.66	281.02
CE26	767989.54	2053894.66	281.02
CE27	767989.54	2053894.66	281.02
CE28	767989.54	2053894.66	281.02
CE29	767989.54	2053894.66	281.02
CE30	767989.54	2053894.66	281.02
CE31	767989.54	2053894.66	281.02
CE32	767989.54	2053894.66	281.02
CE33	767989.54	2053894.66	281.02
CE34	767989.54	2053894.66	281.02
CE35	767989.54	2053894.66	281.02
CE36	767989.54	2053894.66	281.02
CE37	767989.54	2053894.66	281.02
CE38	767989.54	2053894.66	281.02
CE39	767989.54	2053894.66	281.02
CE40	767989.54	2053894.66	281.02
CE41	767989.54	2053894.66	281.02
CE42	767989.54	2053894.66	281.02
CE43	767989.54	2053894.66	281.02
CE44	767989.54	2053894.66	281.02
CE45	767989.54	2053894.66	281.02
CE46	767989.54	2053894.66	281.02
CE47	767989.54	2053894.66	281.02
CE48	767989.54	2053894.66	281.02
CE49	767989.54	2053894.66	281.02
CE50	767989.54	2053894.66	281.02
CE51	767989.54	2053894.66	281.02
CE52	767989.54	2053894.66	281.02
CE53	767989.54	2053894.66	281.02
CE54	767989.54	2053894.66	281.02
CE55	767989.54	2053894.66	281.02
CE56	767989.54	2053894.66	281.02
CE57	767989.54	2053894.66	281.02
CE58	767989.54	2053894.66	281.02
CE59	767989.54	2053894.66	281.02
CE60	767989.54	2053894.66	281.02
CE61	767989.54	2053894.66	281.02
CE62	767989.54	2053894.66	281.02
CE63	767989.54	2053894.66	281.02
CE64	767989.54	2053894.66	281.02
CE65	767989.54	2053894.66	281.02
CE66	767989.54	2053894.66	281.02
CE67	767989.54	2053894.66	281.02
CE68	767989.54	2053894.66	281.02
CE69	767989.54	2053894.66	281.02
CE70	767989.54	2053894.66	281.02
CE71	767989.54	2053894.66	281.02
CE72	767989.54	2053894.66	281.02
CE73	767989.54	2053894.66	281.02
CE74	767989.54	2053894.66	281.02
CE75	767989.54	2053894.66	281.02
CE76	767989.54	2053894.66	281.02
CE77	767989.54	2053894.66	281.02
CE78	767989.54	2053894.66	281.02
CE79	767989.54	2053894.66	281.02
CE80	767989.54	2053894.66	281.02
CE81	767989.54	2053894.66	281.02
CE82	767989.54	2053894.66	281.02
CE83	767989.54	2053894.66	281.02
CE84	767989.54	2053894.66	281.02
CE85	767989.54	2053894.66	281.02
CE86	767989.54	2053894.66	281.02
CE87	767989.54	2053894.66	281.02
CE88	767989.54	2053894.66	281.02
CE89	767989.54	2053894.66	281.02
CE90	767989.54	2053894.66	281.02
CE91	767989.54	2053894.66	281.02
CE92	767989.54	2053894.66	281.02
CE93	767989.54	2053894.66	281.02
CE94	767989.54	2053894.66	281.02
CE95	767989.54	2053894.66	281.02
CE96	767989.54	2053894.66	281.02
CE97	767989.54	2053894.66	281.02
CE98	767989.54	2053894.66	281.02
CE99	767989.54	2053894.66	281.02
CE100	767989.54	2053894.66	281.02



1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107

Kimley»Horn

P.O. BOX 33068 • RALEIGH, N.C. 27636-3068

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

PROJECT REFERENCE NO. 1-5700

RW SHEET NO. ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO. 1-5700

RW SHEET NO. ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

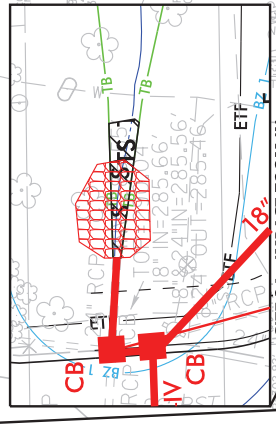
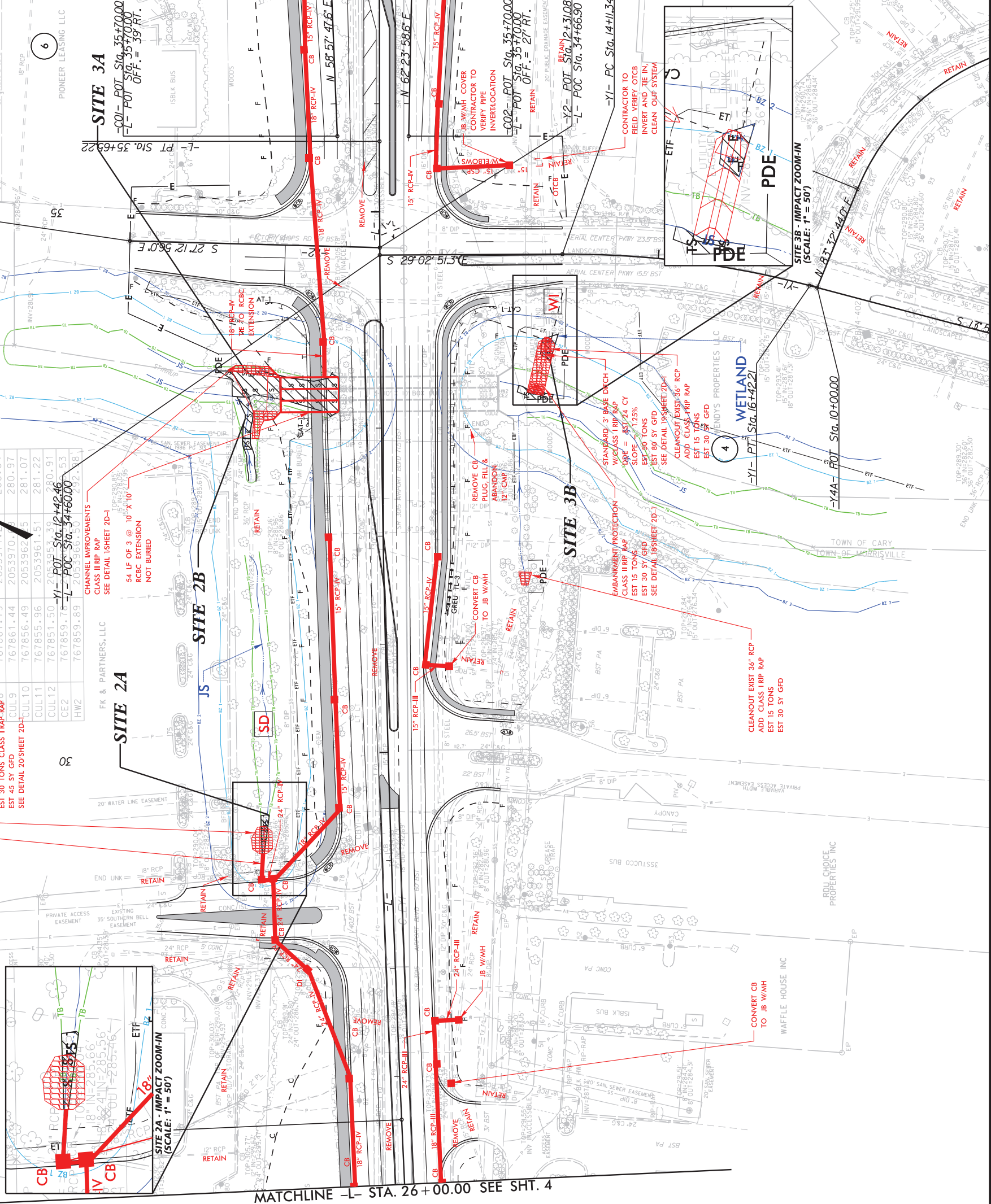
ETHERILL ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107

Kimley»Horn

P.O. BOX 33068 • RALEIGH, N.C. 27636-3068

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION



★ PROPOSED TRAFFIC SIGNAL

SEE SHTS. 15 & 16 FOR -L- PROFILE
SEE SHT. 17 FOR -Y1- PROFILE
SEE SHT. 18 FOR -Y2- PROFILE



1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

Kimley»Horn
©2016
P.O. BOX 33068 RALEIGH, N.C. 27634-3068

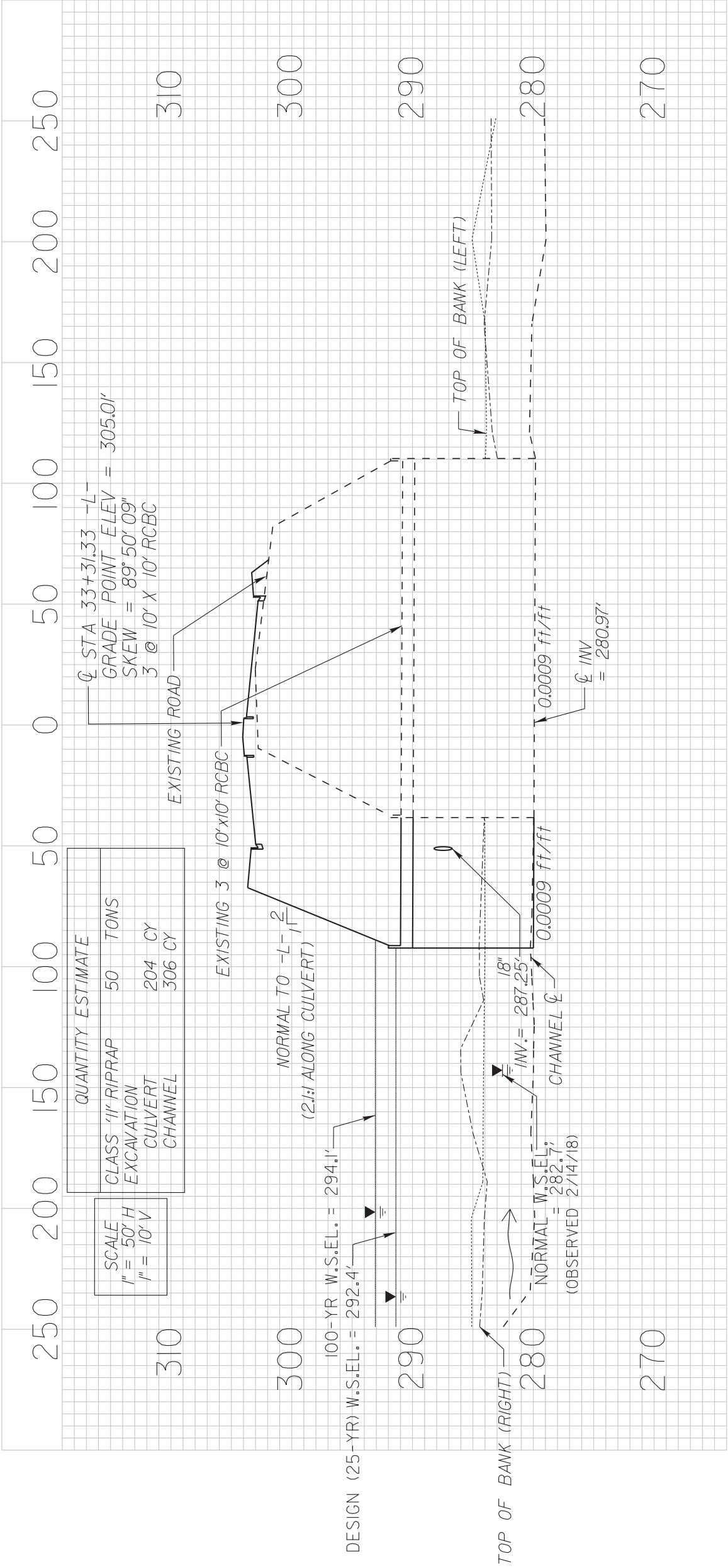
PROJECT REFERENCE NO.
I-5700

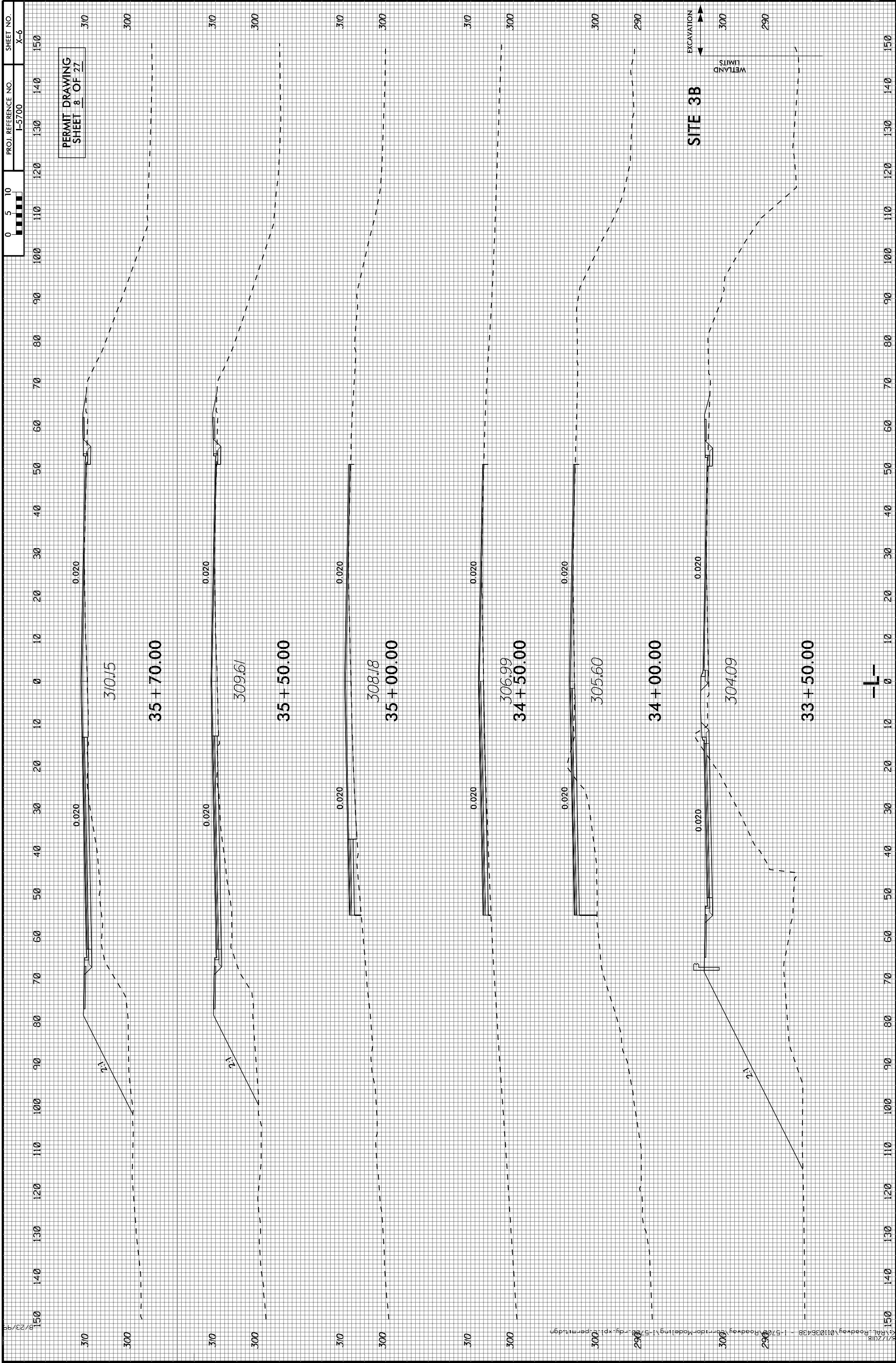
RW SHEET NO.
ENGINEER

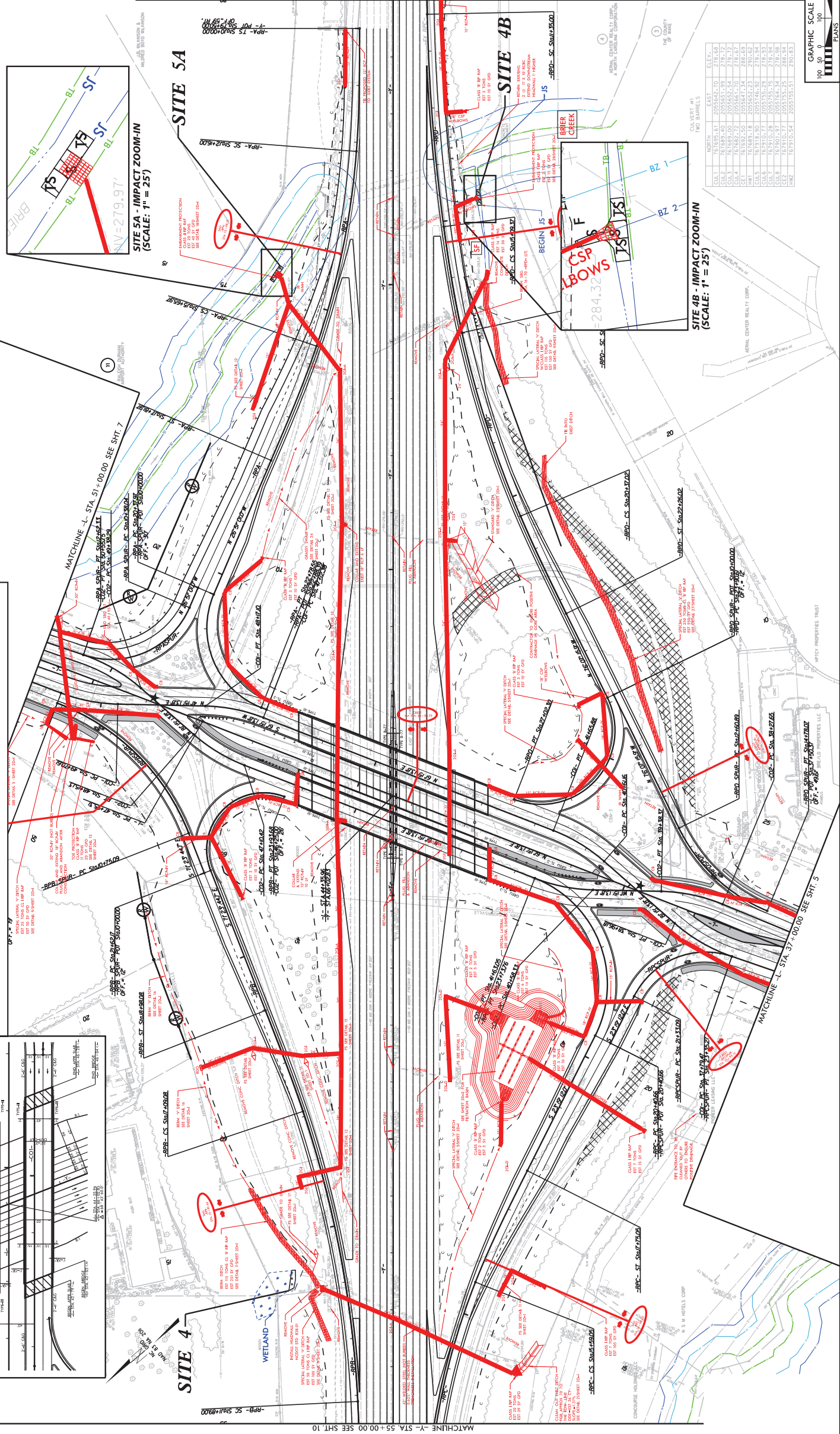
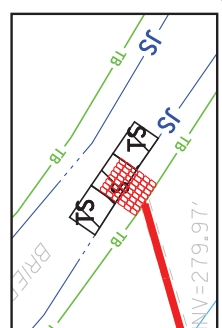
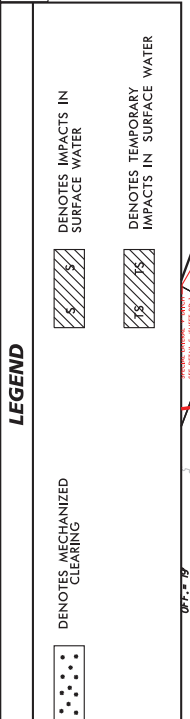
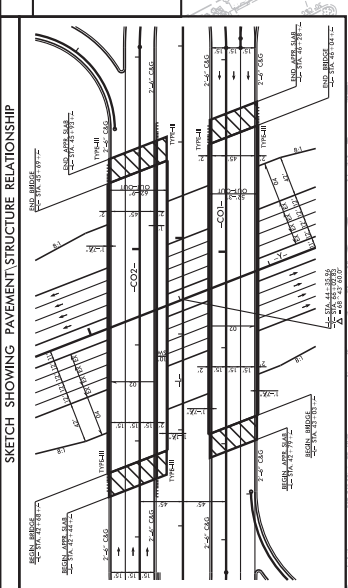
HYDRAULICS
ENGINEER

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

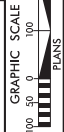
SITE 3A - CULVERT EXTENSION

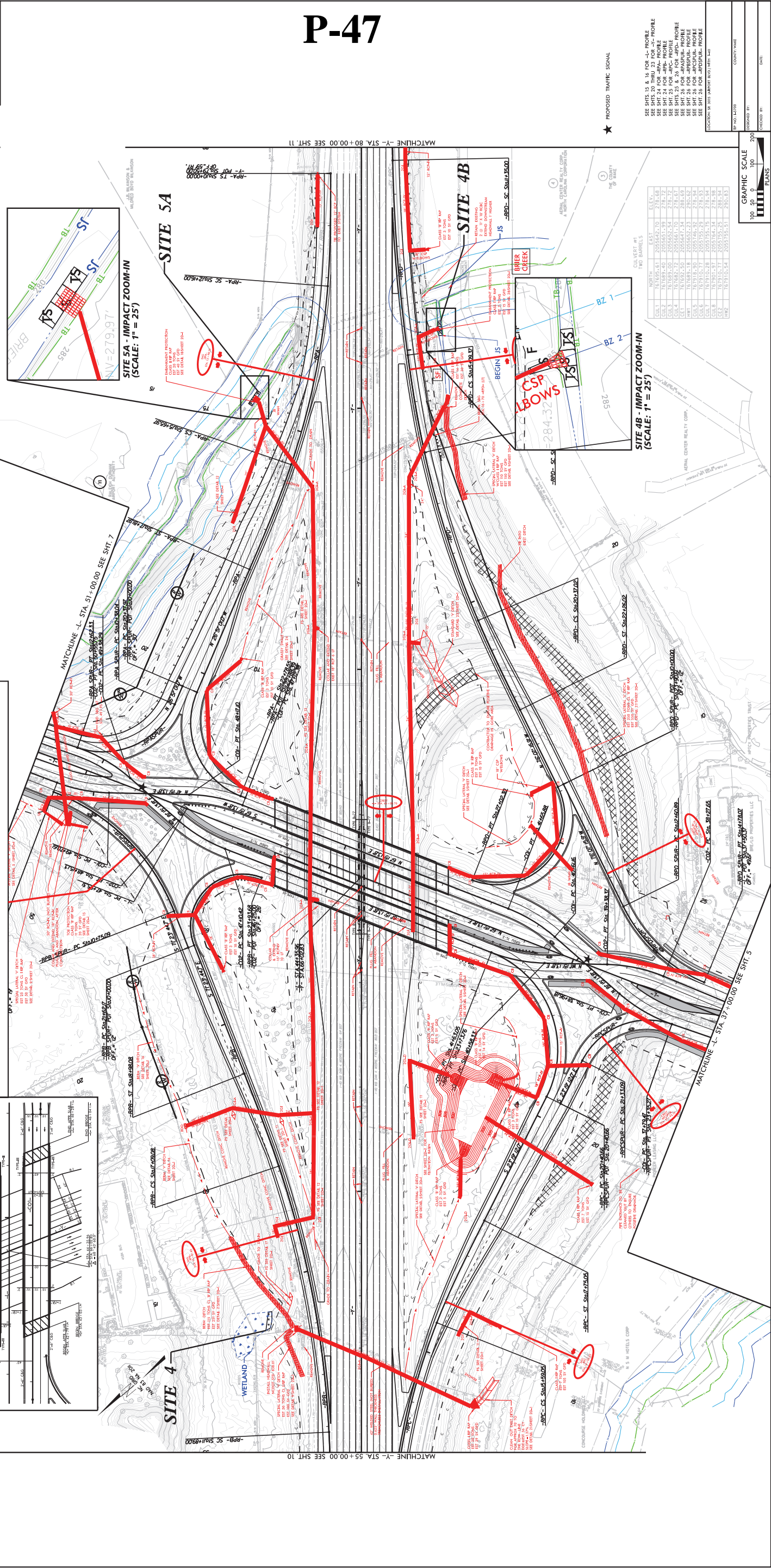






SEE SHTS. 15 & 16 FOR -L- PROFILE
SEE SHTS. 20 THRU 23 FOR -Y- PROFILE
SEE SHT. 24 FOR -RPA- PROFILE
SEE SHT. 24 FOR -RPB- PROFILE
SEE SHT. 25 FOR -RPC- PROFILE
SEE SHTS. 25 & 26 FOR -RPD- PROFILE
SEE SHT. 26 FOR -RPASPUR- PROFILE
SEE SHT. 26 FOR -RPBSPUR- PROFILE
SEE SHT. 26 FOR -RPCSPUR- PROFILE
SEE SHT. 26 FOR -RPDSPUR- PROFILE



 PROPOSED TRAFFIC SIGNAL

EE SHTS. 15 & 16 FOR -L- PROFILE
EE SHTS. 20 THRU 23 FOR -Y- PROFILE
EE SHT. 24 FOR -RPA- PROFILE
EE SHT. 24 FOR -RPB- PROFILE
EE SHT. 25 FOR -RPC- PROFILE
EE SHTS. 25 & 26 FOR -RPD- PROFILE
EE SHT. 26 FOR -RPASPUR- PROFILE
EE SHT. 26 FOR -RPSBPUR- PROFILE
EE SHT. 26 FOR -RPPSPUR- PROFILE
EE SHT. 26 FOR -RPDSPUR- PROFILE

3
2
2
7
6
2
4
2

	NORTH
CUL 1	767695
CUL 2	767689
CUL 3	767689
CUL 4	767682
CE 1	767652
HW 1	767689
CUL 5	767918
CUL 6	767910
CUL 7	767910

SALE: 1" = 25'

Aerial center line view of the runway. The runway is shown as a straight line with a center line. The surrounding terrain is depicted with contour lines. The runway is labeled 'RUNWAY 10-20' and 'TAXIWAY 10-20'.

APD-SPUR- POT SIG
APD-PC SIG-300E
OFF-12

Topographic map showing a road labeled "Sta 12+60.89". A red circle highlights a specific location on the road.

A close-up of a technical drawing, likely a map or architectural plan. A prominent red line runs diagonally across the frame. Below the line, the word "CHINA" is partially visible in a bold, sans-serif font. The drawing includes various geometric lines and symbols, suggesting a technical or scientific context.

APC SP-01
POWER LEAD

LOCATION: SR 302, AIRPORT RD. WITH 140

	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990	2000	
CUL. 8	167301.47	20551644.34	278.98																													
CUL. 2	167310.17	20551525.25	288.94																													
HWY	167310.54	2055755.51	790.83																													

GRAPHIC SCALE

100 50 0 100 200

PLANS

COUNTY: WAKE

ISSUED: 8/1

DATE:

CHECKED: B/

1700

1710

1720

1730

1740

1750

1760

1770

1780

1790

1800

1810

1820

1830

1840

1850

1860

1870

1880

1890

1900

1910

1920

1930

1940

1950

1960

1970

1980

1990

2000

1700

1710

1720

1730

1740

1750

1760

1770

1780

1790

1800

1810

1820

1830

1840

1850

1860

1870

1880

1890

1900

1910

1920

1930

1940

1950

1960

1970

1980

1990

2000

1700

1710

1720

1730

1740

1750

1760

1770

1780

1790

1800

1810

1820

1830

1840

1850

1860

1870

1880

1890

1900

1910

1920

1930

1940

1950

1960

1970

1980

1990

2000

1700

1710

1720

1730

1740

1750

1760

1770

1780

1790

1800

1810

1820

1830

1840

1850

1860

1870

1880

1890

1900

1910

1920

1930

1940

1950

1960

1970

1980

1990

2000

1700

1710

1720

1730

1740

1750

1760

1770

1780

1790

1800

1810

1820

1830

1840

1850

1860

1870

1880

1890

1900

1910

1920

1930

1940

1950

1960

1970

1980

1990

2000

1700

1710

1720

1730

1740

1750

1760

1770

1780

1790

1800

1810

1820

1830

1840

1850

1860

1870

1880

1890

1900

1910

1920

1930

1940

1950

1960

1970

1980

1990

2000

1700

1710

1720

1730

1740

1750

1760

1770

1780

1790

1800

1810

1820

1830

1840

1850

1860

1870

1880

1890

1900

1910

1920

1930

1940

1950

1960

1970

1980

1990

2000

1700

1710

1720

1730

1740

1750

1760

1770

1780

1790

1800

1810

1820

1830

1840

1850

1860

1870

1880

1890

1900

1910

1920

1930

1940

1950

1960

1970

1980

1990

2000

1700

1710

1720

1730

1740

1750

1760

1770

1780

1790

1800

1810

1820

1830

1840

1850

1860

1870

1880

1890

1900

1910

1920

1930

1940

1950

1960

1970

1980

1990

2000

1700

1710

1720

1730

1740

1750

1760

1770

1780

1790

1800

1810

1820

1830

1840

1850

1860

1870

1880

1890

1900

1910

1920

1930

1940

1950

1960

1970

1980

1990

2000

1700

1710

1720

1730

1740

1750

1760

1770

1780

1790

1800

1810

1820

1830

1840

1850

1860

1870

1880

1890

1900

1910

1920

1930

1940

1950

1960

1970

1980

1990

2000

1700

1710

1720

1730

1740

1750

1760

1770

1780

1790

1800

1810

1820

183

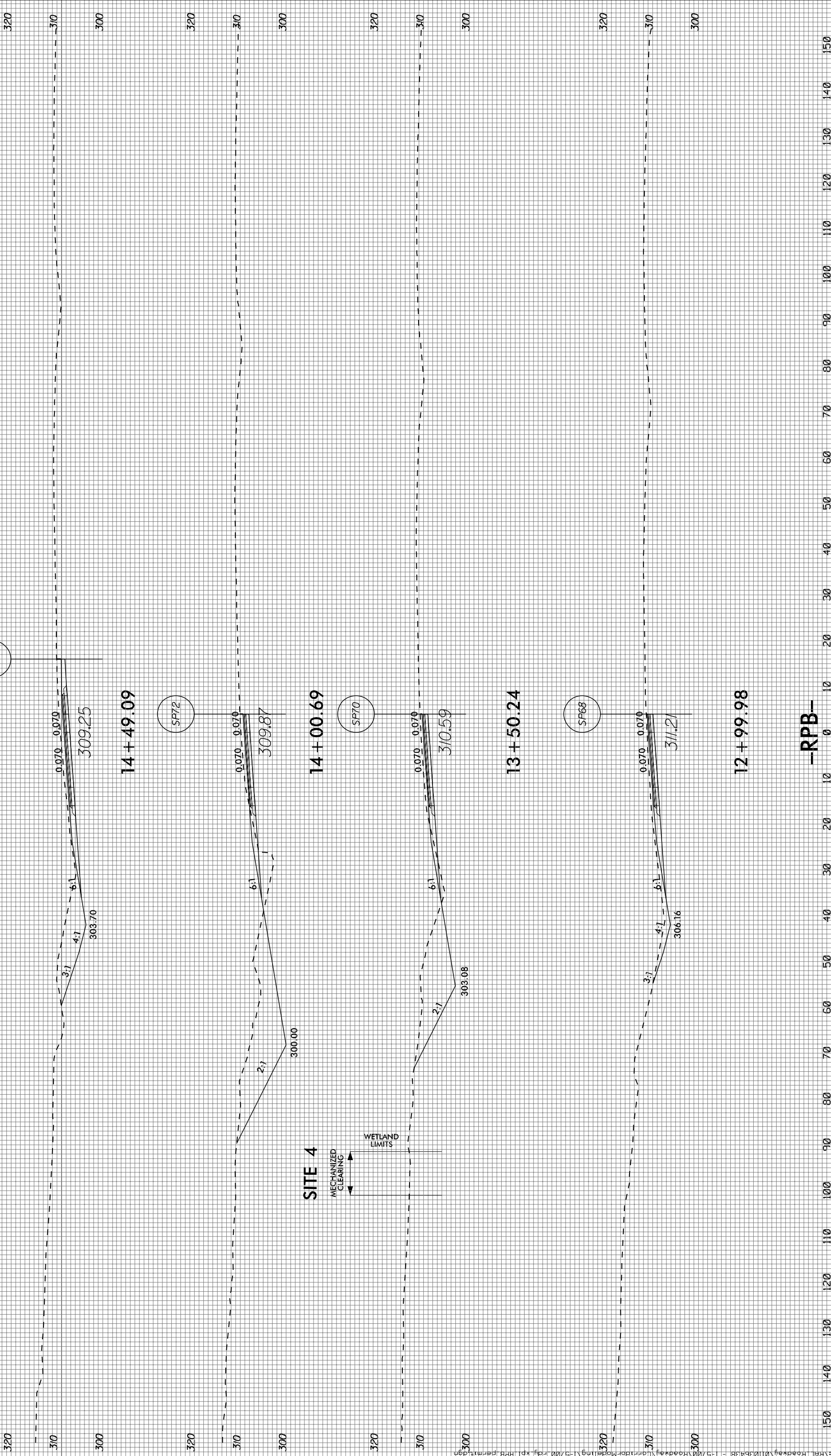
8/23/99



PROJ. REFERENCE NO.
I-5700

SHEET NO.
X-109

PERMIT DRAWING
SHEET 11 OF 27



-RPB-

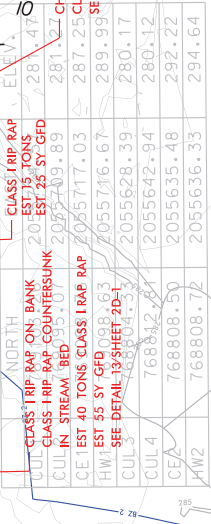
K:\RAL_Roadway\011036438 - I-5700\Roadway\Corridor\Modeling\I-5700-rdy.xpl.RPB-permit.dgn 8/17/2018

SITE 6 REMOVED FROM 4B PLANS.
NOT IMPACTED BY PROPOSED WORK

SITE 7 REMOVED FROM 4B PLANS.
INCORPORATED INTO SITE 5C

	DENOTES IMPACTS IN SURFACE WATER
	DENOTES TEMPORARY IMPACTS IN SURFACE WATER

9



★ PROPOSED TRAFFIC SIGNAL

SEE SHTS. 15 & 16 FOR -L- PROFILE
SEE SHTS. 18 & 19 FOR -Y3- PROFILE
SEE SHT. 17 FOR -NBL- PROFILE



1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GE/GPS - CONSTRUCTION OBSERVATION

Kimley»Horn
©2016
P.O. BOX 33068 RALEIGH, N.C. 27634-3068

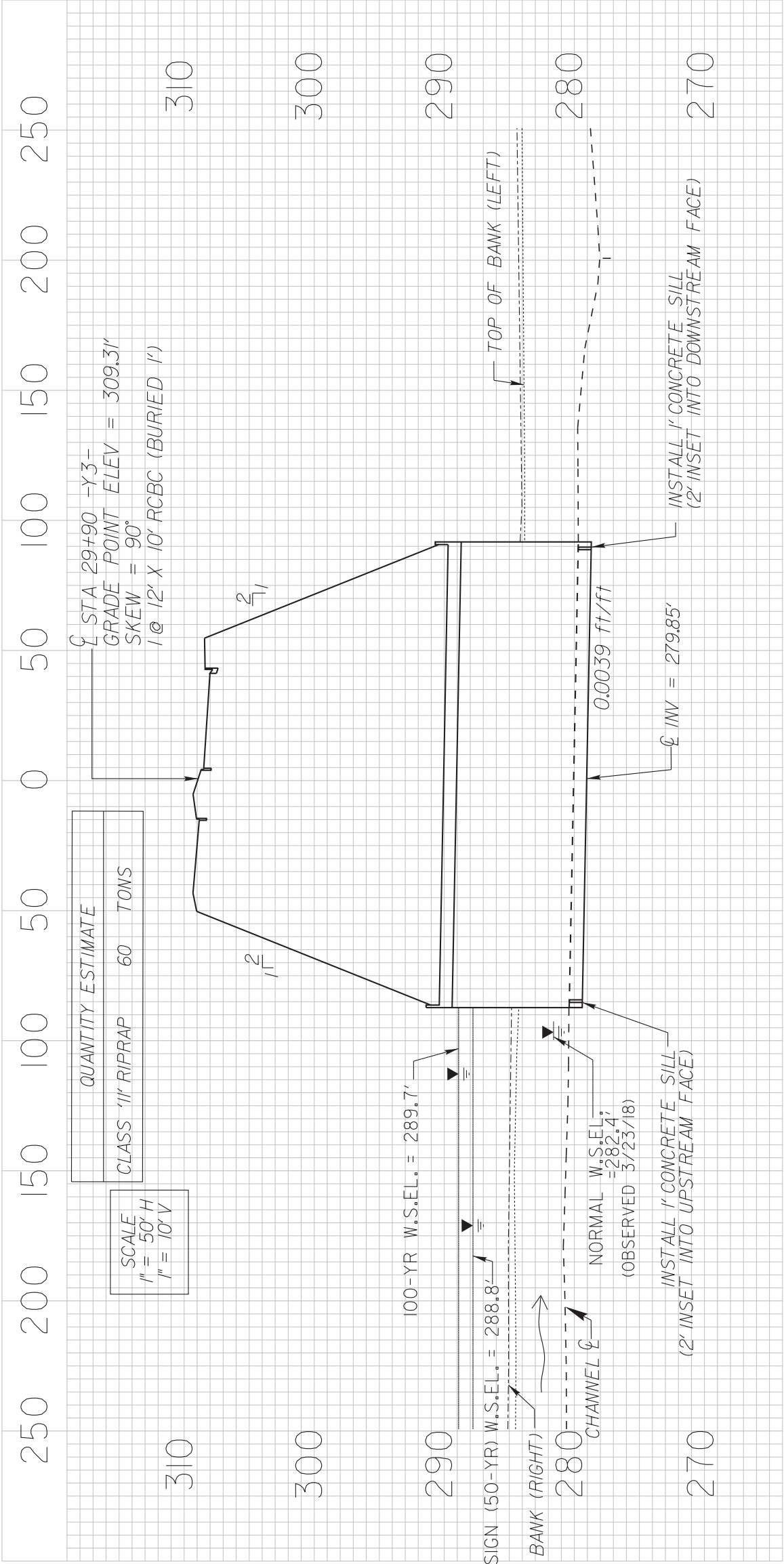
PROJECT REFERENCE NO.
I-5700

R/W SHEET NO.
ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

SITE 5E - PROPOSED CULVERT





1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

Kimley»Horn
© 2016
P.O. BOX 33068 RALEIGH, N.C. 27634-3068

PROJECT REFERENCE NO.
I-5700

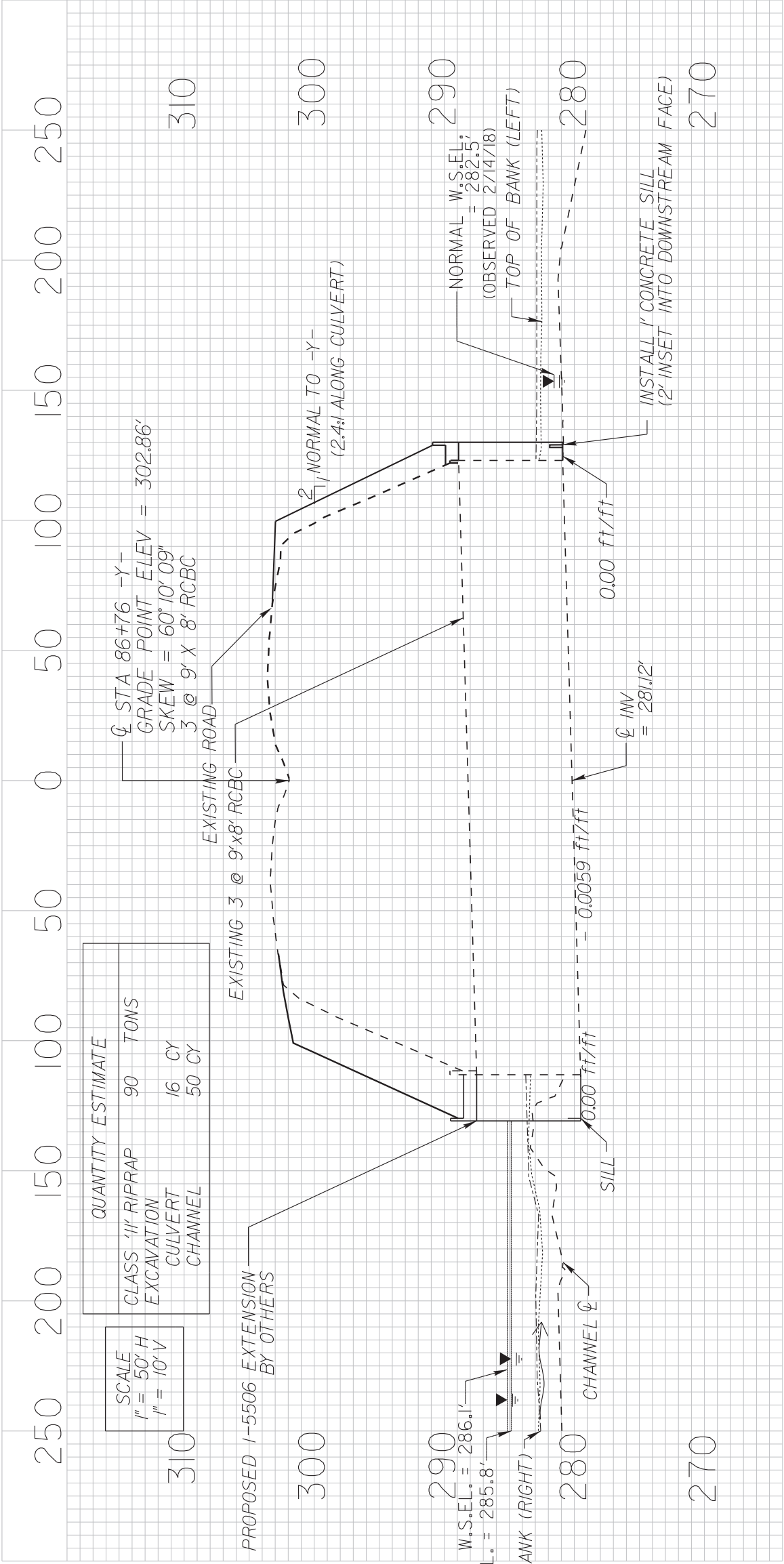
RW SHEET NO.

ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

SITE 10A - CULVERT EXTENSION



LEGEND

•••••

DENOTES MECHANIZED CLEARING

DENOTES FILL IN WETLAND

PERMIT DRAWING
SHEET 26 OF 27

ETHERILL
ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License: No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107

PROJECT REFERENCE NO.

1-5700

SHEET NO.

14

ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

Kimley»Horn

P.O. BOX 33068 RALEIGH, N.C. 27634-3068

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

1/5/14/99

The main site plan for SITE 8B shows a complex layout of wetland areas, roadways, and various engineering details. Key features include:
 - Wetland areas labeled 'WETLAND' and 'RALEIGH DURHAM INTERNATIONAL'.
 - Roadway sections labeled 'Y3- PRC Sta. 22+63.04', 'Y3- POC Sta. 22+28.37', and 'Y8- POT Sta. 22+18.46'.
 - Various engineering details such as 'TOE PROTECTION CLASS 8" RIP RAP EST 30 TONS', 'SPECIAL LATERAL V DITCH', 'CLASS 8" RIP RAP', and '18" RCP-IV'.
 - Specific locations marked with stationing like 'STA 17+13.59.07' and 'STA 17+17.88'.
 - A 'MATCHLINE -Y3- STA. 27+00.00 SEE SHT. 7' at the top right.
 - A 'SITE 8B - IMPACT ZOOM-IN (SCALE: 1" = 50\')

1/24/2019 17:00-hyd-wet.psh14-con.dgn

P-63

GRAPHIC SCALE
50 25 0 50 100
PLANS

SEE SHTS. 18 & 19 FOR -Y3- PROFILE
SEE SHT. 19 FOR -Y8- PROFILE

WETLAND AND SURFACE WATER IMPACTS 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	17+44/17+62 -L- (RT)	Scour Hole Stabilization						< 0.01	< 0.01	20	15	
2A	29+10/29+46 -L- (LT)	Channel Improvements						< 0.01	< 0.01	26	12	
2B	33+00/33+30 -L- (LT)	Bank Stabilization						< 0.01	< 0.01	40	10	
3A	33+30/33+51 -L- (LT)	3 @ 10'X10' RCBC Extension Bank Stabilization						0.03		53		
	33+30/33+51 -L- (LT)							0.02	< 0.01	45	15	
3B	33+61/33+85 -L- (RT)	Excavation			< 0.01							
	33+24/33+38 -L- (RT)	Bank Stabilization						< 0.01	< 0.01	15	33	
4	14+02/14+36 -RPB- (RT)	Fill Slope				< 0.01						
4A	REMOVED AFTER 4B MEETING											
4B	14+52/14+80 -RPD- (LT)	Bank Stabilization						< 0.01	< 0.01	23	20	
5A	75+05/75+30 -Y- (LT)	Bank Stabilization						< 0.01	< 0.01	10	20	
5B	REMOVED DUE TO DESIGN CHANGE											
5C	51+50/52+59 -L- (RT)	3 @ 12'X12' RCBC Extension Channel Improvements Bank Stabilization						0.02		37		
	51+50/52+59 -L- (RT)							0.02		32		
	51+50/52+59 -L- (RT)							0.04	0.03	86	53	
5D	54+50/54+75 -Y- (LT)	Scour Hole Stabilization						< 0.01	< 0.01	14	38	
5E	29+90 -Y3- (CL)	Proposed 12'X10' RCBC Bank Stabilization						0.07		176		
	29+90 -Y3- (CL)							0.03	< 0.01	73	20	
6	51+47/51+67 -L- (RT)	Channel Improvements						< 0.01	< 0.01	10	10	
7	52+38/52+76 -L- (RT)	Channel Improvements						< 0.01	< 0.01	20	24	
8A	29+75/28+90 -Y3- (CL)	Channel Fill						0.01		121		
8B	26+22/28+96 -Y3- (LT)	Fill Slope	0.30			0.07						
	26+25 -Y3- (CL)	Rip Rap Pad	< 0.01									
9	53+20/53+34 -Y- (LT)	Bank Stabilization						< 0.01	< 0.01	45	17	
10A	87+20/88+15 -Y- (RT)	3 @ 9'X8' RCBC Extension Channel Improvements						< 0.01		7		
	87+20/88+15 -Y- (RT)							0.03	0.01	50	17	
10B	88+00/88+74 -Y- (RT)	3 @ 9'X8' RCBC Extension				0.03						
10C	86+82/87+00 -Y- (RT)	3 @ 9'X8' RCBC Extension				< 0.01						
11	95+48/99+77 -Y- (RT)	60" RCP Extension						< 0.01		17		
	95+48/99+77 -Y- (RT)	Scour Hole Stabilization						< 0.01	< 0.01	28	23	
11A	101+00/101+15 -Y- (LT)	Bank Stabilization						< 0.01	< 0.01	28	10	
12	101+15/101+57 -Y- (LT)	Diversion Channel							< 0.01		40	
TOTALS*:			0.30	0.00	0.01	0.11	0.00	0.33	0.10	976	377	0

*Rounded totals are sum of actual impacts

NOTES:
I-5506 Permit Sites have already been permitted and do not contribute to the total wetland and stream impacts for I-5700.
I-5506 Permit Site 5B (Bank Stabilization)
Temporary SW Impacts: <0.01 ac.
Channel Impacts Temporary: 26 FT

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
5/2/2019
WAKE
I-5700
50118.1.FS1

ETHERILL
ENGINEERING

1223 Jones Franklin Rd,
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 6107

PROJECT REFERENCE NO.

1-5700

SHEET NO.

2D-1

ROADWAY DESIGN
ENGINEER

RW SHEET NO.

HYDRAULICS
ENGINEER

1223 Jones Franklin Rd,
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 6107

TRANSPORTATION PLANNING/DESIGN • BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN • GIS/GPS • CONSTRUCTION OBSERVATION

Kimley »Horn

© 2015

P.O. BOX 33068 • RALEIGH, N.C. 27636-3068

PERMIT DRAWING
SHEET 2 OF 11

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

DETAIL 1
INLET CHANNEL IMPROVEMENTS
(NOT TO SCALE)

3' ϕ 10' X 10' RCBC
UPSTREAM EXTENSION

CLASS II RIP RAP KEYED-IN
TO BANKS ONLY (TYP.)
2' OR FLATTER

GEOTEXTILE
EXTEND 2' BELOW BED

33' CHANNEL WIDTH
ALONG CULVERT FACE

NMS ELEV. = 282.7'
(OBSERVED 2/14/98)

STA. 33+31 -L- (LT)

DETAIL 2
OUTLET CHANNEL IMPROVEMENTS
(NOT TO SCALE)

3' ϕ 12' X 12' RCBC
DOWNSTREAM EXTENSION

CLASS II RIP RAP KEYED-IN
ON BANKS ONLY (TYP.)
2' OR FLATTER

GEOTEXTILE
EXTEND 2' BELOW BED

CLASS I RIP RAP
COUNTERSUNK 1' IN STREAM BED
SUPPLEMENT WITH CLASS B RIP RAP
TO FILL VOIDS

APPROX. 17' CHANNEL WIDTH
ALONG CULVERT FACE

288.5' UPSTREAM AND
289.5' DOWNSTREAM
TOP OF BANK OR AN ELEVATION
TO GREATER OF THE EXISTING

STA. 52+40 -L- (RT)

DETAIL 3
INLET AND OUTLET CHANNEL IMPROVEMENTS
(NOT TO SCALE)

1' CONCRETE SILL

15' CHANNEL WIDTH
ALONG CULVERT FACE

GEOTEXTILE
EXTEND 2' BELOW BED

CLASS II RIP RAP
KEYED-IN TO BANKS
ONLY (TYP.) 2' OR FLATTER

NMS ELEV. = 282.4'
(OBSERVED 3/23/98)

STA. 29+30 -Y3- (LT)

STA. 29+30 -Y3- (RT)

DETAIL 4
OUTLET CHANNEL IMPROVEMENTS
(NOT TO SCALE)

3' ϕ 9' X 8' RCBC
DOWNSTREAM EXTENSION

35' WIDE CHANNEL MEASURED
ALONG SKEWED CULVERT FACE

CLASS II RIP RAP
KEYED-IN TO BANKS
ONLY (TYP.) 2' OR FLATTER

GEOTEXTILE
EXTEND 2' BELOW BED

1' SILLS AND 24" WIDE
FLOODPLAIN BENCH
MEASURED ALONG
SKEWED CULVERT FACE

NMS ELEV. = 282.5'
(OBSERVED 2/14/98)

STA. 86+76 -Y- (RT)

SECTION A-A

PLAN VIEW

SECTION B-B

CLASS II RIP RAP
COUNTERSUNK 1' IN STREAM BED
TO FILL VOIDS

CLASS II RIP RAP
ON STREAM BANK

GEOTEXTILE

TOP OF BANK

PIPE OUTLET

PIPE INLET

BANK

CLASS II RIP RAP
COUNTERSUNK 1' IN STREAM BED
TO FILL VOIDS

SECTION B-B

NUMBER	SECTION	SIZE	Q	Q	Q
1	1	12	12	12	12
2	2	12	12	12	12

ALL DIMENSIONS ARE APPROXIMATE

NOTE:
USE CLASS II RIP RAP 2' IN STREAM BED
TO FILL VOIDS AS NECESSARY

DETAIL 22
SPECIAL OUTLET PROTECTION
(NOT TO SCALE)

DETAIL 5
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

3' Ditch Width

Min. D=1.5 Ft.

FROM STA. 19+00 TO STA. 20+25 -Y8- (LT)
FROM STA. 20+25 TO STA. 21+20 -Y8- (LT)
FROM STA. 21+20 TO STA. 22+50 -Y8- (LT)
FROM STA. 22+50 TO STA. 23+50 -Y8- (LT)
FROM STA. 23+50 TO STA. 24+50 -Y8- (LT)
FROM STA. 24+50 TO STA. 25+50 -Y8- (LT)
FROM STA. 25+50 TO STA. 26+50 -Y8- (LT)
FROM STA. 26+50 TO STA. 27+50 -Y8- (LT)
FROM STA. 27+50 TO STA. 28+50 -Y8- (LT)
FROM STA. 28+50 TO STA. 29+50 -Y8- (LT)
FROM STA. 29+50 TO STA. 30+50 -Y8- (LT)

DETAIL 6
SPECIAL CUT DITCH
(Not to Scale)

3' Ditch Width

Min. D=1.0 Ft.

FROM STA. 22+25 TO STA. 23+00 -L- (LT)
FROM STA. 23+00 TO STA. 24+50 -L- (LT)
FROM STA. 24+50 TO STA. 26+50 -L- (LT)
FROM STA. 26+50 TO STA. 28+50 -L- (LT)
FROM STA. 28+50 TO STA. 30+50 -L- (LT)
FROM STA. 30+50 TO STA. 32+50 -L- (LT)
FROM STA. 32+50 TO STA. 34+50 -L- (LT)
FROM STA. 34+50 TO STA. 36+50 -L- (LT)
FROM STA. 36+50 TO STA. 38+50 -L- (LT)
FROM STA. 38+50 TO STA. 40+50 -L- (LT)
FROM STA. 40+50 TO STA. 42+50 -L- (LT)
FROM STA. 42+50 TO STA. 44+50 -L- (LT)

DETAIL 8
LATERAL 'V' DITCH
(Not to Scale)

3' Ditch Width

Min. D=1.5 Ft.

FROM STA. 99+65 TO STA. 100+37 -Y- (RT)

DETAIL 9
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

3' Ditch Width

Min. D=1.5 Ft.

FROM STA. 20+10 TO STA. 20+50 -Y8- (RT)
FROM STA. 20+50 TO STA. 21+00 -Y8- (RT)
FROM STA. 21+00 TO STA. 21+50 -Y8- (RT)
FROM STA. 21+50 TO STA. 22+00 -Y8- (RT)
FROM STA. 22+00 TO STA. 22+50 -Y8- (RT)
FROM STA. 22+50 TO STA. 23+00 -Y8- (RT)
FROM STA. 23+00 TO STA. 23+50 -Y8- (RT)
FROM STA. 23+50 TO STA. 24+00 -Y8- (RT)
FROM STA. 24+00 TO STA. 24+50 -Y8- (RT)
FROM STA. 24+50 TO STA. 25+00 -Y8- (RT)
FROM STA. 25+00 TO STA. 25+50 -Y8- (RT)
FROM STA. 25+50 TO STA. 26+00 -Y8- (RT)
FROM STA. 26+00 TO STA. 26+50 -Y8- (RT)
FROM STA. 26+50 TO STA. 27+00 -Y8- (RT)
FROM STA. 27+00 TO STA. 27+50 -Y8- (RT)
FROM STA. 27+50 TO STA. 28+00 -Y8- (RT)
FROM STA. 28+00 TO STA. 28+50 -Y8- (RT)
FROM STA. 28+50 TO STA. 29+00 -Y8- (RT)
FROM STA. 29+00 TO STA. 29+50 -Y8- (RT)
FROM STA. 29+50 TO STA. 30+00 -Y8- (RT)
FROM STA. 30+00 TO STA. 30+50 -Y8- (RT)
FROM STA. 30+50 TO STA. 31+00 -Y8- (RT)
FROM STA. 31+00 TO STA. 31+50 -Y8- (RT)
FROM STA. 31+50 TO STA. 32+00 -Y8- (RT)
FROM STA. 32+00 TO STA. 32+50 -Y8- (RT)
FROM STA. 32+50 TO STA. 33+00 -Y8- (RT)
FROM STA. 33+00 TO STA. 33+50 -Y8- (RT)
FROM STA. 33+50 TO STA. 34+00 -Y8- (RT)
FROM STA. 34+00 TO STA. 34+50 -Y8- (RT)
FROM STA. 34+50 TO STA. 35+00 -Y8- (RT)
FROM STA. 35+00 TO STA. 35+50 -Y8- (RT)
FROM STA. 35+50 TO STA. 36+00 -Y8- (RT)
FROM STA. 36+00 TO STA. 36+50 -Y8- (RT)
FROM STA. 36+50 TO STA. 37+00 -Y8- (RT)
FROM STA. 37+00 TO STA. 37+50 -Y8- (RT)
FROM STA. 37+50 TO STA. 38+00 -Y8- (RT)
FROM STA. 38+00 TO STA. 38+50 -Y8- (RT)
FROM STA. 38+50 TO STA. 39+00 -Y8- (RT)
FROM STA. 39+00 TO STA. 39+50 -Y8- (RT)
FROM STA. 39+50 TO STA. 40+00 -Y8- (RT)
FROM STA. 40+00 TO STA. 40+50 -Y8- (RT)
FROM STA. 40+50 TO STA. 41+00 -Y8- (RT)
FROM STA. 41+00 TO STA. 41+50 -Y8- (RT)
FROM STA. 41+50 TO STA. 42+00 -Y8- (RT)
FROM STA. 42+00 TO STA. 42+50 -Y8- (RT)
FROM STA. 42+50 TO STA. 43+00 -Y8- (RT)
FROM STA. 43+00 TO STA. 43+50 -Y8- (RT)
FROM STA. 43+50 TO STA. 44+00 -Y8- (RT)
FROM STA. 44+00 TO STA. 44+50 -Y8- (RT)
FROM STA. 44+50 TO STA. 45+00 -Y8- (RT)
FROM STA. 45+00 TO STA. 45+50 -Y8- (RT)
FROM STA. 45+50 TO STA. 46+00 -Y8- (RT)
FROM STA. 46+00 TO STA. 46+50 -Y8- (RT)
FROM STA. 46+50 TO STA. 47+00 -Y8- (RT)
FROM STA. 47+00 TO STA. 47+50 -Y8- (RT)
FROM STA. 47+50 TO STA. 48+00 -Y8- (RT)
FROM STA. 48+00 TO STA. 48+50 -Y8- (RT)
FROM STA. 48+50 TO STA. 49+00 -Y8- (RT)
FROM STA. 49+00 TO STA. 49+50 -Y8- (RT)
FROM STA. 49+50 TO STA. 50+00 -Y8- (RT)
FROM STA. 50+00 TO STA. 50+50 -Y8- (RT)
FROM STA. 50+50 TO STA. 51+00 -Y8- (RT)
FROM STA. 51+00 TO STA. 51+50 -Y8- (RT)
FROM STA. 51+50 TO STA. 52+00 -Y8- (RT)
FROM STA. 52+00 TO STA. 52+50 -Y8- (RT)
FROM STA. 52+50 TO STA. 53+00 -Y8- (RT)
FROM STA. 53+00 TO STA. 53+50 -Y8- (RT)
FROM STA. 53+50 TO STA. 54+00 -Y8- (RT)
FROM STA. 54+00 TO STA. 54+50 -Y8- (RT)
FROM STA. 54+50 TO STA. 55+00 -Y8- (RT)
FROM STA. 55+00 TO STA. 55+50 -Y8- (RT)
FROM STA. 55+50 TO STA. 56+00 -Y8- (RT)
FROM STA. 56+00 TO STA. 56+50 -Y8- (RT)
FROM STA. 56+50 TO STA. 57+00 -Y8- (RT)
FROM STA. 57+00 TO STA. 57+50 -Y8- (RT)
FROM STA. 57+50 TO STA. 58+00 -Y8- (RT)
FROM STA. 58+00 TO STA. 58+50 -Y8- (RT)
FROM STA. 58+50 TO STA. 59+00 -Y8- (RT)
FROM STA. 59+00 TO STA. 59+50 -Y8- (RT)
FROM STA. 59+50 TO STA. 60+00 -Y8- (RT)
FROM STA. 60+00 TO STA. 60+50 -Y8- (RT)
FROM STA. 60+50 TO STA. 61+00 -Y8- (RT)
FROM STA. 61+00 TO STA. 61+50 -Y8- (RT)
FROM STA. 61+50 TO STA. 62+00 -Y8- (RT)
FROM STA. 62+00 TO STA. 62+50 -Y8- (RT)
FROM STA. 62+50 TO STA. 63+00 -Y8- (RT)
FROM STA. 63+00 TO STA. 63+50 -Y8- (RT)
FROM STA. 63+50 TO STA. 64+00 -Y8- (RT)
FROM STA. 64+00 TO STA. 64+50 -Y8- (RT)
FROM STA. 64+50 TO STA. 65+00 -Y8- (RT)
FROM STA. 65+00 TO STA. 65+50 -Y8- (RT)
FROM STA. 65+50 TO STA. 66+00 -Y8- (RT)
FROM STA. 66+00 TO STA. 66+50 -Y8- (RT)
FROM STA. 66+50 TO STA. 67+00 -Y8- (RT)
FROM STA. 67+00 TO STA. 67+50 -Y8- (RT)
FROM STA. 67+50 TO STA. 68+00 -Y8- (RT)
FROM STA. 68+00 TO STA. 68+50 -Y8- (RT)
FROM STA. 68+50 TO STA. 69+00 -Y8- (RT)
FROM STA. 69+00 TO STA. 69+50 -Y8- (RT)
FROM STA. 69+50 TO STA. 70+00 -Y8- (RT)
FROM STA. 70+00 TO STA. 70+50 -Y8- (RT)
FROM STA. 70+50 TO STA. 71+00 -Y8- (RT)
FROM STA. 71+00 TO STA. 71+50 -Y8- (RT)
FROM STA. 71+50 TO STA. 72+00 -Y8- (RT)
FROM STA. 72+00 TO STA. 72+50 -Y8- (RT)
FROM STA. 72+50 TO STA. 73+00 -Y8- (RT)
FROM STA. 73+00 TO STA. 73+50 -Y8- (RT)
FROM STA. 73+50 TO STA. 74+00 -Y8- (RT)
FROM STA. 74+00 TO STA. 74+50 -Y8- (RT)
FROM STA. 74+50 TO STA. 75+00 -Y8- (RT)
FROM STA. 75+00 TO STA. 75+50 -Y8- (RT)
FROM STA. 75+50 TO STA. 76+00 -Y8- (RT)
FROM STA. 76+00 TO STA. 76+50 -Y8- (RT)
FROM STA. 76+50 TO STA. 77+00 -Y8- (RT)
FROM STA. 77+00 TO STA. 77+50 -Y8- (RT)
FROM STA. 77+50 TO STA. 78+00 -Y8- (RT)
FROM STA. 78+00 TO STA. 78+50 -Y8- (RT)
FROM STA. 78+50 TO STA. 79+00 -Y8- (RT)
FROM STA. 79+00 TO STA. 79+50 -Y8- (RT)
FROM STA. 79+50 TO STA. 80+00 -Y8- (RT)
FROM STA. 80+00 TO STA. 80+50 -Y8- (RT)
FROM STA. 80+50 TO STA. 81+00 -Y8- (RT)
FROM STA. 81+00 TO STA. 81+50 -Y8- (RT)
FROM STA. 81+50 TO STA. 82+00 -Y8- (RT)
FROM STA. 82+00 TO STA. 82+50 -Y8- (RT)
FROM STA. 82+50 TO STA. 83+00 -Y8- (RT)
FROM STA. 83+00 TO STA. 83+50 -Y8- (RT)
FROM STA. 83+50 TO STA. 84+00 -Y8- (RT)
FROM STA. 84+00 TO STA. 84+50 -Y8- (RT)
FROM STA. 84+50 TO STA. 85+00 -Y8- (RT)
FROM STA. 85+00 TO STA. 85+50 -Y8- (RT)
FROM STA. 85+50 TO STA. 86+00 -Y8- (RT)
FROM STA. 86+00 TO STA. 86+50 -Y8- (RT)
FROM STA. 86+50 TO STA. 87+00 -Y8- (RT)
FROM STA. 87+00 TO STA. 87+50 -Y8- (RT)
FROM STA. 87+50 TO STA. 88+00 -Y8- (RT)
FROM STA. 88+00 TO STA. 88+50 -Y8- (RT)
FROM STA. 88+50 TO STA. 89+00 -Y8- (RT)
FROM STA. 89+00 TO STA. 89+50 -Y8- (RT)
FROM STA. 89+50 TO STA. 90+00 -Y8- (RT)
FROM STA. 90+00 TO STA. 90+50 -Y8- (RT)
FROM STA. 90+50 TO STA. 91+00 -Y8- (RT)
FROM STA. 91+00 TO STA. 91+50 -Y8- (RT)
FROM STA. 91+50 TO STA. 92+00 -Y8- (RT)
FROM STA. 92+00 TO STA. 92+50 -Y8- (RT)
FROM STA. 92+50 TO STA. 93+00 -Y8- (RT)
FROM STA. 93+00 TO STA. 93+50 -Y8- (RT)
FROM STA. 93+50 TO STA. 94+00 -Y8- (RT)
FROM STA. 94+00 TO STA. 94+50 -Y8- (RT)
FROM STA. 94+50 TO STA. 95+00 -Y8- (RT)
FROM STA. 95+00 TO STA. 95+50 -Y8- (RT)
FROM STA. 95+50 TO STA. 96+00 -Y8- (RT)
FROM STA. 96+00 TO STA. 96+50 -Y8- (RT)
FROM STA. 96+50 TO STA. 97+00 -Y8- (RT)
FROM STA. 97+00 TO STA. 97+50 -Y8- (RT)
FROM STA. 97+50 TO STA. 98+00 -Y8- (RT)
FROM STA. 98+00 TO STA. 98+50 -Y8- (RT)
FROM STA. 98+50 TO STA. 99+00 -Y8- (RT)
FROM STA. 99+00 TO STA. 99+50 -Y8- (RT)
FROM STA. 99+50 TO STA. 100+00 -Y8- (RT)
FROM STA. 100+00 TO STA. 100+50 -Y8- (RT)
FROM STA. 100+50 TO STA. 101+00 -Y8- (RT)
FROM STA. 101+00 TO STA. 101+50 -Y8- (RT)
FROM STA. 101+50 TO STA. 102+00 -Y8- (RT)
FROM STA. 102+00 TO STA. 102+50 -Y8- (RT)
FROM STA. 102+50 TO STA. 103+00 -Y8- (RT)
FROM STA. 103+00 TO STA. 103+50 -Y8- (RT)
FROM STA. 103+50 TO STA. 104+00 -Y8- (RT)
FROM STA. 104+00 TO STA. 104+50 -Y8- (RT)
FROM STA. 104+50 TO STA. 105+00 -Y8- (RT)
FROM STA. 105+00 TO STA. 105+50 -Y8- (RT)
FROM STA. 105+50 TO STA. 106+00 -Y8- (RT)
FROM STA. 106+00 TO STA. 106+50 -Y8- (RT)
FROM STA. 106+50 TO STA. 107+00 -Y8- (RT)
FROM STA. 107+00 TO STA. 107+50 -Y8- (RT)
FROM STA. 107+50 TO STA. 108+00 -Y8- (RT)
FROM STA. 108+00 TO STA. 108+50 -Y8- (RT)
FROM STA. 108+50 TO STA. 109+00 -Y8- (RT)
FROM STA. 109+00 TO STA. 109+50 -Y8- (RT)
FROM STA. 109+50 TO STA. 110+00 -Y8- (RT)
FROM STA. 110+00 TO STA. 110+50 -Y8- (RT)
FROM STA. 110+50 TO STA. 111+00 -Y8- (RT)
FROM STA. 111+00 TO STA. 111+50 -Y8- (RT)
FROM STA. 111+50 TO STA. 112+00 -Y8- (RT)
FROM STA. 112+00 TO STA. 112+50 -Y8- (RT)
FROM STA. 112+50 TO STA. 113+00 -Y8- (RT)
FROM STA. 113+00 TO STA. 113+50 -Y8- (RT)
FROM STA. 113+50 TO STA. 114+00 -Y8- (RT)
FROM STA. 114+00 TO STA. 114+50 -Y8- (RT)
FROM STA. 114+50 TO STA. 115+00 -Y8- (RT)
FROM STA. 115+00 TO STA. 115+50 -Y8- (RT)
FROM STA. 115+50 TO STA. 116+00 -Y8- (RT)
FROM STA. 116+00 TO STA. 116+50 -Y8- (RT)
FROM STA. 116+50 TO STA. 117+00 -Y8- (RT)
FROM STA. 117+00 TO STA. 117+50 -Y8- (RT)
FROM STA. 117+50 TO STA. 118+00 -Y8- (RT)
FROM STA. 118+00 TO STA. 118+50 -Y8- (RT)
FROM STA. 118+50 TO STA. 119+00 -Y8- (RT)
FROM STA. 119+00 TO STA. 119+50 -Y8- (RT)
FROM STA. 119+50 TO STA. 120+00 -Y8- (RT)
FROM STA. 120+00 TO STA. 120+50 -Y8- (RT)
FROM STA. 120+50 TO STA. 121+00 -Y8- (RT)
FROM STA. 121+00 TO STA. 121+50 -Y8- (RT)
FROM STA. 121+50 TO STA. 122+00 -Y8- (RT)
FROM STA. 122+00 TO STA. 122+50 -Y8- (RT)
FROM STA. 122+50 TO STA. 123+00 -Y8- (RT)
FROM STA. 123+00 TO STA. 123+50 -Y8- (RT)
FROM STA. 123+50 TO STA. 124+00 -Y8- (RT)
FROM STA. 124+00 TO STA. 124+50 -Y8- (RT)
FROM STA. 124+50 TO STA. 125+00 -Y8- (RT)
FROM STA. 125+00 TO STA. 125+50 -Y8- (RT)
FROM STA. 125+50 TO STA. 126+00 -Y8- (RT)
FROM STA. 126+00 TO STA. 126+50 -Y8- (RT)
FROM STA. 126+50 TO STA. 127+00 -Y8- (RT)
FROM STA. 127+00 TO STA. 127+50 -Y8- (RT)
FROM STA. 127+50 TO STA. 128+00 -Y8- (RT)
FROM STA. 128+00 TO STA. 128+50 -Y8- (RT)
FROM STA. 128+50 TO STA. 129+00 -Y8- (RT)
FROM STA. 129+00 TO STA. 129+50 -Y8- (RT)
FROM STA. 129+50 TO STA. 130+00 -Y8- (RT)
FROM STA. 130+00 TO STA. 130+50 -Y8- (RT)
FROM STA. 130+50 TO STA. 131+00 -Y8- (RT)
FROM STA. 131+00 TO STA. 131+50 -Y8- (RT)
FROM STA. 131+50 TO STA. 132+00 -Y8- (RT)
FROM STA. 132+00 TO STA. 132+50 -Y8- (RT)
FROM STA. 132+50 TO STA. 133+00 -Y8- (RT)
FROM STA. 133+00 TO STA. 133+50 -Y8- (RT)
FROM STA. 133+50 TO STA. 134+00 -Y8- (RT)
FROM STA. 134+00 TO STA. 134+50 -Y8- (RT)
FROM STA. 134+50 TO STA. 135+00 -Y8- (RT)
FROM STA. 135+00 TO STA. 135+50 -Y8- (RT)
FROM STA. 135+50 TO STA. 136+00 -Y8- (RT)
FROM STA. 136+00 TO STA. 136+50 -Y8- (RT)
FROM STA. 136+50 TO STA. 137+00 -Y8- (RT)
FROM STA. 137+00 TO STA. 137+50 -Y8- (RT)
FROM STA. 137+50 TO STA. 138+00 -Y8- (RT)
FROM STA. 138+00 TO STA. 138+50 -Y8- (RT)
FROM STA. 138+50 TO STA. 139+00 -Y8- (RT)
FROM STA. 139+00 TO STA. 139+50 -Y8- (RT)
FROM STA. 139+50 TO STA. 140+00 -Y8- (RT)
FROM STA. 140+00 TO STA. 140+50 -Y8- (RT)
FROM STA. 140+50 TO STA. 141+00 -Y8- (RT)
FROM STA. 141+00 TO STA. 141+50 -Y8- (RT)
FROM STA. 141+50 TO STA. 142+00 -Y8- (RT)
FROM STA. 142+00 TO STA. 142+50 -Y8- (RT)
FROM STA. 142+50 TO STA. 143+00 -Y8- (RT)
FROM STA. 143+00 TO STA. 143+50 -Y8- (RT)
FROM STA. 143+50 TO STA. 144+00 -Y8- (RT)
FROM STA. 144+00 TO STA. 144+50 -Y8- (RT)
FROM STA. 144+50 TO STA. 145+00 -Y8- (RT)
FROM STA. 145+00 TO STA. 145+50 -Y8- (RT)
FROM STA. 145+50 TO STA. 146+00 -Y8- (RT)
FROM STA. 146+00 TO STA. 146+50 -Y8- (RT)
FROM STA. 146+50 TO STA. 147+00 -Y8- (RT)
FROM STA. 147+00 TO STA. 147+50 -Y8- (RT)
FROM STA. 147+50 TO STA. 148+00 -Y8- (RT)
FROM STA. 148+00 TO STA. 148+50 -Y8- (RT)
FROM STA. 148+50 TO STA. 149+00 -Y8- (RT)
FROM STA. 149+00 TO STA. 149+50 -Y8- (RT)
FROM STA. 149+50 TO STA. 150+00 -Y8- (RT)
FROM STA. 150+00 TO STA. 150+50 -Y8- (RT)
FROM STA. 150+50 TO STA. 151+00 -Y8- (RT)
FROM STA. 151+00 TO STA. 151+50 -Y8- (RT)
FROM STA. 151+50 TO STA. 152+00 -Y8- (RT)
FROM STA. 152+00 TO STA. 152+50 -Y8- (RT)
FROM STA. 152+50 TO STA. 153+00 -Y8- (RT)
FROM STA. 153+00 TO STA. 153+50 -Y8- (RT)
FROM STA. 153+50 TO STA. 154+00 -Y8- (RT)
FROM STA. 154+00 TO STA. 154+50 -Y8- (RT)
FROM STA. 154+50 TO STA. 155+00 -Y8- (RT)
FROM STA. 155+00 TO STA. 155+50 -Y8- (RT)
FROM STA. 155+50 TO STA. 156+00 -Y8- (RT)
FROM STA. 156+00 TO STA. 156+50 -Y8- (RT)
FROM STA. 156+50 TO STA. 157+00 -Y8- (RT)
FROM STA. 157+00 TO STA. 157+50 -Y8- (RT)
FROM STA. 157+50 TO STA. 158+00 -Y8- (RT)
FROM STA. 158+00 TO STA. 158+50 -Y8- (RT)
FROM STA. 158+50 TO STA. 159+00 -Y8- (RT)
FROM STA. 159+00 TO STA. 159+50 -Y8- (RT)
FROM STA. 159+50 TO STA. 160+00 -Y8- (RT)
FROM STA. 160+00 TO STA. 160+50 -Y8- (RT)
FROM STA. 160+50 TO STA. 161+00 -Y8- (RT)
FROM STA. 161+00 TO STA. 161+50 -Y8- (RT)
FROM STA. 161+50 TO STA. 162+00 -Y8- (RT)
FROM STA. 162+00 TO STA. 162+50 -Y8- (RT)
FROM STA. 162+50 TO STA. 163+00 -Y8- (RT)
FROM STA. 163+00 TO STA. 163+50 -Y8- (RT)
FROM STA. 163+50 TO STA. 164+00 -Y8- (RT)
FROM STA. 164+00 TO STA. 164+50 -Y8- (RT)
FROM STA. 164+50 TO STA. 165+00 -Y8- (RT)
FROM STA. 165+00 TO STA. 165+50 -Y8- (RT)
FROM STA. 165+50 TO STA. 166+00 -Y8- (RT)
FROM STA. 166+00 TO STA. 166+50 -Y8- (RT)
FROM STA. 166+50 TO STA. 167+00 -Y8- (RT)
FROM STA. 167+00 TO STA. 167+50 -Y8- (RT)
FROM STA. 167+50 TO STA. 168+00 -Y8- (RT)
FROM STA. 168+00 TO STA. 168+50 -Y8- (RT)
FROM STA. 168+50 TO STA. 169+00 -Y8- (RT)
FROM STA. 169+00 TO STA. 169+50 -Y8- (RT)
FROM STA. 169+50 TO STA. 170+00 -Y8- (RT)
FROM STA. 170+00 TO STA. 170+50 -Y8- (RT)
FROM STA. 170+50 TO STA. 171+00 -Y8- (RT)
FROM STA. 171+00 TO STA. 171+50 -Y8- (RT)
FROM STA. 171+50 TO STA. 172+00 -Y8- (RT)
FROM STA. 172+00 TO STA. 172+50 -Y8- (RT)
FROM STA. 172+50 TO STA. 173+00 -Y8- (RT)
FROM STA. 173+00 TO STA. 173+50 -Y8- (RT)
FROM STA. 173+50 TO STA. 174+00 -Y8- (RT)
FROM STA. 174+00 TO STA. 174+50 -Y8- (RT)
FROM STA. 174+50 TO STA. 175+00 -Y8- (RT)
FROM STA. 175+00 TO STA. 175+50 -Y8- (RT)
FROM STA. 175+50 TO STA. 176+00 -Y8- (RT)
FROM STA. 176+00 TO STA. 176+50 -Y8- (RT)
FROM STA. 176+50 TO STA. 177+00 -Y8- (RT)
FROM STA. 177+00 TO STA. 177+50 -Y8- (RT)
FROM STA. 177+50 TO STA. 178+00 -Y8- (RT)
FROM STA. 178+00 TO STA. 178+50 -Y8- (RT)
FROM STA. 178+50 TO STA. 179+00 -Y8- (RT)
FROM STA. 179+00 TO STA. 179+50 -Y8- (RT)
FROM STA. 179+50 TO STA. 180+00 -Y8- (RT)
FROM STA. 180+00 TO STA. 180+50 -Y8- (RT)
FROM STA. 180+50 TO STA. 181+00 -Y8- (RT)
FROM STA. 181+00 TO STA. 181+50 -Y8- (RT)
FROM STA. 181+50 TO STA

- ALLOWABLE IMPACTS ZONE 1
- ALLOWABLE IMPACTS ZONE 2

CULVERT #2
TWO BARRELS

	NORTH	EAST	ELEV.
CUL1	767148.95	2052518.25	282.44
CUL2	767144.33	2052512.96	292.89
CUL3	767143.64	2052512.15	283.30
CUL4	767138.93	2052506.95	282.41
CE1	767144.39	2052513.01	290.56
HW1	767143.86	2052512.58	291.52
CUL5	767069.89	2052651.60	283.50
CUL6	767065.54	2052646.14	284.33
CUL7	767064.53	2052645.56	281.64
CUL8	767060.05	2052639.88	284.32
CE2	767064.73	2052645.45	289.76
HW2	767065.15	2052645.59	291.22

ETHERILL
ENGINEERING

12223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107

Kimley»Horn

P.O. BOX 33068 • RALEIGH, N.C. 27634-3068

PROJECT REFERENCE NO.
I-5700

R/W SHEET NO.
ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

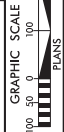
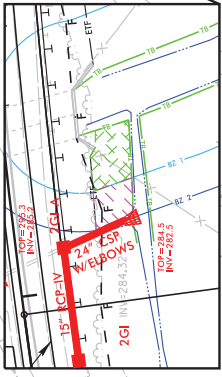
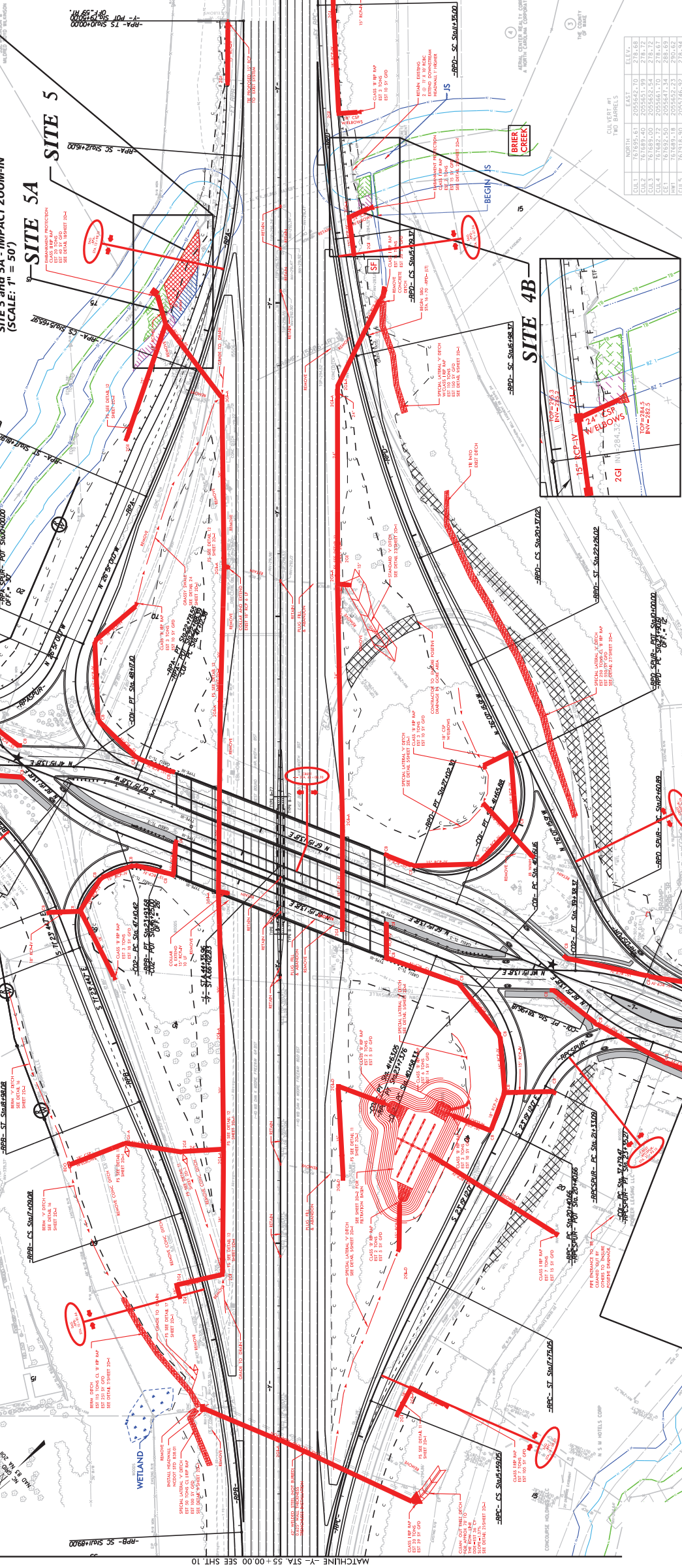
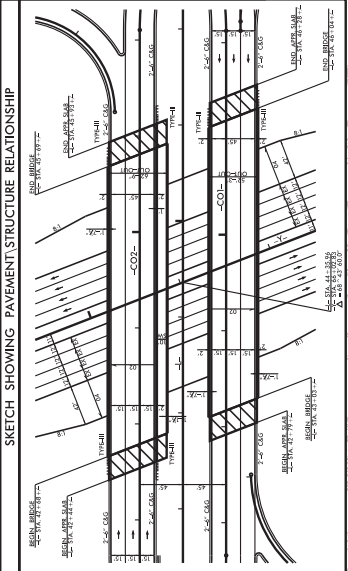
7/24/2019
I-5700-hydr.bur.psh04.dgn

5/14/99

P-67

★ PROPOSED TRAFFIC SIGNAL

SEE SHTS. 15 & 16 FOR -L- PROFILE
SEE SHT. 19 FOR -Y5- PROFILE



★ PROPOSED TRAFFIC SIGNAL

SEE SHTS. 15 & 16 FOR -L- PROFILE
SEE SHTS. 20 THRU 23 FOR -Y- PROFILE
SEE SHT. 24 FOR -R3A- PROFILE
SEE SHT. 24 FOR -R7B- PROFILE
SEE SHT. 25 FOR -R7C- PROFILE
SEE SHTS. 25 & 26 FOR -R7D- PROFILE
SEE SHT. 26 FOR -R7SPUR- PROFILE
SEE SHT. 26 FOR -R7CSPUR- PROFILE
SEE SHT. 26 FOR -R7DSPUR- PROFILE

TIP NO.: L-5700	COUNTY: WASCO
DESIGNED BY:	
CHECKED BY:	DATE:

5/14/99

PERMIT DRAWING
SHEET 8 OF 11

LEGEND

ALLOWABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2



ETHERILL
ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107

ROADWAY DESIGN
ENGINEER



Kimley»Horn

P.O. BOX 33068 RALEIGH, N.C. 27634-3068

PROJECT REFERENCE NO.
I-5700

RW SHEET NO.

HYDRAULICS
ENGINEER

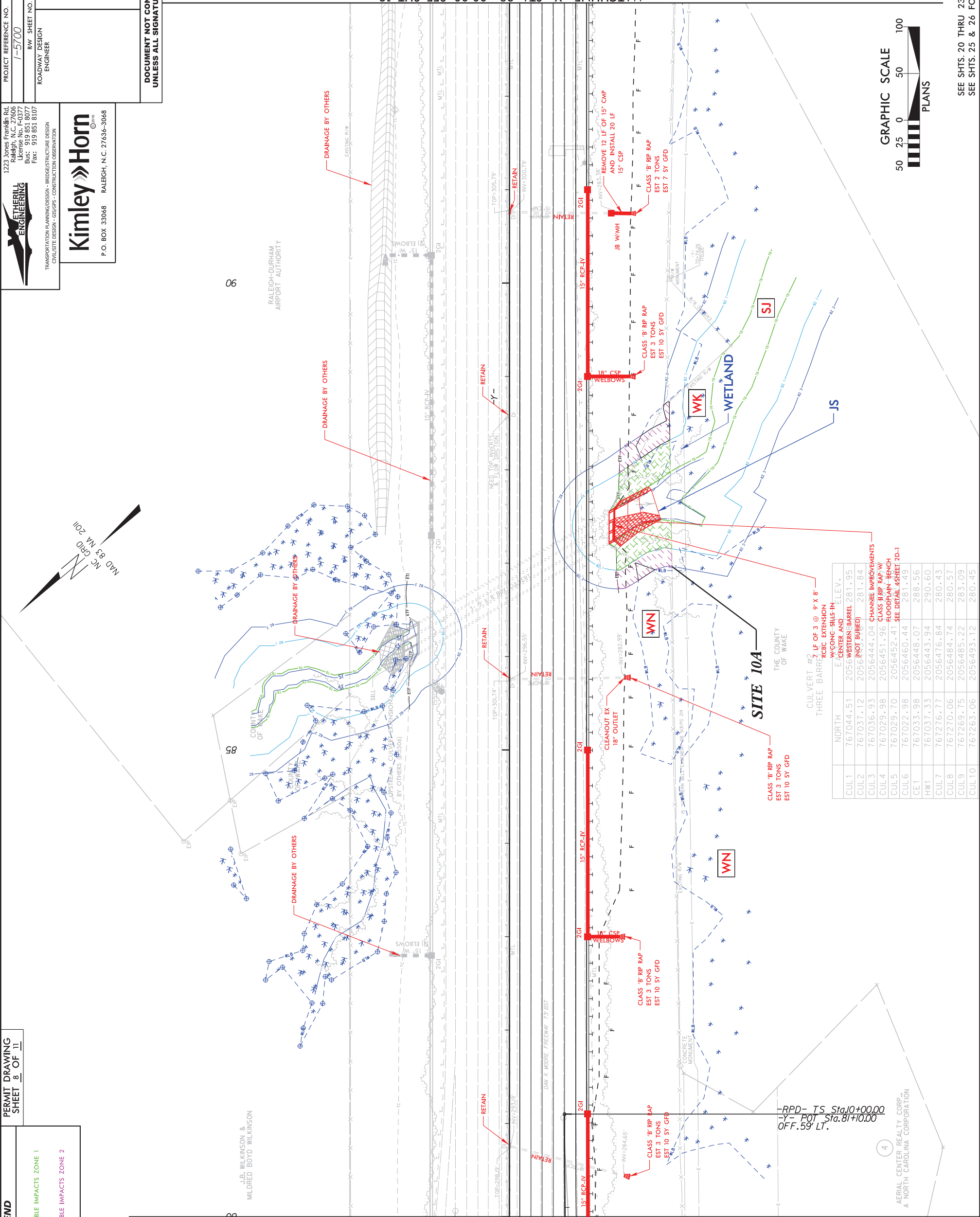
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

SHEET NO.
//

P-72

MATCHLINE -Y- STA. 80+00.00 SEE SHT. 6

MATCHLINE -Y- STA. 93+00.00 SEE SHT. 12

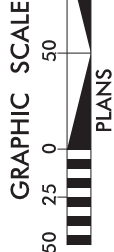


	NORTH	ELEVATION	W/CONC. SILL IN CENTER AND ELEV.
CUL1	767044.51	2056	WESTERN BARREL 281.95
CUL2	767037.12	2056	(NO. 2) 281.84
CUL3	767036.93	2056	444.04 CHANNEL IMPROVEMENTS
CUL4	767029.98	2056	451.96 CLASS II RIP RAP W/
CUL5	767029.70	2056	452.41 FLOODPLAIN BENCH
CUL6	767022.98	2056	460.44 SEE DETAIL 4 SHEET 20-1
CE1	767033.98	2056	448.07 288.56
HW1	767037.33	2056	443.94 290.60
CUL7	767276.77	2056	476.84 280.43
CUL8	767270.06	2056	484.74 280.57
CUL9	767269.75	2056	485.22 283.09
CUL10	767263.06	2056	493.12 280.45

4
AERIAL CENTER REALTY, CORP.,
A NORTH CAROLINA CORPORATION

-RPD- TS Sta. 10+00.00
-Y- POT Sta. 81+00.00
OFF. 59' LT.

CULVERT #2
THREE BARRIERS
IF OF 3 @ 9' X 8'
RCRC EXTENSION



SEE SHTS. 20 THRU 23 FOR -Y- PROFILE
SEE SHTS. 25 & 26 FOR -RPD- PROFILE

RIPARIAN BUFFER IMPACTS SUMMARY													
Site No.				IMPACTS									
				TYPE			ALLOWABLE			MITIGABLE			BUFFER REPLACEMENT
				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)	
1A	17+08/17+61 -L- (RT)	Scour Hole Stabilization	X				634	0	634				
1B	17+85/18+40 -L- (RT)	Bank Stabilization	X				261	195	456				
2A	28+93/29+46 -L- (LT)	Channel Improvements	X				2889		2889				
2B	31+68/32+90 -L- (LT)	Proposed Fill Slope				X				1108	50	1158	
3A	32+90/34+46 -L- (LT)	3 @ 10' x 10' RCBC Extension	X				4098	919	5017				
3B	33+42/33+92 -L- (RT)	Bank Stabilization	X				1357	367	1724				
3C	33+58/34+46 -L- (LT)	Proposed Fill Slope				X				1348	1929	3277	
4	4B MEETING SITE NOT IN BUFFER ZONE												
4A	JS NOT SUBJECT TO BUFFER RULES												
4B	14+14/14+70 -RPD- (LT)	Bank Stabilization	X				605	414	1019				
5	13+42/15+03 -RPA- (LT)	Proposed Fill Slope				X				2867	1390	4257	
5A	15+03/15+68 -RPA- (LT)	Bank Stabilization	X				1699	1753	3452				
5B	REMOVED DUE TO DESIGN CHANGE												
5C	51+23/52+50 -L- (RT)	3 @ 12' x 12' RCBC Extension	X				9315	1967	11282				
5D	54+05/54+89 -L- (LT)	Scour Hole Stabilization	X				2009	1115	3124				
5E	57+00/59+65 -L- (LT)	Proposed 12' x 10' RCBC	X							9400	3633	13033	
6	JS NOT SUBJECT TO BUFFER RULES												
7	JS NOT SUBJECT TO BUFFER RULES												
8A	28+40/29+25 -Y3- (CL)	Channel Fill	X				4932	4741	9673				
8B	4B MEETING SITE NOT IN BUFFER ZONE												
9	52+69/53+84 -Y- (LT)	Bank Stabilization	X				3303	2362	5665				
10A	86+73/88+54 -Y- (RT)	3 @ 9' x 8' RCBC Extension	X				4014	2654	6667				
11	98+97/100+37 -Y- (RT)	Scour Hole Stabilization	X				3629	1937	5566				
11A	100+40/101+90 -Y- (LT)	Bank Stabilization	X				3478	2449	5927				
12	JS NOT SUBJECT TO BUFFER RULES												
TOTALS*:							42223	20873	63096	14723	7002	21725	0 0

NOTES:
I-5506 Permit Sites have already been permitted and do not contribute to the total buffer impacts for I-5700.
I-5506 Permit Site 4 (48" CMP)
Allowable Zone 1 Impacts: 4150 SF
Allowable Zone 2 Impacts: 418 SF
Total Allowable Impacts: 4569 SF

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
5/2/2019
WAKE
I-5700
50118.1.FS1
SHEET 10 OF 11

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 & GRUB- BING	2 ACR		
0006	0022000000-E	225	UNCLASSIFIED EXCAVATION	126,500 CY		
0007	0028000000-N	SP	TYPE I STANDARD APPROACH FILL STATION ***** (44+35.96 -L- LT)	Lump Sum	L.S.	
0008	0028000000-N	SP	TYPE I STANDARD APPROACH FILL STATION ***** (44+35.96 -L- RT)	Lump Sum	L.S.	
0009	0036000000-E	225	UNDERCUT EXCAVATION	2,050 CY		
0010	0106000000-E	230	BORROW EXCAVATION	43,000 CY		
0011	0134000000-E	240	DRAINAGE DITCH EXCAVATION	540 CY		
0012	0141000000-E	240	BERM DITCH CONSTRUCTION	1,000 LF		
0013	0156000000-E	250	REMOVAL OF EXISTING ASPHALT PAVEMENT	49,500 SY		
0014	0192000000-N	260	PROOF ROLLING	20 HR		
0015	0195000000-E	265	SELECT GRANULAR MATERIAL	1,250 CY		
0016	0196000000-E	270	GEOTEXTILE FOR SOIL STABILIZA- TION	5,750 SY		
0017	0199000000-E	SP	TEMPORARY SHORING	2,650 SF		
0018	0223000000-E	275	ROCK PLATING	530 SY		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0019	0234000000-E	SP	GENERIC GRADING ITEM STOCKPILING AND TESTING ONLY OF PCB CONTAMINATED SOIL	540 CY		
0020	0255000000-E	SP	GENERIC GRADING ITEM HAULING AND DISPOSAL OF PETROLEUM CONTAMINATED SOIL	50 TON		
0021	0255000000-E	SP	GENERIC GRADING ITEM STOCKPILING, TESTING, HAULING, AND DISPOSAL OF PCB CONTAMI- NATED SOIL	810 TON		
0022	0318000000-E	300	FOUNDATION CONDITIONING MATE- RIAL, MINOR STRUCTURES	1,870 TON		
0023	0320000000-E	300	FOUNDATION CONDITIONING GEO- TEXTILE	6,406 SY		
0024	0335200000-E	305	15" DRAINAGE PIPE	376 LF		
0025	0335300000-E	305	18" DRAINAGE PIPE	1,688 LF		
0026	0335400000-E	305	24" DRAINAGE PIPE	124 LF		
0027	0335500000-E	305	30" DRAINAGE PIPE	924 LF		
0028	0335600000-E	305	36" DRAINAGE PIPE	28 LF		
0029	0335700000-E	305	42" DRAINAGE PIPE	8 LF		
0030	0366000000-E	310	15" RC PIPE CULVERTS, CLASS III	184 LF		
0031	0372000000-E	310	18" RC PIPE CULVERTS, CLASS III	320 LF		
0032	0378000000-E	310	24" RC PIPE CULVERTS, CLASS III	68 LF		
0033	0384000000-E	310	30" RC PIPE CULVERTS, CLASS III	152 LF		
0034	0390000000-E	310	36" RC PIPE CULVERTS, CLASS III	312 LF		
0035	0414000000-E	310	60" RC PIPE CULVERTS, CLASS III	16 LF		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0036	0448200000-E	310	15" RC PIPE CULVERTS, CLASS IV	5,156	LF	
0037	0448300000-E	310	18" RC PIPE CULVERTS, CLASS IV	3,336	LF	
0038	0448400000-E	310	24" RC PIPE CULVERTS, CLASS IV	388	LF	
0039	0448500000-E	310	30" RC PIPE CULVERTS, CLASS IV	500	LF	
0040	0448600000-E	310	36" RC PIPE CULVERTS, CLASS IV	392	LF	
0041	0448700000-E	310	42" RC PIPE CULVERTS, CLASS IV	48	LF	
0042	0582000000-E	310	15" CS PIPE CULVERTS, 0.064" THICK	240	LF	
0043	0588000000-E	310	18" CS PIPE CULVERTS, 0.064" THICK	584	LF	
0044	0594000000-E	310	24" CS PIPE CULVERTS, 0.064" THICK	180	LF	
0045	0636000000-E	310	*** CS PIPE ELBOWS, ***** THICK (15", 0.064")	10	EA	
0046	0636000000-E	310	*** CS PIPE ELBOWS, ***** THICK (18", 0.064")	22	EA	
0047	0636000000-E	310	*** CS PIPE ELBOWS, ***** THICK (24", 0.064")	6	EA	
0048	0973100000-E	330	*** WELDED STEEL PIPE, ***** THICK, GRADE B IN SOIL (42", 0.625")	188	LF	
0049	0973100000-E	330	*** WELDED STEEL PIPE, ***** THICK, GRADE B IN SOIL (48", 0.688")	144	LF	
0050	0973100000-E	330	*** WELDED STEEL PIPE, ***** THICK, GRADE B IN SOIL (60", 0.844")	160	LF	
0051	0973300000-E	330	*** WELDED STEEL PIPE, ***** THICK, GRADE B NOT IN SOIL (42", 0.625")	188	LF	

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0052	0973300000-E	330	*** WELDED STEEL PIPE, ***** THICK, GRADE B NOT IN SOIL (48", 0.688")	144 LF		
0053	0973300000-E	330	*** WELDED STEEL PIPE, ***** THICK, GRADE B NOT IN SOIL (60", 0.844")	160 LF		
0054	0995000000-E	340	PIPE REMOVAL	4,613 LF		
0055	0996000000-N	350	PIPE CLEAN OUT	10 EA		
0056	1011000000-N	500	FINE GRADING	Lump Sum	L.S.	
0057	1044000000-E	501	LIME TREATED SOIL (SLURRY METHOD)	14,000 SY		
0058	1066000000-E	501	LIME FOR LIME TREATED SOIL	170 TON		
0059	1099500000-E	505	SHALLOW UNDERCUT	1,500 CY		
0060	1099700000-E	505	CLASS IV SUBGRADE STABILIZA- TION	4,960 TON		
0061	1110000000-E	510	STABILIZER AGGREGATE	250 TON		
0062	1115000000-E	SP	GEOTEXTILE FOR PAVEMENT STA- BILIZATION	14,778 SY		
0063	1121000000-E	520	AGGREGATE BASE COURSE	33,000 TON		
0064	1176000000-E	542	SOIL CEMENT BASE	14,000 SY		
0065	1187000000-E	542	PORTLAND CEMENT FOR SOIL CE- MENT BASE	392 TON		
0066	1209000000-E	543	ASPHALT CURING SEAL	4,200 GAL		
0067	1220000000-E	545	INCIDENTAL STONE BASE	200 TON		
0068	1297000000-E	607	MILLING ASPHALT PAVEMENT, ***** DEPTH (1-1/2")	450 SY		
0069	1297000000-E	607	MILLING ASPHALT PAVEMENT, ***** DEPTH (3-3/4")	88,850 SY		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0070	1330000000-E	607	INCIDENTAL MILLING	4,000 SY		
0071	1491000000-E	610	ASPHALT CONC BASE COURSE, TYPE B25.0C	18,000 TON		
0072	1503000000-E	610	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C	20,200 TON		
0073	1519000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5B	2,700 TON		
0074	1523000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5C	11,700 TON		
0075	1524200000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5D	18,900 TON		
0076	1526000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S4.75A	4,630 TON		
0077	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	2,990 TON		
0078	1577000000-E	620	POLYMER MODIFIED ASPHALT BINDER FOR PLANT MIX	1,080 TON		
0079	1693000000-E	654	ASPHALT PLANT MIX, PAVEMENT REPAIR	540 TON		
0080	1840000000-E	665	MILLED RUMBLE STRIPS (ASPHALT CONCRETE)	25,400 LF		
0081	2000000000-N	806	RIGHT-OF-WAY MARKERS	22 EA		
0082	2020000000-N	806	CONTROL-OF-ACCESS MARKERS	6 EA		
0083	2022000000-E	815	SUBDRAIN EXCAVATION	224 CY		
0084	2026000000-E	815	GEOTEXTILE FOR SUBSURFACE DRAINS	1,000 SY		
0085	2036000000-E	815	SUBDRAIN COARSE AGGREGATE	168 CY		
0086	2044000000-E	815	6" PERFORATED SUBDRAIN PIPE	1,000 LF		
0087	2070000000-N	815	SUBDRAIN PIPE OUTLET	2 EA		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0088	2077000000-E	815	6" OUTLET PIPE	12 LF		
0089	2143000000-E	818	BLOTTING SAND	10 TON		
0090	2209000000-E	838	ENDWALLS	15.9 CY		
0091	2220000000-E	838	REINFORCED ENDWALLS	5.6 CY		
0092	2253000000-E	840	PIPE COLLARS	3.7 CY		
0093	2275000000-E	SP	FLOWABLE FILL	97 CY		
0094	2286000000-N	840	MASONRY DRAINAGE STRUCTURES	173 EA		
0095	2297000000-E	840	MASONRY DRAINAGE STRUCTURES	4.5 CY		
0096	2308000000-E	840	MASONRY DRAINAGE STRUCTURES	125.5 LF		
0097	2354000000-N	840	FRAME WITH GRATE, STD 840.22	1 EA		
0098	2364000000-N	840	FRAME WITH TWO GRATES, STD 840.16	11 EA		
0099	2364200000-N	840	FRAME WITH TWO GRATES, STD 840.20	33 EA		
0100	2365000000-N	840	FRAME WITH TWO GRATES, STD 840.22	32 EA		
0101	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)	6 EA		
0102	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)	41 EA		
0103	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)	40 EA		
0104	2396000000-N	840	FRAME WITH COVER, STD 840.54	15 EA		
0105	2440000000-N	852	CONCRETE TRANSITIONAL SECTION FOR CATCH BASIN	9 EA		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0106	2451000000-N	852	CONCRETE TRANSITIONAL SECTION FOR DROP INLET	2 EA		
0107	2474000000-N	SP	GENERIC DRAINAGE ITEM FILTRATION BASIN	Lump Sum	L.S.	
0108	2542000000-E	846	1'-6" CONCRETE CURB & GUTTER	5,500 LF		
0109	2549000000-E	846	2'-6" CONCRETE CURB & GUTTER	12,900 LF		
0110	2556000000-E	846	SHOULDER BERM GUTTER	6,100 LF		
0111	2591000000-E	848	4" CONCRETE SIDEWALK	5,500 SY		
0112	2605000000-N	848	CONCRETE CURB RAMPS	31 EA		
0113	2619000000-E	850	4" CONCRETE PAVED DITCH	11 SY		
0114	2647000000-E	852	5" MONOLITHIC CONCRETE ISLANDS (SURFACE MOUNTED)	1,110 SY		
0115	2752000000-E	SP	GENERIC PAVING ITEM MEDIAN HAZARD PROTECTION	400 LF		
0116	2800000000-N	858	ADJUSTMENT OF CATCH BASINS	1 EA		
0117	2830000000-N	858	ADJUSTMENT OF MANHOLES	3 EA		
0118	2860000000-N	859	CONVERT EXISTING CATCH BASIN TO JUNCTION BOX	3 EA		
0119	2875000000-N	859	CONVERT EXISTING CATCH BASIN TO DROP INLET	3 EA		
0120	2905000000-N	859	CONVERT EXISTING DROP INLET TO JUNCTION BOX	1 EA		
0121	3001000000-N	SP	IMPACT ATTENUATOR UNITS, TYPE TL-3	2 EA		
0122	3030000000-E	862	STEEL BEAM GUARDRAIL	11,300 LF		
0123	3045000000-E	862	STEEL BEAM GUARDRAIL, SHOP CURVED	650 LF		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0124	3150000000-N	862	ADDITIONAL GUARDRAIL POSTS	20 EA		
0125	3195000000-N	862	GUARDRAIL END UNITS, TYPE AT-1	2 EA		
0126	3210000000-N	862	GUARDRAIL END UNITS, TYPE CAT-1	8 EA		
0127	3215000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE III	2 EA		
0128	3287000000-N	SP	GUARDRAIL END UNITS, TYPE TL-3	13 EA		
0129	3317000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE B-77	8 EA		
0130	3360000000-E	863	REMOVE EXISTING GUARDRAIL	13,900 LF		
0131	3503000000-E	866	WOVEN WIRE FENCE, 47" FABRIC	2,100 LF		
0132	3509000000-E	866	4" TIMBER FENCE POSTS, 7'-6" LONG	120 EA		
0133	3515000000-E	866	5" TIMBER FENCE POSTS, 8'-0" LONG	60 EA		
0134	3628000000-E	876	RIP RAP, CLASS I	735 TON		
0135	3635000000-E	876	RIP RAP, CLASS II	706 TON		
0136	3649000000-E	876	RIP RAP, CLASS B	772 TON		
0137	3656000000-E	876	GEOTEXTILE FOR DRAINAGE	3,988 SY		
0138	4048000000-E	902	REINFORCED CONCRETE SIGN FOUNDATIONS	9 CY		
0139	4054000000-E	902	PLAIN CONCRETE SIGN FOUNDATIONS	3 CY		
0140	4057000000-E	SP	OVERHEAD FOOTING	285 CY		
0141	4060000000-E	903	SUPPORTS, BREAKAWAY STEEL BEAM	4,141 LB		
0142	4066000000-E	903	SUPPORTS, SIMPLE STEEL BEAM	6,475 LB		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0143	4072000000-E	903	SUPPORTS, 3-LB STEEL U-CHANNEL	1,483 LF		
0144	4078000000-E	903	SUPPORTS, 2-LB STEEL U-CHANNEL	1 EA		
0145	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (112+38 -Y-)	Lump Sum	L.S.	
0146	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (16+90 -RPC-)	Lump Sum	L.S.	
0147	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (19+30 -RPA-)	Lump Sum	L.S.	
0148	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (32+50 -Y-)	Lump Sum	L.S.	
0149	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (37+72 -L-)	Lump Sum	L.S.	
0150	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (42+36 -L-)	Lump Sum	L.S.	
0151	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (43+00 -Y-)	Lump Sum	L.S.	
0152	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (46+13 -L-)	Lump Sum	L.S.	
0153	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (51+48 -L-)	Lump Sum	L.S.	
0154	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (51+80 -Y-)	Lump Sum	L.S.	
0155	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (54+41 -L-)	Lump Sum	L.S.	
0156	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (70+00 -Y-)	Lump Sum	L.S.	

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0157	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (86+00 -Y-)	Lump Sum	L.S.	
0158	4096000000-N	904	SIGN ERECTION, TYPE D	10 EA		
0159	4102000000-N	904	SIGN ERECTION, TYPE E	84 EA		
0160	4108000000-N	904	SIGN ERECTION, TYPE F	5 EA		
0161	4109000000-N	904	SIGN ERECTION, TYPE *** (OVER-HEAD) (A)	33 EA		
0162	4109000000-N	904	SIGN ERECTION, TYPE *** (OVER-HEAD) (B)	9 EA		
0163	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)	14 EA		
0164	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (B)	6 EA		
0165	4114000000-N	904	SIGN ERECTION, MILEMARKERS	1 EA		
0166	4116000000-N	904	SIGN ERECTION, OVERLAY (GROUND MOUNTED)	5 EA		
0167	4116100000-N	904	SIGN ERECTION, RELOCATE TYPE **** (GROUND MOUNTED) (A)	2 EA		
0168	4116100000-N	904	SIGN ERECTION, RELOCATE TYPE **** (GROUND MOUNTED) (E)	6 EA		
0169	4116100000-N	904	SIGN ERECTION, RELOCATE TYPE **** (GROUND MOUNTED) (F)	6 EA		
0170	4116300000-N	904	SIGN ERECTION, LOGO TO PANEL	56 EA		
0171	4138000000-N	907	DISPOSAL OF SUPPORT, STEEL BEAM	1 EA		
0172	4149000000-N	907	DISPOSAL OF SIGN SYSTEM, OVER-HEAD	8 EA		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0173	4151000000-N	907	STOCKPILE SIGN SYSTEM, STEEL BEAM	1 EA		
0174	4152000000-N	907	DISPOSAL OF SIGN SYSTEM, STEEL BEAM	16 EA		
0175	4155000000-N	907	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	61 EA		
0176	4192000000-N	907	DISPOSAL OF SUPPORT, U-CHANNEL	12 EA		
0177	4234000000-N	907	DISPOSAL OF SIGN, A OR B (OVERHEAD)	7 EA		
0178	4236000000-N	907	DISPOSAL OF SIGN, A & B (GROUND MOUNTED)	1 EA		
0179	4360000000-N	SP	GENERIC SIGNING ITEM SIGN ERECTION, LOGO MILEAGE PANEL TO SIGN	49 EA		
0180	4400000000-E	1110	WORK ZONE SIGNS (STATIONARY)	1,479 SF		
0181	4405000000-E	1110	WORK ZONE SIGNS (PORTABLE)	2,600 SF		
0182	4410000000-E	1110	WORK ZONE SIGNS (BARRICADE MOUNTED)	560 SF		
0183	4415000000-N	1115	FLASHING ARROW BOARD	11 EA		
0184	4420000000-N	1120	PORTABLE CHANGEABLE MESSAGE SIGN	20 EA		
0185	4423000000-N	SP	WORK ZONE DIGITAL SPEED LIMIT SIGNS	7 EA		
0186	4430000000-N	1130	DRUMS	850 EA		
0187	4434000000-N	SP	SEQUENTIAL FLASHING WARNING LIGHTS	120 EA		
0188	4445000000-E	1145	BARRICADES (TYPE III)	320 LF		
0189	4447000000-E	SP	PEDESTRIAN CHANNELIZING DEVICES	228 LF		
0190	4455000000-N	1150	FLAGGER	400 DAY		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0191	4465000000-N	1160	TEMPORARY CRASH CUSHIONS	7 EA		
0192	4470000000-N	1160	REMOVE & RESET TEMPORARY CRASH CUSHION	8 EA		
0193	4480000000-N	1165	TMA	11 EA		
0194	4485000000-E	1170	PORTABLE CONCRETE BARRIER	6,020 LF		
0195	4490000000-E	1170	PORTABLE CONCRETE BARRIER (ANCHORED)	6,020 LF		
0196	4500000000-E	1170	REMOVE & RESET PORTABLE CONCRETE BARRIER	4,860 LF		
0197	4505000000-E	1170	REMOVE & RESET PORTABLE CONCRETE BARRIER (ANCHORED)	4,860 LF		
0198	4507000000-E	1170	WATER FILLED BARRIER	553 LF		
0199	4508000000-E	SP	REMOVE & RESET WATER FILLED BARRIER	77 LF		
0200	4510000000-N	1190	LAW ENFORCEMENT	160 HR		
0201	4520000000-N	1266	TUBULAR MARKERS (FIXED)	40 EA		
0202	4600000000-N	SP	GENERIC TRAFFIC CONTROL ITEM AUDIBLE WARNING DEVICE	18 EA		
0203	4600000000-N	SP	GENERIC TRAFFIC CONTROL ITEM PEDESTRIAN TRANSPORT SERVICE (PER TRIP)	2,250 EA		
0204	4650000000-N	1251	TEMPORARY RAISED PAVEMENT MARKERS	7,000 EA		
0205	4685000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)	16,632 LF		
0206	4688000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (6", 90 MILS)	43,453 LF		
0207	4695000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)	4,422 LF		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0208	4700000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (12", 90 MILS)	7,768 LF		
0209	4720000000-E	1205	THERMOPLASTIC PAVEMENT MARKING CHARACTER (90 MILS)	94 EA		
0210	4725000000-E	1205	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)	249 EA		
0211	4770000000-E	1205	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (II)	1,679 LF		
0212	4770000000-E	1205	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV)	2,700 LF		
0213	4775000000-E	1205	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (6") (IV)	3,500 LF		
0214	4780000000-E	1205	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (8") (II)	89 LF		
0215	4780000000-E	1205	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (8") (IV)	100 LF		
0216	4800000000-N	1205	COLD APPLIED PLASTIC PAVEMENT MARKING CHARACTER, TYPE ** (II)	8 EA		
0217	4805000000-N	1205	COLD APPLIED PLASTIC PAVEMENT MARKING SYMBOL, TYPE ** (II)	4 EA		
0218	4810000000-E	1205	PAINT PAVEMENT MARKING LINES (4")	144,280 LF		
0219	4820000000-E	1205	PAINT PAVEMENT MARKING LINES (8")	5,170 LF		
0220	4825000000-E	1205	PAINT PAVEMENT MARKING LINES (12")	1,370 LF		
0221	4835000000-E	1205	PAINT PAVEMENT MARKING LINES (24")	5,490 LF		
0222	4840000000-N	1205	PAINT PAVEMENT MARKING CHARACTER	28 EA		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0223	4845000000-N	1205	PAINT PAVEMENT MARKING SYMBOL	380	EA	
0224	4847500000-E	SP	WORK ZONE PERFORMANCE PAVEMENT MARKING LINES, 6"	98,150	LF	
0225	4847600000-E	SP	WORK ZONE PERFORMANCE PAVEMENT MARKING LINES, 12"	9,880	LF	
0226	4850000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (4")	73,490	LF	
0227	4855000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (6")	46,075	LF	
0228	4860000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (8")	2,635	LF	
0229	4865000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (12")	5,625	LF	
0230	4870000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (24")	2,800	LF	
0231	4875000000-N	1205	REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS	244	EA	
0232	4891000000-E	1205	GENERIC PAVEMENT MARKING ITEM THERMOPLASTIC PAVEMENT MARKING LINES (24", 90 MILS)	2,492	LF	
0233	4900000000-N	1251	PERMANENT RAISED PAVEMENT MARKERS	487	EA	
0234	4905000000-N	1253	SNOWPLOWABLE PAVEMENT MARKERS	676	EA	
0235	4935000000-N	1267	FLEXIBLE DELINEATORS (CRYSTAL)	38	EA	
0236	4940000000-N	1267	FLEXIBLE DELINEATORS (YELLOW)	28	EA	
0237	4945000000-N	1267	FLEXIBLE DELINEATORS (CRYSTAL & RED)	10	EA	
0238	4950000000-N	1267	FLEXIBLE DELINEATORS (YELLOW & RED)	16	EA	
0239	5005000000-E	1401	80' HIGH MOUNT STANDARD	3	EA	

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0240	5010000000-E	1401	100' HIGH MOUNT STANDARD	4	EA	
0241	5020000000-N	1401	PORTABLE DRIVE UNIT	2	EA	
0242	5025000000-E	SP	HIGH MOUNT FOUNDATIONS	49	CY	
0243	5050000000-N	1404	LIGHT STANDARDS, TYPE MTLT ***** (45' SA, 15' ARM)	15	EA	
0244	5070000000-N	SP	STANDARD FOUNDATION ***** (R1)	13	EA	
0245	5070000000-N	SP	STANDARD FOUNDATION ***** (R2)	2	EA	
0246	5120000000-N	1407	ELECTRIC SERVICE POLE **** ***** (30' CLASS 4)	1	EA	
0247	5125000000-E	1407	ELECTRIC SERVICE LATERAL ***** (3 #1/0 USE)	25	LF	
0248	5155000000-E	1409	ELECTRICAL DUCT, TYPE BD, SIZE ***** (2")	590	LF	
0249	5160000000-E	1409	ELECTRICAL DUCT, TYPE JA, SIZE ***** (3")	385	LF	
0250	5160000000-E	1409	ELECTRICAL DUCT, TYPE JA, SIZE ***** (4")	450	LF	
0251	5175000000-E	1410	** #6 W/G FEEDER CIRCUIT (2)	470	LF	
0252	5180000000-E	1410	** #4 W/G FEEDER CIRCUIT (2)	540	LF	
0253	5185000000-E	1410	** #2 W/G FEEDER CIRCUIT (2)	530	LF	
0254	5210000000-E	1410	** #6 W/G FEEDER CIRCUIT IN ***** CONDUIT (2, 1.5")	4,310	LF	

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0255	5215000000-E	1410	** #4 W/G FEEDER CIRCUIT IN ***** CONDUIT (2, 1.5")	6,580 LF		
0256	5220000000-E	1410	** #2 W/G FEEDER CIRCUIT IN ***** CONDUIT (2, 1.5")	2,130 LF		
0257	5240000000-N	1411	ELECTRICAL JUNCTION BOXES ***** (CS36)	1 EA		
0258	5240000000-N	1411	ELECTRICAL JUNCTION BOXES ***** (HM18)	6 EA		
0259	5240000000-N	1411	ELECTRICAL JUNCTION BOXES ***** (HM30)	2 EA		
0260	5240000000-N	1411	ELECTRICAL JUNCTION BOXES ***** (IG18)	17 EA		
0261	5240000000-N	1411	ELECTRICAL JUNCTION BOXES ***** (IG30)	5 EA		
0262	5240000000-N	1411	ELECTRICAL JUNCTION BOXES ***** (LS18)	15 EA		
0263	5252000000-N	1412	UNDERPASS LUMINARIES ***** (WM)	8 EA		
0264	5253000000-N	1412	UNDERPASS CIRCUITRY AT ***** (I-40/AIRPORT BLVD INTER- CHANGE)	Lump Sum	L.S.	
0265	5270000000-N	SP	GENERIC LIGHTING ITEM 100' HIGH MOUNT LUMINAIRE - LED	24 EA		
0266	5270000000-N	SP	GENERIC LIGHTING ITEM 80' HIGH MOUNT LUMINAIRE - LED	24 EA		
0267	5270000000-N	SP	GENERIC LIGHTING ITEM COMMUNICATION GATEWAY	1 EA		
0268	5270000000-N	SP	GENERIC LIGHTING ITEM CONTROL NODE	64 EA		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0269	5270000000-N	SP	GENERIC LIGHTING ITEM LIGHTING CONTROL SYSTEM	1 EA		
0270	5270000000-N	SP	GENERIC LIGHTING ITEM REMOVE RDU HIGH MOUNT STANDARD	1 EA		
0271	5270000000-N	SP	GENERIC LIGHTING ITEM REPLACE RDU HIGH MOUNT STAND- ARD	1 EA		
0272	5270000000-N	SP	GENERIC LIGHTING ITEM ROADWAY LIGHT STANDARD LUMIN- AIRE - 285W LED	15 EA		
0273	5325800000-E	1510	8" WATER LINE	140 LF		
0274	5326600000-E	1510	16" WATER LINE	3,058 LF		
0275	5329000000-E	1510	DUCTILE IRON WATER PIPE FITTINGS	15,316 LB		
0276	5540000000-E	1515	6" VALVE	1 EA		
0277	5546000000-E	1515	8" VALVE	3 EA		
0278	5558600000-E	1515	16" VALVE	5 EA		
0279	5571800000-E	1515	8" TAPPING SLEEVE & VALVE	2 EA		
0280	5589200000-E	1515	2" AIR RELEASE VALVE	1 EA		
0281	5649000000-N	1515	RECONNECT WATER METER	3 EA		
0282	5672000000-N	1515	RELOCATE FIRE HYDRANT	2 EA		
0283	5673000000-E	1515	FIRE HYDRANT LEG	15 LF		
0284	5709400000-E	1520	8" FORCE MAIN SEWER	362 LF		
0285	5801000000-E	1530	ABANDON 8" UTILITY PIPE	595 LF		
0286	5804000000-E	1530	ABANDON 12" UTILITY PIPE	339 LF		
0287	5810000000-E	1530	ABANDON 16" UTILITY PIPE	1,974 LF		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0288	5815000000-N	1530	REMOVE WATER METER	1 EA		
0289	5835700000-E	1540	16" ENCASEMENT PIPE	210 LF		
0290	5836000000-E	1540	24" ENCASEMENT PIPE	265 LF		
0291	5836400000-E	1540	36" ENCASEMENT PIPE	525 LF		
0292	5872500000-E	1550	BORE AND JACK OF *** (36")	350 LF		
0293	5882000000-N	SP	GENERIC UTILITY ITEM 8" INSERTION VALVE	2 EA		
0294	5882000000-N	SP	GENERIC UTILITY ITEM RECONNECT 6" WATER LINE	1 EA		
0295	5882000000-N	SP	GENERIC UTILITY ITEM REMOVE BLACKFLOW PREVENTER	2 EA		
0296	5882000000-N	SP	GENERIC UTILITY ITEM THRUST COLLAR	8 EA		
0297	5888000000-E	SP	GENERIC UTILITY ITEM CONCRETE PROTECTION ON WATER MAIN	10 LF		
0298	6000000000-E	1605	TEMPORARY SILT FENCE	46,245 LF		
0299	6006000000-E	1610	STONE FOR EROSION CONTROL, CLASS A	255 TON		
0300	6009000000-E	1610	STONE FOR EROSION CONTROL, CLASS B	3,645 TON		
0301	6012000000-E	1610	SEDIMENT CONTROL STONE	3,655 TON		
0302	6015000000-E	1615	TEMPORARY MULCHING	9.5 ACR		
0303	6018000000-E	1620	SEED FOR TEMPORARY SEEDING	600 LB		
0304	6021000000-E	1620	FERTILIZER FOR TEMPORARY SEED- ING	4 TON		
0305	6024000000-E	1622	TEMPORARY SLOPE DRAINS	1,795 LF		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0306	6029000000-E	SP	SAFETY FENCE	3,000 LF		
0307	6030000000-E	1630	SILT EXCAVATION	4,900 CY		
0308	6036000000-E	1631	MATting FOR EROSION CONTROL	101,685 SY		
0309	6037000000-E	SP	COIR FIBER MAT	100 SY		
0310	6042000000-E	1632	1/4" HARDWARE CLOTH	10,530 LF		
0311	6045000000-E	SP	*** TEMPORARY PIPE (42")	65 LF		
0312	6045000000-E	SP	*** TEMPORARY PIPE (48")	500 LF		
0313	6070000000-N	1639	SPECIAL STILLING BASINS	10 EA		
0314	6071020000-E	SP	POLYACRYLAMIDE (PAM)	90 LB		
0315	6071030000-E	1640	COIR FIBER BAFFLE	1,155 LF		
0316	6071050000-E	SP	*** SKIMMER (2-1/2")	1 EA		
0317	6084000000-E	1660	SEEDING & MULCHING	21 ACR		
0318	6087000000-E	1660	MOWING	12 ACR		
0319	6090000000-E	1661	SEED FOR REPAIR SEEDING	100 LB		
0320	6093000000-E	1661	FERTILIZER FOR REPAIR SEEDING	0.75 TON		
0321	6096000000-E	1662	SEED FOR SUPPLEMENTAL SEEDING	475 LB		
0322	6108000000-E	1665	FERTILIZER TOPDRESSING	14 TON		
0323	6111000000-E	SP	IMPERVIOUS DIKE	830 LF		
0324	6114500000-N	1667	SPECIALIZED HAND MOWING	10 MHR		
0325	6117000000-N	SP	RESPONSE FOR EROSION CONTROL	25 EA		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0326	6117500000-N	SP	CONCRETE WASHOUT STRUCTURE	4 EA		
0327	6123000000-E	1670	REFORESTATION	2 ACR		
0328	7048500000-E	1705	PEDESTRIAN SIGNAL HEAD (16", 1 SECTION W/COUNTDOWN)	25 EA		
0329	7060000000-E	1705	SIGNAL CABLE	20,050 LF		
0330	7120000000-E	1705	VEHICLE SIGNAL HEAD (12", 3 SECTION)	91 EA		
0331	7132000000-E	1705	VEHICLE SIGNAL HEAD (12", 4 SECTION)	12 EA		
0332	7144000000-E	1705	VEHICLE SIGNAL HEAD (12", 5 SECTION)	6 EA		
0333	7252000000-E	1710	MESSENGER CABLE (1/4")	3,800 LF		
0334	7264000000-E	1710	MESSENGER CABLE (3/8")	3,175 LF		
0335	7279000000-E	1715	TRACER WIRE	13,100 LF		
0336	7300000000-E	1715	UNPAVED TRENCHING (*****) (1, 2")	2,950 LF		
0337	7300000000-E	1715	UNPAVED TRENCHING (*****) (2, 2")	8,000 LF		
0338	7301000000-E	1715	DIRECTIONAL DRILL (*****) (1, 2")	1,075 LF		
0339	7301000000-E	1715	DIRECTIONAL DRILL (*****) (2, 2")	2,975 LF		
0340	7324000000-N	1716	JUNCTION BOX (STANDARD SIZE)	41 EA		
0341	7348000000-N	1716	JUNCTION BOX (OVER-SIZED, HEAVY DUTY)	34 EA		
0342	7360000000-N	1720	WOOD POLE	13 EA		
0343	7372000000-N	1721	GUY ASSEMBLY	35 EA		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0344	7396000000-E	1722	1/2" RISER WITH WEATHERHEAD	4 EA		
0345	7408000000-E	1722	1" RISER WITH WEATHERHEAD	4 EA		
0346	7420000000-E	1722	2" RISER WITH WEATHERHEAD	6 EA		
0347	7432000000-E	1722	2" RISER WITH HEAT SHRINK TUBING	3 EA		
0348	7444000000-E	1725	INDUCTIVE LOOP SAWCUT	6,150 LF		
0349	7456000000-E	1726	LEAD-IN CABLE (*****)(14-2)	25,825 LF		
0350	7481000000-N	SP	SITE SURVEY	5 EA		
0351	7481240000-N	SP	CAMERA WITHOUT INTERNAL LOOP EMULATOR PROCESSING UNIT	20 EA		
0352	7481260000-N	SP	EXTERNAL LOOP EMULATOR PROCESSING UNIT	5 EA		
0353	7481280000-N	SP	RELOCATE CAMERA SENSOR UNIT	17 EA		
0354	7516000000-E	1730	COMMUNICATIONS CABLE (**FIBER)(12)	3,400 LF		
0355	7516000000-E	1730	COMMUNICATIONS CABLE (**FIBER)(144)	8,525 LF		
0356	7516000000-E	1730	COMMUNICATIONS CABLE (**FIBER)(24)	11,925 LF		
0357	7528000000-E	1730	DROP CABLE	4,325 LF		
0358	7540000000-N	1731	SPLICE ENCLOSURE	8 EA		
0359	7552000000-N	1731	INTERCONNECT CENTER	5 EA		
0360	7566000000-N	1733	DELINEATOR MARKER	33 EA		
0361	7575142010-N	1736	900MHZ SERIAL/ETHERNET SPREAD SPECTRUM RADIO	5 EA		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0362	7575160000-E	1734	REMOVE EXISTING COMMUNICATIONS CABLE	20,950 LF		
0363	7576000000-N	SP	METAL STRAIN SIGNAL POLE	4 EA		
0364	7588000000-N	SP	METAL POLE WITH SINGLE MAST ARM	5 EA		
0365	7590000000-N	SP	METAL POLE WITH DUAL MAST ARM	2 EA		
0366	7613000000-N	SP	SOIL TEST	12 EA		
0367	7614100000-E	SP	DRILLED PIER FOUNDATION	72 CY		
0368	7631000000-N	SP	MAST ARM WITH METAL POLE DE-SIGN	7 EA		
0369	7636000000-N	1745	SIGN FOR SIGNALS	43 EA		
0370	7642100000-N	1743	TYPE I POST WITH FOUNDATION	3 EA		
0371	7642200000-N	1743	TYPE II PEDESTAL WITH FOUNDATION	16 EA		
0372	7684000000-N	1750	SIGNAL CABINET FOUNDATION	4 EA		
0373	7852000000-N	1751	DETECTOR CARD (NEMA TS-2)	26 EA		
0374	7980000000-N	SP	GENERIC SIGNAL ITEM CCTV CAMERA ASSEMBLY	2 EA		
0375	7980000000-N	SP	GENERIC SIGNAL ITEM CCTV EQUIPMENT CABINET	1 EA		
0376	7980000000-N	SP	GENERIC SIGNAL ITEM CCTV METAL POLE (40')	1 EA		
0377	7980000000-N	SP	GENERIC SIGNAL ITEM CCTV WOOD POLE	1 EA		
0378	7980000000-N	SP	GENERIC SIGNAL ITEM CONTRLER W/CABINET NEMA TS-2, TYPE 2070E CONTRLER, TYPE 1 CABINET BASE MOUNT	4 EA		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0379	7980000000-N	SP	GENERIC SIGNAL ITEM ETHERNET EDGE SWITCH	1 EA		
0380	7980000000-N	SP	GENERIC SIGNAL ITEM GROUNDING SYSTEM	1 EA		
0381	7980000000-N	SP	GENERIC SIGNAL ITEM METER BASE/DISCONNECT COMBINA- TION PANEL	1 EA		
0382	7990000000-E	SP	GENERIC SIGNAL ITEM 3-WIRE COPPER FEEDER CONDUCTORS	150 LF		
0383	7990000000-E	SP	GENERIC SIGNAL ITEM ETHERNET CABLE	375 LF		
CULVERT ITEMS						
0384	8126000000-N	414	CULVERT EXCAVATION, STA ***** (29+90.00-Y3-)	Lump Sum	L.S.	
0385	8126000000-N	414	CULVERT EXCAVATION, STA ***** (33+31.33-L-)	Lump Sum	L.S.	
0386	8126000000-N	414	CULVERT EXCAVATION, STA ***** (53+39.00-L-)	Lump Sum	L.S.	
0387	8126000000-N	414	CULVERT EXCAVATION, STA ***** (86+76.00-Y-)	Lump Sum	L.S.	
0388	8133000000-E	414	FOUNDATION CONDITIONING MATERIAL, BOX CULVERT	519 TON		
0389	8196000000-E	420	CLASS A CONCRETE (CULVERT)	1,039.8 CY		
0390	8245000000-E	425	REINFORCING STEEL (CULVERT)	113,023 LB		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
STRUCTURE ITEMS						
0391	8035000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (44+35.96 -L- RT)	Lump Sum	L.S.	
0392	8065000000-N	SP	ASBESTOS ASSESSMENT	Lump Sum	L.S.	
0393	8096000000-E	450	PILE EXCAVATION IN SOIL	41 LF		
0394	8097000000-E	450	PILE EXCAVATION NOT IN SOIL	9 LF		
0395	8105560000-E	411	4'-0" DIA DRILLED PIERS IN SOIL	78 LF		
0396	8105660000-E	411	4'-0" DIA DRILLED PIERS NOT IN SOIL	90 LF		
0397	8113000000-N	411	SID INSPECTIONS	2 EA		
0398	8114000000-N	411	SPT TESTING	6 EA		
0399	8115000000-N	411	CSL TESTING	2 EA		
0400	8121000000-N	412	UNCLASSIFIED STRUCTURE EXCAVA- TION AT STATION ***** (44+35.96 -L- RT)	Lump Sum	L.S.	
0401	8147000000-E	420	REINFORCED CONCRETE DECK SLAB	34,860 SF		
0402	8161000000-E	420	GROOVING BRIDGE FLOORS	36,152 SF		
0403	8182000000-E	420	CLASS A CONCRETE (BRIDGE)	596.1 CY		
0404	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (44+35.96 -L- LT)	Lump Sum	L.S.	
0405	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (44+35.96 -L- RT)	Lump Sum	L.S.	
0406	8217000000-E	425	REINFORCING STEEL (BRIDGE)	106,041 LB		
0407	8238000000-E	425	SPIRAL COLUMN REINFORCING STEEL (BRIDGE)	7,597 LB		
0408	8280000000-E	440	APPROX LBS STRUCTURAL STEEL	1,734,220 LS		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0409	8328200000-E	450	PILE DRIVING EQUIPMENT SETUP FOR *** STEEL PILES (HP 12 X 53)	20 EA		
0410	8364000000-E	450	HP12X53 STEEL PILES	317.8 LF		
0411	8391000000-N	450	STEEL PILE POINTS	20 EA		
0412	8503000000-E	460	CONCRETE BARRIER RAIL	909.72 LF		
0413	8505000000-E	460	VERTICAL CONCRETE BARRIER RAIL	706.7 LF		
0414	8531000000-E	462	4" SLOPE PROTECTION	1,350 SY		
0415	8654000000-N	SP	DISC BEARINGS	Lump Sum	L.S.	
0416	8657000000-N	430	ELASTOMERIC BEARINGS	Lump Sum	L.S.	
0417	8692000000-N	SP	FOAM JOINT SEALS	Lump Sum	L.S.	
1043/Oct17/Q3544556.57/D1859094102010/E417			Total Amount Of Bid For Entire Project :			

GFE
DBEGOALSET:11.0%
DBEGOALOB:8.3%

Vendor 1 of 6: ZACHRY CONSTRUCTION CORPORATION (9105)
Call Order 001 (Proposal: C204351)

Bid Information

Proposal County: WAKE
Vendor Address: P.O. BOX 33240
SAN ANTONIO , TX , 78265
Signature Check: Samuel Edward White
Time Bid Received: November 19, 2019 01:59 PM
Amendment Count: 0

Bid Checksum: 93C96B33B1
Bid Total: \$34,895,402.71
Items Total: \$34,895,402.71
Time Total: \$0.00

Bidding Errors:
DBE List Goal not met.

Vendor 1 of 6: ZACHRY CONSTRUCTION CORPORATION (9105) Call Order 001 (Proposal: C204351)

Bid Bond Information

Projects:**Counties:****Bond ID:** SNC19402794**Paid by Check:** No**Bond Percent:** 5%**Bond Maximum:****State of Incorporation:** New York**Agency Execution Date:** 11/13/2019 10**Surety Name:** Surety2000**Bond Agency Name:** Zurich American Insurance
Company

Letting: L191119
11/19/2019 02:00:00 PM

North Carolina Department of Transportation
9105 - Zachry Construction Corp

Contract ID: C204351
Call: 001

DBE Load Information

Letting ID: L191119
Letting Date: 11/19/2019
Call Order: 001
Contract ID: C204351
Project: NHPP-040-1(259)286NHPP-040-1(259)286NHPP-040-1(259)286NHPP-040-1(259)286
Bid Total: \$34,895,402.71
DBE Goal: 11.00% (\$3,838,494.30)

Vendor ID: 9105
Vendor Name: Zachry Construction Corp
DBE Entered: 8.30% (\$2,896,671.58)

Vendor ID	DBE Name	Is Supplier?	City/State	Goods/Service	Amount
4898	BULLINGTON CONSTRUCTION INC	False	417 FOXGLOVE LANE , INDIAN TRAIL, NC 28079	SubContractor	313,050.00 <i>Committed</i>
15755	GOSALIA CONCRETE CONSTRUCTORS INC.	False	SUITE 200 WESTSHORE BLVD , TAMPA, FL 33607	SubContractor	115,326.06 <i>Committed</i>
4289	VISTABUTION LLC	False	1407 GAYLORD DR. , RALEIGH, NC 27612	SubContractor	67,450.00 <i>Committed</i>
11883	JC CONCRETE CONSTRUCTION LLC	False	P.O. BOX 613 , PINNACLE, NC 27043	SubContractor	708,900.00 <i>Committed</i>
4260	JORGE AGUILA CARRILLO DBA AGUILA'S MASONRY SERVICES	False	PO BOX 837 , SILER CITY, NC 27344	SubContractor	128,770.82 <i>Committed</i>
11540	Whitehurst Trucking	False	4912 cupine ct, raleigh, nc 27604	SubContractor	200,033.60 <i>Committed</i>
12196	COVENANT TRUCKING CO INC	False	P. O. BOX 1000 , YOUNGSVILLE, NC 27596	SubContractor	802,470.01 <i>Committed</i>
7294	STRATCON CONTRACTING CORP	False	OLD WILLIAMS ROAD , RALEIGH, NC 27610	SubContractor	182,000.00 <i>Committed</i>
16955	J.R. CASKEY, INC.	False	P.O. BOX 305 , OILVILLE, VA 23129	SubContractor	260,714.70 <i>Committed</i>
12578	LOPEZ REBAR LLC	False	1024 CY CIRCLE , CONCORD, NC 28025	SubContractor	117,956.39 <i>Committed</i>

Letting: L191119
11/19/2019 02:00:00 PM

North Carolina Department of Transportation
9105 - Zachry Construction Corp

Contract ID: C204351
Call: 001

BondID: SNC19402794

Surety Registry Agency: Surety2000

Verified?: 1

Surety Agency: Zurich American Insurance Company

Bond Execution Date: 11/13/2019 10:30:44 AM

Line Number	Item Number	Quantity	Unit	Unit Price	Extension Price
Section 0001					
ROADWAY ITEMS - NPAR (TOWN OF CARY)					
0001	0000100000-N	1.000	LS	\$1,775,000.0000	\$1,775,000.00
	MOBILIZATION				
0002	0000400000-N	1.000	LS	\$1,000,000.0000	\$1,000,000.00
	CONSTRUCTION SURVEYING				
0003	0000900000-N	1.000	LS	\$1,250,000.0000	\$1,250,000.00
	GENERIC MISCELLANEOUS ITEM UTILITY COORDINATOR				
0004	0001000000-E	1.000	LS	\$4,311,305.0000	\$4,311,305.00
	CLEARING & GRUBBING .. ACRE(S)				
0005	0008000000-E	2.000	ACR	\$8,600.0000	\$17,200.00
	SUPPLEMENTARY CLEARING & GRUB-BING				
0006	0022000000-E	126500.000	CY	\$20.0000	\$2,530,000.00
	UNCLASSIFIED EXCAVATION				
0007	0028000000-N	1.000	LS	\$54,774.6300	\$54,774.63
	TYPE I STANDARD APPROACH FILL STATION ***** (44+35.96 -L- LT)				
0008	0028000000-N	1.000	LS	\$47,208.8400	\$47,208.84
	TYPE I STANDARD APPROACH FILL STATION ***** (44+35.96 -L- RT)				
0009	0036000000-E	2050.000	CY	\$4.2600	\$8,733.00
	UNDERCUT EXCAVATION				
0010	0106000000-E	43000.000	CY	\$0.0100	\$430.00
	BORROW EXCAVATION				
0011	0134000000-E	540.000	CY	\$3.5400	\$1,911.60
	DRAINAGE DITCH EXCAVATION				
0012	0141000000-E	1000.000	LF	\$4.8700	\$4,870.00
	BERM DITCH CONSTRUCTION				
0013	0156000000-E	49500.000	SY	\$4.2500	\$210,375.00
	REMOVAL OF EXISTING ASPHALT PAVEMENT				
0014	0192000000-N	20.000	HR	\$181.3800	\$3,627.60
	PROOF ROLLING				
0015	0195000000-E	1250.000	CY	\$31.5400	\$39,425.00
	SELECT GRANULAR MATERIAL				
0016	0196000000-E	5750.000	SY	\$1.0100	\$5,807.50
	GEOTEXTILE FOR SOIL STABILIZA-TION				
0017	0199000000-E	2650.000	SF	\$41.2100	\$109,206.50
	TEMPORARY SHORING				
0018	0223000000-E	530.000	SY	\$73.1100	\$38,748.30
	ROCK PLATING				
0019	0234000000-E	540.000	CY	\$24.3900	\$13,170.60
	GENERIC GRADING ITEM STOCKPILING AND TESTING ONLY OF PCB CONTAMINATED SOIL				
0020	0255000000-E	50.000	TON	\$76.8500	\$3,842.50
	GENERIC GRADING ITEM HAULING AND DISPOSAL OF PETROLEUM CONTAMINATED SOIL				
0021	0255000000-E	810.000	TON	\$71.8700	\$58,214.70
	GENERIC GRADING ITEM STOCKPILING, TESTING, HAULING, AND DISPOSAL OF PCB CONTAMI- NATED SOIL				
0022	0318000000-E	1870.000	TON	\$45.3000	\$84,711.00
	FOUNDATION CONDITIONING MATE- RIAL, MINOR STRUCTURES				
0023	0320000000-E	6406.000	SY	\$0.7500	\$4,804.50
	FOUNDATION CONDITIONING GEO- TEXTILE				

0024	0335200000-E	376.000	LF	\$42.0500	\$15,810.80
	15" DRAINAGE PIPE				
0025	0335300000-E	1688.000	LF	\$42.7100	\$72,094.48
	18" DRAINAGE PIPE				
0026	0335400000-E	124.000	LF	\$52.4000	\$6,497.60
	24" DRAINAGE PIPE				
0027	0335500000-E	924.000	LF	\$66.9200	\$61,834.08
	30" DRAINAGE PIPE				
0028	0335600000-E	28.000	LF	\$117.2100	\$3,281.88
	36" DRAINAGE PIPE				
0029	0335700000-E	8.000	LF	\$167.2900	\$1,338.32
	42" DRAINAGE PIPE				
0030	0366000000-E	184.000	LF	\$48.5800	\$8,938.72
	15" RC PIPE CULVERTS, CLASS III				
0031	0372000000-E	320.000	LF	\$51.6300	\$16,521.60
	18" RC PIPE CULVERTS, CLASS III				
0032	0378000000-E	68.000	LF	\$86.4800	\$5,880.64
	24" RC PIPE CULVERTS, CLASS III				
0033	0384000000-E	152.000	LF	\$86.2700	\$13,113.04
	30" RC PIPE CULVERTS, CLASS III				
0034	0390000000-E	312.000	LF	\$116.2900	\$36,282.48
	36" RC PIPE CULVERTS, CLASS III				
0035	0414000000-E	16.000	LF	\$235.7200	\$3,771.52
	60" RC PIPE CULVERTS, CLASS III				
0036	0448200000-E	5156.000	LF	\$51.6300	\$266,204.28
	15" RC PIPE CULVERTS, CLASS IV				
0037	0448300000-E	3336.000	LF	\$56.7700	\$189,384.72
	18" RC PIPE CULVERTS, CLASS IV				
0038	0448400000-E	388.000	LF	\$76.2900	\$29,600.52
	24" RC PIPE CULVERTS, CLASS IV				
0039	0448500000-E	500.000	LF	\$110.1900	\$55,095.00
	30" RC PIPE CULVERTS, CLASS IV				
0040	0448600000-E	392.000	LF	\$121.6100	\$47,671.12
	36" RC PIPE CULVERTS, CLASS IV				
0041	0448700000-E	48.000	LF	\$183.4700	\$8,806.56
	42" RC PIPE CULVERTS, CLASS IV				
0042	0582000000-E	240.000	LF	\$34.0500	\$8,172.00
	15" CS PIPE CULVERTS, 0.064" THICK				
0043	0588000000-E	584.000	LF	\$36.3700	\$21,240.08
	18" CS PIPE CULVERTS, 0.064" THICK				
0044	0594000000-E	180.000	LF	\$45.2600	\$8,146.80
	24" CS PIPE CULVERTS, 0.064" THICK				
0045	0636000000-E	10.000	EA	\$179.9000	\$1,799.00
	*** CS PIPE ELBOWS, ***** THICK (15", 0.064")				
0046	0636000000-E	22.000	EA	\$207.1700	\$4,557.74
	*** CS PIPE ELBOWS, ***** THICK (18", 0.064")				
0047	0636000000-E	6.000	EA	\$234.4300	\$1,406.58
	*** CS PIPE ELBOWS, ***** THICK (24", 0.064")				
0048	0973100000-E	188.000	LF	\$759.0000	\$142,692.00

*** WELDED STEEL PIPE, ***** THICK, GRADE B IN SOIL (42", 0.625")				
0049	0973100000-E	144.000 LF	\$899.0000	\$129,456.00
*** WELDED STEEL PIPE, ***** THICK, GRADE B IN SOIL (48", 0.688")				
0050	0973100000-E	160.000 LF	\$1,349.0000	\$215,840.00
*** WELDED STEEL PIPE, ***** THICK, GRADE B IN SOIL (60", 0.844")				
0051	0973300000-E	188.000 LF	\$1,189.0000	\$223,532.00
*** WELDED STEEL PIPE, ***** THICK, GRADE B NOT IN SOIL (42", 0.625")				
0052	0973300000-E	144.000 LF	\$1,299.0000	\$187,056.00
*** WELDED STEEL PIPE, ***** THICK, GRADE B NOT IN SOIL (48", 0.688")				
0053	0973300000-E	160.000 LF	\$1,899.0000	\$303,840.00
*** WELDED STEEL PIPE, ***** THICK, GRADE B NOT IN SOIL (60", 0.844")				
0054	0995000000-E	4613.000 LF	\$15.7000	\$72,424.10
PIPE REMOVAL				
0055	0996000000-N	10.000 EA	\$319.6900	\$3,196.90
PIPE CLEAN OUT				
0056	1011000000-N	1.000 LS	\$271,763.9000	\$271,763.90
FINE GRADING				
0057	1044000000-E	14000.000 SY	\$2.9500	\$41,300.00
LIME TREATED SOIL (SLURRY METHOD)				
0058	1066000000-E	170.000 TON	\$214.3500	\$36,439.50
LIME FOR LIME TREATED SOIL				
0059	1099500000-E	1500.000 CY	\$7.1800	\$10,770.00
SHALLOW UNDERCUT				
0060	1099700000-E	4960.000 TON	\$20.8300	\$103,316.80
CLASS IV SUBGRADE STABILIZATION				
0061	1110000000-E	250.000 TON	\$25.7100	\$6,427.50
STABILIZER AGGREGATE				
0062	1115000000-E	14778.000 SY	\$4.5100	\$66,648.78
GEOTEXTILE FOR PAVEMENT STABILIZATION				
0063	1121000000-E	33000.000 TON	\$0.0100	\$330.00
AGGREGATE BASE COURSE				
0064	1176000000-E	14000.000 SY	\$2.9500	\$41,300.00
SOIL CEMENT BASE				
0065	1187000000-E	392.000 TON	\$195.6000	\$76,675.20
PORTLAND CEMENT FOR SOIL CEMENT BASE				
0066	1209000000-E	4200.000 GAL	\$2.7100	\$11,382.00
ASPHALT CURING SEAL				
0067	1220000000-E	200.000 TON	\$25.1900	\$5,038.00
INCIDENTAL STONE BASE				
0068	1297000000-E	450.000 SY	\$18.1100	\$8,149.50
MILLING ASPHALT PAVEMENT, ***"DEPTH (1-1/2")				
0069	1297000000-E	88850.000 SY	\$2.3000	\$204,355.00
MILLING ASPHALT PAVEMENT, ***"DEPTH (3-3/4")				
0070	1330000000-E	4000.000 SY	\$11.2500	\$45,000.00
INCIDENTAL MILLING				
0071	1491000000-E	18000.000 TON	\$46.0000	\$828,000.00
ASPHALT CONC BASE COURSE, TYPE B25.0C				
0072	1503000000-E	20200.000 TON	\$47.0000	\$949,400.00
ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C				

0073	1519000000-E	2700.000	TON	\$55.0000	\$148,500.00
	ASPHALT CONC SURFACE COURSE, TYPE S9.5B				
0074	1523000000-E	11700.000	TON	\$51.0000	\$596,700.00
	ASPHALT CONC SURFACE COURSE, TYPE S9.5C				
0075	1524200000-E	18900.000	TON	\$55.0000	\$1,039,500.00
	ASPHALT CONC SURFACE COURSE, TYPE S9.5D				
0076	1526000000-E	4630.000	TON	\$60.0000	\$277,800.00
	ASPHALT CONC SURFACE COURSE, TYPE S4.75A				
0077	1575000000-E	2990.000	TON	\$480.0000	\$1,435,200.00
	ASPHALT BINDER FOR PLANT MIX				
0078	1577000000-E	1080.000	TON	\$625.0000	\$675,000.00
	POLYMER MODIFIED ASPHALT BINDER FOR PLANT MIX				
0079	1693000000-E	540.000	TON	\$80.0000	\$43,200.00
	ASPHALT PLANT MIX, PAVEMENT REPAIR				
0080	1840000000-E	25400.000	LF	\$0.4400	\$11,176.00
	MILLED RUMBLE STRIPS (ASPHALT CONCRETE)				
0081	2000000000-N	22.000	EA	\$400.0000	\$8,800.00
	RIGHT-OF-WAY MARKERS				
0082	2020000000-N	6.000	EA	\$400.0000	\$2,400.00
	CONTROL-OF-ACCESS MARKERS				
0083	2022000000-E	224.000	CY	\$30.2700	\$6,780.48
	SUBDRAIN EXCAVATION				
0084	2026000000-E	1000.000	SY	\$1.2300	\$1,230.00
	GEOTEXTILE FOR SUBSURFACE DRAINS				
0085	2036000000-E	168.000	CY	\$38.5900	\$6,483.12
	SUBDRAIN COARSE AGGREGATE				
0086	2044000000-E	1000.000	LF	\$12.3900	\$12,390.00
	6" PERFORATED SUBDRAIN PIPE				
0087	2070000000-N	2.000	EA	\$342.6400	\$685.28
	SUBDRAIN PIPE OUTLET				
0088	2077000000-E	12.000	LF	\$18.4400	\$221.28
	6" OUTLET PIPE				
0089	2143000000-E	10.000	TON	\$50.2200	\$502.20
	BLOTTING SAND				
0090	2209000000-E	15.900	CY	\$1,389.8500	\$22,098.62
	ENDWALLS				
0091	2220000000-E	5.600	CY	\$2,100.9200	\$11,765.15
	REINFORCED ENDWALLS				
0092	2253000000-E	3.700	CY	\$1,513.1000	\$5,598.47
	PIPE COLLARS				
0093	2275000000-E	97.000	CY	\$175.0000	\$16,975.00
	FLOWABLE FILL				
0094	2286000000-N	173.000	EA	\$1,723.8200	\$298,220.86
	MASONRY DRAINAGE STRUCTURES				
0095	2297000000-E	4.500	CY	\$465.4100	\$2,094.35
	MASONRY DRAINAGE STRUCTURES				
0096	2308000000-E	125.500	LF	\$432.8000	\$54,316.40
	MASONRY DRAINAGE STRUCTURES				
0097	2354000000-N	1.000	EA	\$707.6900	\$707.69

FRAME WITH GRATE, STD 840.22					
0098	2364000000-N	11.000	EA	\$643.9700	\$7,083.67
FRAME WITH TWO GRATES, STD 840.16					
0099	2364200000-N	33.000	EA	\$803.7400	\$26,523.42
FRAME WITH TWO GRATES, STD 840.20					
0100	2365000000-N	32.000	EA	\$803.7400	\$25,719.68
FRAME WITH TWO GRATES, STD 840.22					
0101	2374000000-N	6.000	EA	\$680.3300	\$4,081.98
FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)					
0102	2374000000-N	41.000	EA	\$696.1300	\$28,541.33
FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)					
0103	2374000000-N	40.000	EA	\$696.1300	\$27,845.20
FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)					
0104	2396000000-N	15.000	EA	\$551.1900	\$8,267.85
FRAME WITH COVER, STD 840.54					
0105	2440000000-N	9.000	EA	\$2,079.9800	\$18,719.82
CONCRETE TRANSITIONAL SECTION FOR CATCH BASIN					
0106	2451000000-N	2.000	EA	\$1,500.0000	\$3,000.00
CONCRETE TRANSITIONAL SECTION FOR DROP INLET					
0107	2474000000-N	1.000	LS	\$56,188.4200	\$56,188.42
GENERIC DRAINAGE ITEM FILTRATION BASIN					
0108	2542000000-E	5500.000	LF	\$18.0200	\$99,110.00
1'-6" CONCRETE CURB & GUTTER					
0109	2549000000-E	12900.000	LF	\$20.0200	\$258,258.00
2'-6" CONCRETE CURB & GUTTER					
0110	2556000000-E	6100.000	LF	\$25.0200	\$152,622.00
SHOULDER BERM GUTTER					
0111	2591000000-E	5500.000	SY	\$26.5300	\$145,915.00
4" CONCRETE SIDEWALK					
0112	2605000000-N	31.000	EA	\$1,800.0000	\$55,800.00
CONCRETE CURB RAMPS					
0113	2619000000-E	11.000	SY	\$104.5300	\$1,149.83
4" CONCRETE PAVED DITCH					
0114	2647000000-E	1110.000	SY	\$50.0000	\$55,500.00
5" MONOLITHIC CONCRETE ISLANDS (SURFACE MOUNTED)					
0115	2752000000-E	400.000	LF	\$99.0300	\$39,612.00
GENERIC PAVING ITEM MEDIAN HAZARD PROTECTION					
0116	2800000000-N	1.000	EA	\$426.5200	\$426.52
ADJUSTMENT OF CATCH BASINS					
0117	2830000000-N	3.000	EA	\$426.5200	\$1,279.56
ADJUSTMENT OF MANHOLES					
0118	2860000000-N	3.000	EA	\$1,126.9300	\$3,380.79
CONVERT EXISTING CATCH BASIN TO JUNCTION BOX					
0119	2875000000-N	3.000	EA	\$1,459.8100	\$4,379.43
CONVERT EXISTING CATCH BASIN TO DROP INLET					
0120	2905000000-N	1.000	EA	\$1,126.9300	\$1,126.93
CONVERT EXISTING DROP INLET TO JUNCTION BOX					
0121	3001000000-N	2.000	EA	\$23,800.0000	\$47,600.00
IMPACT ATTENUATOR UNITS, TYPE TL-3					

0122	3030000000-E	11300.000	LF	\$15.0000	\$169,500.00
	STEEL BEAM GUARDRAIL				
0123	3045000000-E	650.000	LF	\$17.5000	\$11,375.00
	STEEL BEAM GUARDRAIL, SHOP CURVED				
0124	3150000000-N	20.000	EA	\$44.0000	\$880.00
	ADDITIONAL GUARDRAIL POSTS				
0125	3195000000-N	2.000	EA	\$550.0000	\$1,100.00
	GUARDRAIL END UNITS, TYPE AT-1				
0126	3210000000-N	8.000	EA	\$550.0000	\$4,400.00
	GUARDRAIL END UNITS, TYPE CAT-1				
0127	3215000000-N	2.000	EA	\$1,600.0000	\$3,200.00
	GUARDRAIL ANCHOR UNITS, TYPE III				
0128	3287000000-N	13.000	EA	\$2,800.0000	\$36,400.00
	GUARDRAIL END UNITS, TYPE TL-3				
0129	3317000000-N	8.000	EA	\$1,600.0000	\$12,800.00
	GUARDRAIL ANCHOR UNITS, TYPE B-77				
0130	3360000000-E	13900.000	LF	\$1.0000	\$13,900.00
	REMOVE EXISTING GUARDRAIL				
0131	3503000000-E	2100.000	LF	\$3.7500	\$7,875.00
	WOVEN WIRE FENCE, 47" FABRIC				
0132	3509000000-E	120.000	EA	\$18.0000	\$2,160.00
	4" TIMBER FENCE POSTS, 7'-6" LONG				
0133	3515000000-E	60.000	EA	\$31.0000	\$1,860.00
	5" TIMBER FENCE POSTS, 8'-0" LONG				
0134	3628000000-E	735.000	TON	\$47.3800	\$34,824.30
	RIP RAP, CLASS I				
0135	3635000000-E	706.000	TON	\$48.3800	\$34,156.28
	RIP RAP, CLASS II				
0136	3649000000-E	772.000	TON	\$46.8800	\$36,191.36
	RIP RAP, CLASS B				
0137	3656000000-E	3988.000	SY	\$2.5000	\$9,970.00
	GEOTEXTILE FOR DRAINAGE				
0138	4048000000-E	9.000	CY	\$753.7500	\$6,783.75
	REINFORCED CONCRETE SIGN FOUN-DATIONS				
0139	4054000000-E	3.000	CY	\$301.5000	\$904.50
	PLAIN CONCRETE SIGN FOUNDA-TIONS				
0140	4057000000-E	285.000	CY	\$904.5000	\$257,782.50
	OVERHEAD FOOTING				
0141	4060000000-E	4141.000	LB	\$4.0200	\$16,646.82
	SUPPORTS, BREAKAWAY STEEL BEAM				
0142	4066000000-E	6475.000	LB	\$2.2600	\$14,633.50
	SUPPORTS, SIMPLE STEEL BEAM				
0143	4072000000-E	1483.000	LF	\$8.0400	\$11,923.32
	SUPPORTS, 3-LB STEEL U-CHANNEL				
0144	4078000000-E	1.000	EA	\$72.3600	\$72.36
	SUPPORTS, 2-LB STEEL U-CHANNEL				
0145	4082100000-N	1.000	LS	\$29,647.5000	\$29,647.50
	SUPPORTS, OVERHEAD SIGN STRUC-TURE AT STA ***** (112+38 -Y-)				
0146	4082100000-N	1.000	LS	\$54,370.5000	\$54,370.50

	SUPPORTS, OVERHEAD SIGN STRUC-TURE	AT STA ***** (16+90 -RPC-)		
0147	4082100000-N	1.000 LS	\$61,003.5000	\$61,003.50
	SUPPORTS, OVERHEAD SIGN STRUC-TURE	AT STA ***** (19+30 -RPA-)		
0148	4082100000-N	1.000 LS	\$29,647.5000	\$29,647.50
	SUPPORTS, OVERHEAD SIGN STRUC-TURE	AT STA ***** (32+50 -Y-)		
0149	4082100000-N	1.000 LS	\$110,550.0000	\$110,550.00
	SUPPORTS, OVERHEAD SIGN STRUC-TURE	AT STA ***** (37+72 -L-)		
0150	4082100000-N	1.000 LS	\$51,255.0000	\$51,255.00
	SUPPORTS, OVERHEAD SIGN STRUC-TURE	AT STA ***** (42+36 -L-)		
0151	4082100000-N	1.000 LS	\$63,315.0000	\$63,315.00
	SUPPORTS, OVERHEAD SIGN STRUC-TURE	AT STA ***** (43+00 -Y-)		
0152	4082100000-N	1.000 LS	\$50,802.7500	\$50,802.75
	SUPPORTS, OVERHEAD SIGN STRUC-TURE	AT STA ***** (46+13 -L-)		
0153	4082100000-N	1.000 LS	\$57,536.2500	\$57,536.25
	SUPPORTS, OVERHEAD SIGN STRUC-TURE	AT STA ***** (51+48 -L-)		
0154	4082100000-N	1.000 LS	\$57,787.5000	\$57,787.50
	SUPPORTS, OVERHEAD SIGN STRUC-TURE	AT STA ***** (51+80 -Y-)		
0155	4082100000-N	1.000 LS	\$115,575.0000	\$115,575.00
	SUPPORTS, OVERHEAD SIGN STRUC-TURE	AT STA ***** (54+41 -L-)		
0156	4082100000-N	1.000 LS	\$63,817.5000	\$63,817.50
	SUPPORTS, OVERHEAD SIGN STRUC-TURE	AT STA ***** (70+00 -Y-)		
0157	4082100000-N	1.000 LS	\$29,722.8800	\$29,722.88
	SUPPORTS, OVERHEAD SIGN STRUC-TURE	AT STA ***** (86+00 -Y-)		
0158	4096000000-N	10.000 EA	\$110.5500	\$1,105.50
	SIGN ERECTION, TYPE D			
0159	4102000000-N	84.000 EA	\$34.1700	\$2,870.28
	SIGN ERECTION, TYPE E			
0160	4108000000-N	5.000 EA	\$66.3300	\$331.65
	SIGN ERECTION, TYPE F			
0161	4109000000-N	33.000 EA	\$703.5000	\$23,215.50
	SIGN ERECTION, TYPE *** (OVER-HEAD) (A)			
0162	4109000000-N	9.000 EA	\$301.5000	\$2,713.50
	SIGN ERECTION, TYPE *** (OVER-HEAD) (B)			
0163	4110000000-N	14.000 EA	\$301.5000	\$4,221.00
	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)			
0164	4110000000-N	6.000 EA	\$175.8800	\$1,055.28
	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (B)			
0165	4114000000-N	1.000 EA	\$50.2500	\$50.25
	SIGN ERECTION, MILEMARKERS			
0166	4116000000-N	5.000 EA	\$603.0000	\$3,015.00
	SIGN ERECTION, OVERLAY (GROUND MOUNTED)			
0167	4116100000-N	2.000 EA	\$301.5000	\$603.00
	SIGN ERECTION, RELOCATE TYPE ***** (GROUND MOUNTED) (A)			
0168	4116100000-N	6.000 EA	\$55.2800	\$331.68
	SIGN ERECTION, RELOCATE TYPE ***** (GROUND MOUNTED) (E)			
0169	4116100000-N	6.000 EA	\$70.3500	\$422.10
	SIGN ERECTION, RELOCATE TYPE ***** (GROUND MOUNTED) (F)			
0170	4116300000-N	56.000 EA	\$150.7500	\$8,442.00
	SIGN ERECTION, LOGO TO PANEL			

0171	4138000000-N	1.000	EA	\$1,758.7500	\$1,758.75
	DISPOSAL OF SUPPORT, STEEL BEAM				
0172	4149000000-N	8.000	EA	\$5,025.0000	\$40,200.00
	DISPOSAL OF SIGN SYSTEM, OVER-HEAD				
0173	4151000000-N	1.000	EA	\$402.0000	\$402.00
	STOCKPILE SIGN SYSTEM, STEEL BEAM				
0174	4152000000-N	16.000	EA	\$1,065.3000	\$17,044.80
	DISPOSAL OF SIGN SYSTEM, STEELBEAM				
0175	4155000000-N	61.000	EA	\$1.0000	\$61.00
	DISPOSAL OF SIGN SYSTEM, U- CHANNEL				
0176	4192000000-N	12.000	EA	\$1.0100	\$12.12
	DISPOSAL OF SUPPORT, U-CHANNEL				
0177	4234000000-N	7.000	EA	\$577.8800	\$4,045.16
	DISPOSAL OF SIGN, A OR B (OVERHEAD)				
0178	4236000000-N	1.000	EA	\$381.9000	\$381.90
	DISPOSAL OF SIGN, A & B (GROUND MOUNTED)				
0179	4360000000-N	49.000	EA	\$180.9000	\$8,864.10
	GENERIC SIGNING ITEM SIGN ERECTION, LOGO MILEAGE PANEL TO SIGN				
0180	4400000000-E	1479.000	SF	\$7.1000	\$10,500.90
	WORK ZONE SIGNS (STATIONARY)				
0181	4405000000-E	2600.000	SF	\$8.3000	\$21,580.00
	WORK ZONE SIGNS (PORTABLE)				
0182	4410000000-E	560.000	SF	\$6.2500	\$3,500.00
	WORK ZONE SIGNS (BARRICADE MOUNTED)				
0183	4415000000-N	11.000	EA	\$1,950.0000	\$21,450.00
	FLASHING ARROW BOARD				
0184	4420000000-N	20.000	EA	\$9,200.0000	\$184,000.00
	PORTABLE CHANGEABLE MESSAGE SIGN				
0185	4423000000-N	7.000	EA	\$4,100.0000	\$28,700.00
	WORK ZONE DIGITAL SPEED LIMIT SIGNS				
0186	4430000000-N	850.000	EA	\$40.0000	\$34,000.00
	DRUMS				
0187	4434000000-N	120.000	EA	\$120.0000	\$14,400.00
	SEQUENTIAL FLASHING WARNING LIGHTS				
0188	4445000000-E	320.000	LF	\$25.0000	\$8,000.00
	BARRICADES (TYPE III)				
0189	4447000000-E	228.000	LF	\$32.0000	\$7,296.00
	PEDESTRIAN CHANNELIZING DEVICES				
0190	4455000000-N	400.000	DAY	\$217.8200	\$87,128.00
	FLAGGER				
0191	4465000000-N	7.000	EA	\$9,365.6300	\$65,559.41
	TEMPORARY CRASH CUSHIONS				
0192	4470000000-N	8.000	EA	\$2,885.6300	\$23,085.04
	REMOVE & RESET TEMPORARY CRASH CUSHION				
0193	4480000000-N	11.000	EA	\$11,046.1000	\$121,507.10
	TMA				
0194	4485000000-E	6020.000	LF	\$32.5500	\$195,951.00
	PORTABLE CONCRETE BARRIER				
0195	4490000000-E	6020.000	LF	\$52.9000	\$318,458.00

PORTABLE CONCRETE BARRIER		(ANCHORED)			
0196	4500000000-E	4860.000	LF	\$6.5800	\$31,978.80
	REMOVE & RESET PORTABLE CONC- RETE BARRIER				
0197	4505000000-E	4860.000	LF	\$20.4000	\$99,144.00
	REMOVE & RESET PORTABLE CONC-				
0198	4507000000-E	553.000	LF	\$52.0000	\$28,756.00
	WATER FILLED BARRIER				
0199	4508000000-E	77.000	LF	\$9.5000	\$731.50
	REMOVE & RESET WATER FILLED BARRIER				
0200	4510000000-N	160.000	HR	\$50.0500	\$8,008.00
	LAW ENFORCEMENT				
0201	4520000000-N	40.000	EA	\$42.0000	\$1,680.00
	TUBULAR MARKERS (FIXED)				
0202	4600000000-N	18.000	EA	\$275.0000	\$4,950.00
	GENERIC TRAFFIC CONTROL ITEM AUDIBLE WARNING DEVICE				
0203	4600000000-N	2250.000	EA	\$51.5500	\$115,987.50
	GENERIC TRAFFIC CONTROL ITEM PEDESTRIAN TRANSPORT SERVICE (PER TRIP)				
0204	4650000000-N	7000.000	EA	\$5.5000	\$38,500.00
	TEMPORARY RAISED PAVEMENT MARKERS				
0205	4685000000-E	16632.000	LF	\$1.0000	\$16,632.00
	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)				
0206	4688000000-E	43453.000	LF	\$1.2000	\$52,143.60
	THERMOPLASTIC PAVEMENT MARKING LINES (6", 90 MILS)				
0207	4695000000-E	4422.000	LF	\$1.5000	\$6,633.00
	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)				
0208	4700000000-E	7768.000	LF	\$1.7500	\$13,594.00
	THERMOPLASTIC PAVEMENT MARKING LINES (12", 90 MILS)				
0209	4720000000-E	94.000	EA	\$100.0000	\$9,400.00
	THERMOPLASTIC PAVEMENT MARKING CHARACTER (90 MILS)				
0210	4725000000-E	249.000	EA	\$135.0000	\$33,615.00
	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)				
0211	4770000000-E	1679.000	LF	\$2.0000	\$3,358.00
	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (II)				
0212	4770000000-E	2700.000	LF	\$2.0000	\$5,400.00
	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV)				
0213	4775000000-E	3500.000	LF	\$2.5000	\$8,750.00
	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (6") (IV)				
0214	4780000000-E	89.000	LF	\$3.0000	\$267.00
	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (8") (II)				
0215	4780000000-E	100.000	LF	\$3.0000	\$300.00
	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (8") (IV)				
0216	4800000000-N	8.000	EA	\$125.0000	\$1,000.00
	COLD APPLIED PLASTIC PAVEMENT MARKING CHARACTER, TYPE ** (II)				
0217	4805000000-N	4.000	EA	\$250.0000	\$1,000.00
	COLD APPLIED PLASTIC PAVEMENT MARKING SYMBOL, TYPE ** (II)				
0218	4810000000-E	144280.000	LF	\$0.3100	\$44,726.80
	PAINT PAVEMENT MARKING LINES (4")				
0219	4820000000-E	5170.000	LF	\$0.7500	\$3,877.50
	PAINT PAVEMENT MARKING LINES (8")				

0220	4825000000-E	1370.000	LF	\$0.7500	\$1,027.50
	PAINT PAVEMENT MARKING LINES (12")				
0221	4835000000-E	5490.000	LF	\$3.0000	\$16,470.00
	PAINT PAVEMENT MARKING LINES (24")				
0222	4840000000-N	28.000	EA	\$35.0000	\$980.00
	PAINT PAVEMENT MARKING CHARAC-TER				
0223	4845000000-N	380.000	EA	\$35.0000	\$13,300.00
	PAINT PAVEMENT MARKING SYMBOL				
0224	4847500000-E	98150.000	LF	\$0.9500	\$93,242.50
	WORK ZONE PERFORMANCE PAVEMENTMARKING LINES, 6"				
0225	4847600000-E	9880.000	LF	\$1.5000	\$14,820.00
	WORK ZONE PERFORMANCE PAVEMENTMARKING LINES, 12"				
0226	4850000000-E	73490.000	LF	\$0.1500	\$11,023.50
	REMOVAL OF PAVEMENT MARKING LINES (4")				
0227	4855000000-E	46075.000	LF	\$0.2000	\$9,215.00
	REMOVAL OF PAVEMENT MARKING LINES (6")				
0228	4860000000-E	2635.000	LF	\$0.5000	\$1,317.50
	REMOVAL OF PAVEMENT MARKING LINES (8")				
0229	4865000000-E	5625.000	LF	\$0.5000	\$2,812.50
	REMOVAL OF PAVEMENT MARKING LINES (12")				
0230	4870000000-E	2800.000	LF	\$3.0000	\$8,400.00
	REMOVAL OF PAVEMENT MARKING LINES (24")				
0231	4875000000-N	244.000	EA	\$25.0000	\$6,100.00
	REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS				
0232	4891000000-E	2492.000	LF	\$10.0000	\$24,920.00
	GENERIC PAVEMENT MARKING ITEM THERMOPLASTIC PAVEMENT MARKING LINES (24", 90 MILS)				
0233	4900000000-N	487.000	EA	\$5.5000	\$2,678.50
	PERMANENT RAISED PAVEMENT MARKERS				
0234	4905000000-N	676.000	EA	\$30.0000	\$20,280.00
	SNOWPLOWABLE PAVEMENT MARKERS				
0235	4935000000-N	38.000	EA	\$55.3100	\$2,101.78
	FLEXIBLE DELINEATORS (CRYSTAL)				
0236	4940000000-N	28.000	EA	\$54.8800	\$1,536.64
	FLEXIBLE DELINEATORS (YELLOW)				
0237	4945000000-N	10.000	EA	\$60.2000	\$602.00
	FLEXIBLE DELINEATORS (CRYSTAL & RED)				
0238	4950000000-N	16.000	EA	\$53.0000	\$848.00
	FLEXIBLE DELINEATORS (YELLOW &RED)				
0239	5005000000-E	3.000	EA	\$22,110.0000	\$66,330.00
	80' HIGH MOUNT STANDARD				
0240	5010000000-E	4.000	EA	\$26,130.0000	\$104,520.00
	100' HIGH MOUNT STANDARD				
0241	5020000000-N	2.000	EA	\$5,025.0000	\$10,050.00
	PORTABLE DRIVE UNIT				
0242	5025000000-E	49.000	CY	\$1,005.0000	\$49,245.00
	HIGH MOUNT FOUNDATIONS				
0243	5050000000-N	15.000	EA	\$3,618.0000	\$54,270.00
	LIGHT STANDARDS, TYPE MTLT ***** (45' SA, 15' ARM)				
0244	5070000000-N	13.000	EA	\$1,708.5000	\$22,210.50

STANDARD FOUNDATION ***** (R1)				
0245	5070000000-N	2.000 EA	\$1,708.5000	\$3,417.00
STANDARD FOUNDATION ***** (R2)				
0246	5120000000-N	1.000 EA	\$1,708.5000	\$1,708.50
ELECTRIC SERVICE POLE ***** (30' CLASS 4)				
0247	5125000000-E	25.000 LF	\$55.2800	\$1,382.00
ELECTRIC SERVICE LATERAL ***** (3 #1/0 USE)				
0248	5155000000-E	590.000 LF	\$6.7800	\$4,000.20
ELECTRICAL DUCT, TYPE BD, SIZE ***** (2")				
0249	5160000000-E	385.000 LF	\$25.1300	\$9,675.05
ELECTRICAL DUCT, TYPE JA, SIZE ***** (3")				
0250	5160000000-E	450.000 LF	\$30.1500	\$13,567.50
ELECTRICAL DUCT, TYPE JA, SIZE ***** (4")				
0251	5175000000-E	470.000 LF	\$3.5200	\$1,654.40
** #6 W/G FEEDER CIRCUIT (2)				
0252	5180000000-E	540.000 LF	\$5.0300	\$2,716.20
** #4 W/G FEEDER CIRCUIT (2)				
0253	5185000000-E	530.000 LF	\$7.0300	\$3,725.90
** #2 W/G FEEDER CIRCUIT (2)				
0254	5210000000-E	4310.000 LF	\$9.5500	\$41,160.50
** #6 W/G FEEDER CIRCUIT IN ***** CONDUIT (2, 1.5")				
0255	5215000000-E	6580.000 LF	\$10.5500	\$69,419.00
** #4 W/G FEEDER CIRCUIT IN ***** CONDUIT (2, 1.5")				
0256	5220000000-E	2130.000 LF	\$12.8100	\$27,285.30
** #2 W/G FEEDER CIRCUIT IN ***** CONDUIT (2, 1.5")				
0257	5240000000-N	1.000 EA	\$1,005.0000	\$1,005.00
ELECTRICAL JUNCTION BOXES ***** (CS36)				
0258	5240000000-N	6.000 EA	\$552.7500	\$3,316.50
ELECTRICAL JUNCTION BOXES ***** (HM18)				
0259	5240000000-N	2.000 EA	\$753.7500	\$1,507.50
ELECTRICAL JUNCTION BOXES ***** (HM30)				
0260	5240000000-N	17.000 EA	\$552.7500	\$9,396.75
ELECTRICAL JUNCTION BOXES ***** (IG18)				
0261	5240000000-N	5.000 EA	\$753.7500	\$3,768.75
ELECTRICAL JUNCTION BOXES ***** (IG30)				
0262	5240000000-N	15.000 EA	\$552.7500	\$8,291.25
ELECTRICAL JUNCTION BOXES ***** (LS18)				
0263	5252000000-N	8.000 EA	\$954.7500	\$7,638.00
UNDERPASS LUMINARIES ***** (WM)				
0264	5253000000-N	1.000 LS	\$10,050.0000	\$10,050.00
UNDERPASS CIRCUITRY AT ***** (I-40/AIRPORT BLVD INTER-CHANGE)				
0265	5270000000-N	24.000 EA	\$1,909.5000	\$45,828.00
GENERIC LIGHTING ITEM 100' HIGH MOUNT LUMINAIRE - LED				
0266	5270000000-N	24.000 EA	\$1,457.2500	\$34,974.00
GENERIC LIGHTING ITEM 80' HIGH MOUNT LUMINAIRE - LED				
0267	5270000000-N	1.000 EA	\$10,050.0000	\$10,050.00
GENERIC LIGHTING ITEM COMMUNICATION GATEWAY				
0268	5270000000-N	64.000 EA	\$351.7500	\$22,512.00
GENERIC LIGHTING ITEM CONTROL NODE				

0269	5270000000-N	1.000	EA	\$15,075.0000	\$15,075.00
	GENERIC LIGHTING ITEM LIGHTING CONTROL SYSTEM				
0270	5270000000-N	1.000	EA	\$6,030.0000	\$6,030.00
	GENERIC LIGHTING ITEM REMOVE RDU HIGH MOUNT STANDARD				
0271	5270000000-N	1.000	EA	\$29,145.0000	\$29,145.00
	GENERIC LIGHTING ITEM REPLACE RDU HIGH MOUNT STAND- ARD				
0272	5270000000-N	15.000	EA	\$703.5000	\$10,552.50
	GENERIC LIGHTING ITEM ROADWAY LIGHT STANDARD LUMIN- AIRE - 285W LED				
0273	5325800000-E	140.000	LF	\$97.0700	\$13,589.80
	8" WATER LINE				
0274	5326600000-E	3058.000	LF	\$92.8600	\$283,965.88
	16" WATER LINE				
0275	5329000000-E	15316.000	LB	\$3.3800	\$51,768.08
	DUCTILE IRON WATER PIPE FITTINGS				
0276	5540000000-E	1.000	EA	\$2,369.5300	\$2,369.53
	6" VALVE				
0277	5546000000-E	3.000	EA	\$2,754.4500	\$8,263.35
	8" VALVE				
0278	5558600000-E	5.000	EA	\$10,123.5400	\$50,617.70
	16" VALVE				
0279	5571800000-E	2.000	EA	\$4,810.0900	\$9,620.18
	8" TAPPING SLEEVE & VALVE				
0280	5589200000-E	1.000	EA	\$4,715.3300	\$4,715.33
	2" AIR RELEASE VALVE				
0281	5649000000-N	3.000	EA	\$1,021.3100	\$3,063.93
	RECONNECT WATER METER				
0282	5672000000-N	2.000	EA	\$2,130.6200	\$4,261.24
	RELOCATE FIRE HYDRANT				
0283	5673000000-E	15.000	LF	\$145.2000	\$2,178.00
	FIRE HYDRANT LEG				
0284	5709400000-E	362.000	LF	\$64.9500	\$23,511.90
	8" FORCE MAIN SEWER				
0285	5801000000-E	595.000	LF	\$4.2500	\$2,528.75
	ABANDON 8" UTILITY PIPE				
0286	5804000000-E	339.000	LF	\$6.4800	\$2,196.72
	ABANDON 12" UTILITY PIPE				
0287	5810000000-E	1974.000	LF	\$10.3100	\$20,351.94
	ABANDON 16" UTILITY PIPE				
0288	5815000000-N	1.000	EA	\$298.1500	\$298.15
	REMOVE WATER METER				
0289	5835700000-E	210.000	LF	\$90.9600	\$19,101.60
	16" ENCASEMENT PIPE				
0290	5836000000-E	265.000	LF	\$132.5500	\$35,125.75
	24" ENCASEMENT PIPE				
0291	5836400000-E	525.000	LF	\$227.7000	\$119,542.50
	36" ENCASEMENT PIPE				
0292	5872500000-E	350.000	LF	\$1,152.6600	\$403,431.00
	BORE AND JACK OF *** (36")				
0293	5882000000-N	2.000	EA	\$12,025.9300	\$24,051.86

GENERIC UTILITY ITEM 8" INSERTION VALVE					
0294	5882000000-N	1.000	EA	\$3,071.4000	\$3,071.40
GENERIC UTILITY ITEM RECONNECT 6" WATER LINE					
0295	5882000000-N	2.000	EA	\$252.1900	\$504.38
GENERIC UTILITY ITEM REMOVE BLACKFLOW PREVENTER					
0296	5882000000-N	8.000	EA	\$207.0400	\$1,656.32
GENERIC UTILITY ITEM THRUST COLLAR					
0297	5888000000-E	10.000	LF	\$52.2700	\$522.70
GENERIC UTILITY ITEM CONCRETE PROTECTION ON WATER MAIN					
0298	6000000000-E	46245.000	LF	\$1.7500	\$80,928.75
TEMPORARY SILT FENCE					
0299	6006000000-E	255.000	TON	\$26.6500	\$6,795.75
STONE FOR EROSION CONTROL, CLASS A					
0300	6009000000-E	3645.000	TON	\$37.2300	\$135,703.35
STONE FOR EROSION CONTROL, CLASS B					
0301	6012000000-E	3655.000	TON	\$28.4400	\$103,948.20
SEDIMENT CONTROL STONE					
0302	6015000000-E	9.500	ACR	\$1,500.0000	\$14,250.00
TEMPORARY MULCHING					
0303	6018000000-E	600.000	LB	\$1.0000	\$600.00
SEED FOR TEMPORARY SEEDING					
0304	6021000000-E	4.000	TON	\$400.0000	\$1,600.00
FERTILIZER FOR TEMPORARY SEED-ING					
0305	6024000000-E	1795.000	LF	\$19.0200	\$34,140.90
TEMPORARY SLOPE DRAINS					
0306	6029000000-E	3000.000	LF	\$2.0000	\$6,000.00
SAFETY FENCE					
0307	6030000000-E	4900.000	CY	\$7.4700	\$36,603.00
SILT EXCAVATION					
0308	6036000000-E	101685.000	SY	\$0.7000	\$71,179.50
MATTING FOR EROSION CONTROL					
0309	6037000000-E	100.000	SY	\$9.0000	\$900.00
COIR FIBER MAT					
0310	6042000000-E	10530.000	LF	\$4.2600	\$44,857.80
1/4" HARDWARE CLOTH					
0311	6045000000-E	65.000	LF	\$7.3400	\$477.10
*** TEMPORARY PIPE (42")					
0312	6045000000-E	500.000	LF	\$7.3400	\$3,670.00
*** TEMPORARY PIPE (48")					
0313	6070000000-N	10.000	EA	\$582.6900	\$5,826.90
SPECIAL STILLING BASINS					
0314	6071020000-E	90.000	LB	\$11.0000	\$990.00
POLYACRYLAMIDE (PAM)					
0315	6071030000-E	1155.000	LF	\$6.0000	\$6,930.00
COIR FIBER BAFFLE					
0316	6071050000-E	1.000	EA	\$1,030.4100	\$1,030.41
*** SKIMMER (2-1/2")					
0317	6084000000-E	21.000	ACR	\$4,200.0000	\$88,200.00
SEEDING & MULCHING					

0318	6087000000-E	12.000	ACR	\$250.0000	\$3,000.00
	MOWING				
0319	6090000000-E	100.000	LB	\$9.0000	\$900.00
	SEED FOR REPAIR SEEDING				
0320	6093000000-E	0.750	TON	\$1,250.0000	\$937.50
	FERTILIZER FOR REPAIR SEEDING				
0321	6096000000-E	475.000	LB	\$4.0000	\$1,900.00
	SEED FOR SUPPLEMENTAL SEEDING				
0322	6108000000-E	14.000	TON	\$900.0000	\$12,600.00
	FERTILIZER TOPDRESSING				
0323	6111000000-E	830.000	LF	\$57.4200	\$47,658.60
	IMPERVIOUS DIKE				
0324	6114500000-N	10.000	MHR	\$95.0000	\$950.00
	SPECIALIZED HAND MOWING				
0325	6117000000-N	25.000	EA	\$300.0000	\$7,500.00
	RESPONSE FOR EROSION CONTROL				
0326	6117500000-N	4.000	EA	\$667.7900	\$2,671.16
	CONCRETE WASHOUT STRUCTURE				
0327	6123000000-E	2.000	ACR	\$2,000.0000	\$4,000.00
	REFORESTATION				
0328	7048500000-E	25.000	EA	\$1,065.7500	\$26,643.75
	PEDESTRIAN SIGNAL HEAD (16", 1SECTION W/COUNTDOWN)				
0329	7060000000-E	20050.000	LF	\$3.3000	\$66,165.00
	SIGNAL CABLE				
0330	7120000000-E	91.000	EA	\$761.2500	\$69,273.75
	VEHICLE SIGNAL HEAD (12", 3 SECTION)				
0331	7132000000-E	12.000	EA	\$989.6300	\$11,875.56
	VEHICLE SIGNAL HEAD (12", 4 SECTION)				
0332	7144000000-E	6.000	EA	\$1,065.7500	\$6,394.50
	VEHICLE SIGNAL HEAD (12", 5 SECTION)				
0333	7252000000-E	3800.000	LF	\$2.2800	\$8,664.00
	MESSENGER CABLE (1/4")				
0334	7264000000-E	3175.000	LF	\$4.3100	\$13,684.25
	MESSENGER CABLE (3/8")				
0335	7279000000-E	13100.000	LF	\$0.8100	\$10,611.00
	TRACER WIRE				
0336	7300000000-E	2950.000	LF	\$6.6000	\$19,470.00
	UNPAVED TRENCHING (*****) (1, 2")				
0337	7300000000-E	8000.000	LF	\$7.1100	\$56,880.00
	UNPAVED TRENCHING (*****) (2, 2")				
0338	7301000000-E	1075.000	LF	\$15.7300	\$16,909.75
	DIRECTIONAL DRILL (*****) (1, 2")				
0339	7301000000-E	2975.000	LF	\$17.2600	\$51,348.50
	DIRECTIONAL DRILL (*****) (2, 2")				
0340	7324000000-N	41.000	EA	\$279.1300	\$11,444.33
	JUNCTION BOX (STANDARD SIZE)				
0341	7348000000-N	34.000	EA	\$558.2500	\$18,980.50
	JUNCTION BOX (OVER-SIZED, HEA-VY DUTY)				
0342	7360000000-N	13.000	EA	\$1,116.5000	\$14,514.50

WOOD POLE					
0343	7372000000-N	35.000	EA	\$329.8800	\$11,545.80
GUY ASSEMBLY					
0344	7396000000-E	4.000	EA	\$228.3800	\$913.52
1/2" RISER WITH WEATHERHEAD					
0345	7408000000-E	4.000	EA	\$329.8800	\$1,319.52
1" RISER WITH WEATHERHEAD					
0346	7420000000-E	6.000	EA	\$431.3800	\$2,588.28
2" RISER WITH WEATHERHEAD					
0347	7432000000-E	3.000	EA	\$456.7500	\$1,370.25
2" RISER WITH HEAT SHRINK TUBING					
0348	7444000000-E	6150.000	LF	\$5.8400	\$35,916.00
INDUCTIVE LOOP SAWCUT					
0349	7456000000-E	25825.000	LF	\$1.3700	\$35,380.25
LEAD-IN CABLE (*****) (14-2)					
0350	7481000000-N	5.000	EA	\$609.0000	\$3,045.00
SITE SURVEY					
0351	7481240000-N	20.000	EA	\$2,943.5000	\$58,870.00
CAMERA WITHOUT INTERNAL LOOP EMULATOR PROCESSING UNIT					
0352	7481260000-N	5.000	EA	\$5,278.0000	\$26,390.00
EXTERNAL LOOP EMULATOR PRO- CESSING UNIT					
0353	7481280000-N	17.000	EA	\$862.7500	\$14,666.75
RELOCATE CAMERA SENSOR UNIT					
0354	7516000000-E	3400.000	LF	\$2.2800	\$7,752.00
COMMUNICATIONS CABLE (**FIBER) (12)					
0355	7516000000-E	8525.000	LF	\$3.3000	\$28,132.50
COMMUNICATIONS CABLE (**FIBER) (144)					
0356	7516000000-E	11925.000	LF	\$2.4900	\$29,693.25
COMMUNICATIONS CABLE (**FIBER) (24)					
0357	7528000000-E	4325.000	LF	\$2.3900	\$10,336.75
DROP CABLE					
0358	7540000000-N	8.000	EA	\$4,161.5000	\$33,292.00
SPLICE ENCLOSURE					
0359	7552000000-N	5.000	EA	\$1,877.7500	\$9,388.75
INTERCONNECT CENTER					
0360	7566000000-N	33.000	EA	\$126.8800	\$4,187.04
DELINEATOR MARKER					
0361	7575142010-N	5.000	EA	\$3,451.0000	\$17,255.00
900MHZ SERIAL/ETHERNET SPREAD SPECTRUM RADIO					
0362	7575160000-E	20950.000	LF	\$0.8600	\$18,017.00
REMOVE EXISTING COMMUNICATIONSCABLE					
0363	7576000000-N	4.000	EA	\$11,165.0000	\$44,660.00
METAL STRAIN SIGNAL POLE					
0364	7588000000-N	5.000	EA	\$13,195.0000	\$65,975.00
METAL POLE WITH SINGLE MAST ARM					
0365	7590000000-N	2.000	EA	\$22,330.0000	\$44,660.00
METAL POLE WITH DUAL MAST ARM					
0366	7613000000-N	12.000	EA	\$913.5000	\$10,962.00
SOIL TEST					

0367	7614100000-E	72.000	CY	\$862.7500	\$62,118.00
	DRILLED PIER FOUNDATION				
0368	7631000000-N	7.000	EA	\$355.2500	\$2,486.75
	MAST ARM WITH METAL POLE DE- SIGN				
0369	7636000000-N	43.000	EA	\$355.2500	\$15,275.75
	SIGN FOR SIGNALS				
0370	7642100000-N	3.000	EA	\$1,827.0000	\$5,481.00
	TYPE I POST WITH FOUNDATION				
0371	7642200000-N	16.000	EA	\$2,131.5000	\$34,104.00
	TYPE II PEDESTAL WITH FOUND- ATION				
0372	7684000000-N	4.000	EA	\$862.7500	\$3,451.00
	SIGNAL CABINET FOUNDATION				
0373	7852000000-N	26.000	EA	\$137.0300	\$3,562.78
	DETECTOR CARD (NEMA TS-2)				
0374	7980000000-N	2.000	EA	\$5,582.5000	\$11,165.00
	GENERIC SIGNAL ITEM CCTV CAMERA ASSEMBLY				
0375	7980000000-N	1.000	EA	\$5,075.0000	\$5,075.00
	GENERIC SIGNAL ITEM CCTV EQUIPMENT CABINET				
0376	7980000000-N	1.000	EA	\$15,225.0000	\$15,225.00
	GENERIC SIGNAL ITEM CCTV METAL POLE (40')				
0377	7980000000-N	1.000	EA	\$2,131.5000	\$2,131.50
	GENERIC SIGNAL ITEM CCTV WOOD POLE				
0378	7980000000-N	4.000	EA	\$22,330.0000	\$89,320.00
	GENERIC SIGNAL ITEM CONTRLER W/CABINET NEMA TS-2, TYPE 2070E CONTRLER, TYPE 1 CABINET BASE MOUNT				
0379	7980000000-N	1.000	EA	\$2,131.5000	\$2,131.50
	GENERIC SIGNAL ITEM ETHERNET EDGE SWITCH				
0380	7980000000-N	1.000	EA	\$1,218.0000	\$1,218.00
	GENERIC SIGNAL ITEM GROUNDING SYSTEM				
0381	7980000000-N	1.000	EA	\$1,218.0000	\$1,218.00
	GENERIC SIGNAL ITEM METER BASE/DISCONNECT COMBINA-TION PANEL				
0382	7990000000-E	150.000	LF	\$6.0900	\$913.50
	GENERIC SIGNAL ITEM 3-WIRE COPPER FEEDER CONDUCTORS				
0383	7990000000-E	375.000	LF	\$2.0300	\$761.25
	GENERIC SIGNAL ITEM ETHERNET CABLE				

Section 0001 Total \$29,385,713.34

Section 0002
CULVERT ITEMS

0384	8126000000-N	1.000	LS	\$15,000.0000	\$15,000.00
	CULVERT EXCAVATION, STA ***** (29+90.00-Y3-)				
0385	8126000000-N	1.000	LS	\$15,000.0000	\$15,000.00
	CULVERT EXCAVATION, STA ***** (33+31.33-L-)				
0386	8126000000-N	1.000	LS	\$15,000.0000	\$15,000.00
	CULVERT EXCAVATION, STA ***** (53+39.00-L-)				
0387	8126000000-N	1.000	LS	\$15,000.0000	\$15,000.00
	CULVERT EXCAVATION, STA ***** (86+76.00-Y-)				
0388	8133000000-E	519.000	TON	\$55.0000	\$28,545.00
	FOUNDATION CONDITIONING MATERIAL, BOX CULVERT				

0389	8196000000-E	1039.800	CY	\$700.0000	\$727,860.00
	CLASS A CONCRETE (CULVERT)				
0390	8245000000-E	113023.000	LB	\$1.0500	\$118,674.15
	REINFORCING STEEL (CULVERT)				
Section 0002 Total					\$935,079.15
Section 0004					
STRUCTURE ITEMS					
0391	8035000000-N	1.000	LS	\$144,584.6000	\$144,584.60
	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (44+35.96 -L- RT)				
0392	8065000000-N	1.000	LS	\$750.0000	\$750.00
	ASBESTOS ASSESSMENT				
0393	8096000000-E	41.000	LF	\$93.7800	\$3,844.98
	PILE EXCAVATION IN SOIL				
0394	8097000000-E	9.000	LF	\$256.8100	\$2,311.29
	PILE EXCAVATION NOT IN SOIL				
0395	8105560000-E	78.000	LF	\$444.2900	\$34,654.62
	4'-0" DIA DRILLED PIERS IN SOIL				
0396	8105660000-E	90.000	LF	\$1,520.5100	\$136,845.90
	4'-0" DIA DRILLED PIERS NOT IN SOIL				
0397	8113000000-N	2.000	EA	\$510.0000	\$1,020.00
	SID INSPECTIONS				
0398	8114000000-N	6.000	EA	\$510.0000	\$3,060.00
	SPT TESTING				
0399	8115000000-N	2.000	EA	\$3,570.0000	\$7,140.00
	CSL TESTING				
0400	8121000000-N	1.000	LS	\$15,236.5100	\$15,236.51
	UNCLASSIFIED STRUCTURE EXCAVATION AT STATION ***** (44+35.96 -L- RT)				
0401	8147000000-E	34860.000	SF	\$28.7400	\$1,001,876.40
	REINFORCED CONCRETE DECK SLAB				
0402	8161000000-E	36152.000	SF	\$0.4100	\$14,822.32
	GROOVING BRIDGE FLOORS				
0403	8182000000-E	596.100	CY	\$595.4300	\$354,935.82
	CLASS A CONCRETE (BRIDGE)				
0404	8210000000-N	1.000	LS	\$66,684.0300	\$66,684.03
	BRIDGE APPROACH SLABS, STATION***** (44+35.96 -L- LT)				
0405	8210000000-N	1.000	LS	\$56,588.9800	\$56,588.98
	BRIDGE APPROACH SLABS, STATION***** (44+35.96 -L- RT)				
0406	8217000000-E	106041.000	LB	\$0.8900	\$94,376.49
	REINFORCING STEEL (BRIDGE)				
0407	8238000000-E	7597.000	LB	\$1.5300	\$11,623.41
	SPIRAL COLUMN REINFORCING STEEL (BRIDGE)				
0408	8280000000-E	1.000	LS	\$2,209,519.1900	\$2,209,519.19
	APPROX LBS STRUCTURALSTEEL				
0409	8328200000-E	20.000	EA	\$272.6900	\$5,453.80
	PILE DRIVING EQUIPMENT SETUP (HP 12 X 53)				
0410	8364000000-E	317.800	LF	\$78.8300	\$25,052.17

HP12X53 STEEL PILES					
0411	8391000000-N	20.000	EA	\$107.2500	\$2,145.00
STEEL PILE POINTS					
0412	8503000000-E	909.720	LF	\$97.6600	\$88,843.26
CONCRETE BARRIER RAIL					
0413	8505000000-E	706.700	LF	\$151.5000	\$107,065.05
VERTICAL CONCRETE BARRIER RAIL					
0414	8531000000-E	1350.000	SY	\$62.6600	\$84,591.00
4" SLOPE PROTECTION					
0415	8654000000-N	1.000	LS	\$46,106.7900	\$46,106.79
DISC BEARINGS					
0416	8657000000-N	1.000	LS	\$26,140.7100	\$26,140.71
ELASTOMERIC BEARINGS					
0417	8692000000-N	1.000	LS	\$29,337.9000	\$29,337.90
FOAM JOINT SEALS					
Section 0004 Total					\$4,574,610.22
Item Total					\$34,895,402.71

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.

=====

NON-COLLUSION, DEBARMENT AND GIFT BAN CERTIFICATION

The prequalified bidder declares (or certifies, verifies, or states) under penalty of perjury under the laws of the United States 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 any bid or contract, that the prequalified bidder has not been convicted of violating N.C.G.S. §133-24 within the last three years, and that the prequalified bidder intends to do the work with his own bonafide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion, debarment and gift ban certification, the Contractor is attesting 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.

DEBARMENT CERTIFICATION OF PREQUALIFIED BIDDER

Conditions for certification:

1. The prequalified bidder shall provide immediate written notice to the Department if at any time the bidder learns that his certification was erroneous when he submitted his debarment certification or explanation that is file with the Department, or has become erroneous because of changed circumstances.
2. The terms covered transaction, debarred, suspended, ineligible, lower tier

covered transaction, participant, person, primary covered transaction, principal, proposal, and voluntarily excluded, as used in this provision, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. A copy of the Federal Rules requiring this certification and detailing the definitions and coverages may be obtained from the Contract Officer of the Department.

3. The prequalified bidder agrees by submitting this form, that he will not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in NCDOT contracts, unless authorized by the Department.

4. For Federal Aid projects, the prequalified bidder further agrees that by submitting this form he will include the Federal- Aid Provision titled Required Contract Provisions Federal-Aid Construction Contract (Form FHWA PR 1273) provided by the Department, without subsequent modification, in all lower tier covered transactions.

5. The prequalified bidder may rely upon a certification of a participant in a lower tier covered transaction that he is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless he knows that the certification is erroneous. The bidder may decide the method and frequency by which he will determine the eligibility of his subcontractors.

6. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this provision. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

7. Except as authorized in paragraph 6 herein, the Department may terminate any contract if the bidder knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available by the Federal Government.

DEBARMENT CERTIFICATION

The prequalified bidder certifies to the best of his knowledge and belief, that he and his principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or

commission of embezzlement, theft, forgery, bribery, falsification or destruction of records; making false statements; or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph b. of this certification; and

d. Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

e. Will submit a revised Debarment Certification immediately if his status changes and will show in his bid proposal an explanation for the change in status.

If the prequalified bidder cannot certify that he is not debarred, he shall provide an explanation with this submittal. An explanation will not necessarily result in denial of participation in a contract.

Failure to submit a non-collusion and debarment certification will result in the prequalified bidder's bid being considered non-responsive.

EXPLANATION:

=====

Award Limits on Multiple Projects

By answering YES to this statement, the bidder acknowledges that they are using the award limits on multiple projects? **Yes** ☐ **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 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

Contract Number
County

Contract Number
County

Contract Number
County

Contract Number
County

Contract Number
County

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.

DBE List Summary

Project: NHPP-040-1(259)286

Bidder ID: 9105

Bid Total: 34,895,402.71

Business Name: Zachry Construction Corp

Goal: 11.00% (3,838,494.30)

Total Entered: 8.30% (2,896,671.58)

ID	Name	Is Supplier?	Item Count	Amount	Is Complete?
4898	BULLINGTON CONSTRUCTION INC	False	13	313,050.00	True
15755	GOSALIA CONCRETE CONSTRUCTORS INC.	False	2	115,326.06	True
4289	VISTABUTION LLC	False	4	67,450.00	True
11883	JC CONCRETE CONSTRUCTION LLC	False	8	708,900.00	True
4260	JORGE AGUILA CARRILLO DBA AGUILA'S MASONRY SERVICES	False	8	128,770.82	True
11540	Whitehurst Trucking	False	6	200,033.60	True
12196	COVENANT TRUCKING CO INC	False	11	802,470.01	True
7294	STRATCON CONTRACTING CORP	False	3	182,000.00	True
16955	J.R. CASKEY, INC.	False	5	260,714.70	True
12578	LOPEZ REBAR LLC	False	6	117,956.39	True

Name: BULLINGTON CONSTRUCTION INC ID: 4898

Address: 417 FOXGLOVE LANE , INDIAN TRAIL, NC 28079

Used As: SubContractor DBE Items Total:\$313,050.00

Items for BULLINGTON CONSTRUCTION INC

0001					
ROADWAY ITEMS - NPAR (TOWN OF CARY)					
0121	3001000000-N	2.000	EA	\$23,800.0000	\$47,600.00
	IMPACT ATTENUATOR UNITS, TYPE TL-3				
0122	3030000000-E	11300.000	LF	\$15.0000	\$169,500.00
	STEEL BEAM GUARDRAIL				
0123	3045000000-E	650.000	LF	\$17.5000	\$11,375.00
	STEEL BEAM GUARDRAIL, SHOP CURVED				
0124	3150000000-N	20.000	EA	\$44.0000	\$880.00
	ADDITIONAL GUARDRAIL POSTS				
0125	3195000000-N	2.000	EA	\$550.0000	\$1,100.00
	GUARDRAIL END UNITS, TYPE AT-1				
0126	3210000000-N	8.000	EA	\$550.0000	\$4,400.00
	GUARDRAIL END UNITS, TYPE CAT-1				
0127	3215000000-N	2.000	EA	\$1,600.0000	\$3,200.00
	GUARDRAIL ANCHOR UNITS, TYPE III				
0128	3287000000-N	13.000	EA	\$2,800.0000	\$36,400.00
	GUARDRAIL END UNITS, TYPE TL-3				
0129	3317000000-N	8.000	EA	\$1,600.0000	\$12,800.00
	GUARDRAIL ANCHOR UNITS, TYPE B-77				
0130	3360000000-E	13900.000	LF	\$1.0000	\$13,900.00
	REMOVE EXISTING GUARDRAIL				
0131	3503000000-E	2100.000	LF	\$3.7500	\$7,875.00
	WOVEN WIRE FENCE, 47" FABRIC				
0132	3509000000-E	120.000	EA	\$18.0000	\$2,160.00
	4" TIMBER FENCE POSTS, 7'-6" LONG				
0133	3515000000-E	60.000	EA	\$31.0000	\$1,860.00
	5" TIMBER FENCE POSTS, 8'-0" LONG				
Section 0001 Total					\$313,050.00
Item Total					\$313,050.00

Letting: L191119
11/19/2019 02:00:00 PM

North Carolina Department of Transportation
9105 - Zachry Construction Corp

Contract ID: C204351
Call: 001

Name: GOSALIA CONCRETE CONSTRUCTORS INC. ID: 15755

Address: SUITE 200 WESTSHORE BLVD , TAMPA, FL 33607

Used As: SubContractor DBE Items Total:\$115,326.06

Items for GOSALIA CONCRETE CONSTRUCTORS INC.

0004				
STRUCTURE ITEMS				
0412	8503000000-E	909.720 LF	\$75.5000	\$68,683.86
CONCRETE BARRIER RAIL				
0413	8505000000-E	706.700 LF	\$66.0000	\$46,642.20
VERTICAL CONCRETE BARRIER RAIL				
Section 0004 Total				\$115,326.06
Item Total				\$115,326.06

Name: VISTABUTION LLC ID: 4289

Address: 1407 GAYLORD DR. , RALEIGH, NC 27612

Used As: SubContractor DBE Items Total:\$67,450.00

Items for VISTABUTION LLC

0001				
ROADWAY ITEMS - NPAR (TOWN OF CARY)				
0019	0234000000-E	540.000 CY	\$20.0000	\$10,800.00
GENERIC GRADING ITEM STOCKPILING AND TESTING ONLY OF PCB CONTAMINATED SOIL				
0020	0255000000-E	50.000 TON	\$65.0000	\$3,250.00
GENERIC GRADING ITEM HAULING AND DISPOSAL OF PETROLEUM CONTAMINATED SOIL				
0021	0255000000-E	810.000 TON	\$65.0000	\$52,650.00
GENERIC GRADING ITEM STOCKPILING, TESTING, HAULING, AND DISPOSAL OF PCB CONTAMINATED SOIL				
Section 0001 Total				\$66,700.00
0004				
STRUCTURE ITEMS				
0392	8065000000-N	1.000 LS	\$750.0000	\$750.00
ASBESTOS ASSESSMENT				
Section 0004 Total				\$750.00
Item Total				
				\$67,450.00

Name: JC CONCRETE CONSTRUCTION LLC ID: 11883

Address: P.O. BOX 613 , PINNACLE, NC 27043

Used As: SubContractor DBE Items Total:\$708,900.00

Items for JC CONCRETE CONSTRUCTION LLC

0001				
ROADWAY ITEMS - NPAR (TOWN OF CARY)				
0001	0000100000-N	1.000	LS	\$15,000.0000
	MOBILIZATION			\$15,000.00
0108	2542000000-E	5500.000	LF	\$16.0000
	1'-6" CONCRETE CURB & GUTTER			\$88,000.00
0109	2549000000-E	12900.000	LF	\$18.0000
	2'-6" CONCRETE CURB & GUTTER			\$232,200.00
0110	2556000000-E	6100.000	LF	\$23.0000
	SHOULDER BERM GUTTER			\$140,300.00
0111	2591000000-E	5500.000	SY	\$22.0000
	4" CONCRETE SIDEWALK			\$121,000.00
0112	2605000000-N	31.000	EA	\$1,800.0000
	CONCRETE CURB RAMPS			\$55,800.00
0113	2619000000-E	11.000	SY	\$100.0000
	4" CONCRETE PAVED DITCH			\$1,100.00
0114	2647000000-E	1110.000	SY	\$50.0000
	5" MONOLITHIC CONCRETE ISLANDS (SURFACE MOUNTED)			\$55,500.00
Section 0001 Total				\$708,900.00
Item Total				\$708,900.00

Name: JORGE AGUILA CARRILLO DBA AGUILA'S MASONRY SERVICES ID: 4260

Address: PO BOX 837 , SILER CITY, NC 27344

Used As: SubContractor DBE Items Total:\$128,770.82

Items for JORGE AGUILA CARRILLO DBA AGUILA'S MASONRY SERVICES

0001					
ROADWAY ITEMS - NPAR (TOWN OF CARY)					
0097	2354000000-N	1.000	EA	\$707.6900	\$707.69
	FRAME WITH GRATE, STD 840.22				
0098	2364000000-N	11.000	EA	\$643.9700	\$7,083.67
	FRAME WITH TWO GRATES, STD 840.16				
0099	2364200000-N	33.000	EA	\$803.7400	\$26,523.42
	FRAME WITH TWO GRATES, STD 840.20				
0100	2365000000-N	32.000	EA	\$803.7400	\$25,719.68
	FRAME WITH TWO GRATES, STD 840.22				
0101	2374000000-N	6.000	EA	\$680.3300	\$4,081.98
	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)				
0102	2374000000-N	41.000	EA	\$696.1300	\$28,541.33
	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)				
0103	2374000000-N	40.000	EA	\$696.1300	\$27,845.20
	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)				
0104	2396000000-N	15.000	EA	\$551.1900	\$8,267.85
	FRAME WITH COVER, STD 840.54				
Section 0001 Total					\$128,770.82
Item Total					\$128,770.82

Name: Whitehurst Trucking ID: 11540

Address: 4912 cupine ct, raleigh, nc 27604

Used As: SubContractor DBE Items Total:\$200,033.60

Items for Whitehurst Trucking

0001				
ROADWAY ITEMS - NPAR (TOWN OF CARY)				
0071	1491000000-E	18000.000 TON	\$2.4000	\$43,200.00
	ASPHALT CONC BASE COURSE, TYPE B25.0C			
0072	1503000000-E	20200.000 TON	\$2.4500	\$49,490.00
	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C			
0073	1519000000-E	2700.000 TON	\$2.8600	\$7,722.00
	ASPHALT CONC SURFACE COURSE, TYPE S9.5B			
0074	1523000000-E	11700.000 TON	\$2.6600	\$31,122.00
	ASPHALT CONC SURFACE COURSE, TYPE S9.5C			
0075	1524200000-E	18900.000 TON	\$2.8600	\$54,054.00
	ASPHALT CONC SURFACE COURSE, TYPE S9.5D			
0076	1526000000-E	4630.000 TON	\$3.1200	\$14,445.60
	ASPHALT CONC SURFACE COURSE, TYPE S4.75A			
Section 0001 Total				\$200,033.60
Item Total				\$200,033.60

Name: COVENANT TRUCKING CO INC ID: 12196

Address: P. O. BOX 1000 , YOUNGSVILLE, NC 27596

Used As: SubContractor DBE Items Total:\$802,470.01

Items for COVENANT TRUCKING CO INC

0001 ROADWAY ITEMS - NPAR (TOWN OF CARY)				
0004	0001000000-E	1.000 LS	\$382,947.9100	\$382,947.91
	CLEARING & GRUBBING .. ACRE(S)			
0006	0022000000-E	126500.000 CY	\$2.7500	\$347,875.00
	UNCLASSIFIED EXCAVATION			
0007	0028000000-N	1.000 LS	\$6,520.0000	\$6,520.00
	TYPE I STANDARD APPROACH FILL STATION ***** (44+35.96 -L- LT)			
0008	0028000000-N	1.000 LS	\$5,390.0000	\$5,390.00
	TYPE I STANDARD APPROACH FILL STATION ***** (44+35.96 -L- RT)			
0018	0223000000-E	43.140 SY	\$73.1100	\$3,153.97
	ROCK PLATING			
0060	1099700000-E	809.602 TON	\$20.8300	\$16,864.01
	CLASS IV SUBGRADE STABILIZA- TION			
0107	2474000000-N	1.000 LS	\$13,293.1700	\$13,293.17
	GENERIC DRAINAGE ITEM FILTRATION BASIN			
0134	3628000000-E	735.000 TON	\$4.1500	\$3,050.25
	RIP RAP, CLASS I			
0135	3635000000-E	706.000 TON	\$4.1500	\$2,929.90
	RIP RAP, CLASS II			
0136	3649000000-E	772.000 TON	\$3.6500	\$2,817.80
	RIP RAP, CLASS B			
Section 0001 Total				\$784,842.01
0004 STRUCTURE ITEMS				
0391	8035000000-N	1.000 LS	\$17,628.0000	\$17,628.00
	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (44+35.96 -L- RT)			
Section 0004 Total				\$17,628.00
Item Total				\$802,470.01

Letting: L191119
11/19/2019 02:00:00 PM

North Carolina Department of Transportation
9105 - Zachry Construction Corp

Contract ID: C204351
Call: 001

Name: STRATCON CONTRACTING CORP ID: 7294

Address: OLD WILLIAMS ROAD , RALEIGH, NC 27610

Used As: SubContractor DBE Items Total:\$182,000.00

Items for STRATCON CONTRACTING CORP

0001				
ROADWAY ITEMS - NPAR (TOWN OF CARY)				
0001	0000100000-N	1.000 LS	\$12,000.0000	\$12,000.00
MOBILIZATION				
0004	0001000000-E	1.000 LS	\$153,000.0000	\$153,000.00
CLEARING & GRUBBING .. ACRE(S)				
0005	0008000000-E	2.000 ACR	\$8,500.0000	\$17,000.00
SUPPLEMENTARY CLEARING & GRUB-BING				
Section 0001 Total				\$182,000.00
Item Total				\$182,000.00

Name: J.R. CASKEY, INC. ID: 16955

Address: P.O. BOX 305 , OILVILLE, VA 23129

Used As: SubContractor DBE Items Total:\$260,714.70

Items for J.R. CASKEY, INC.

0001				
ROADWAY ITEMS - NPAR (TOWN OF CARY)				
0001	0000100000-N	1.000 LS	\$65,000.0000	\$65,000.00
MOBILIZATION				
0057	1044000000-E	14000.000 SY	\$2.9500	\$41,300.00
LIME TREATED SOIL (SLURRY METHOD)				
0058	1066000000-E	170.000 TON	\$214.3500	\$36,439.50
LIME FOR LIME TREATED SOIL				
0064	1176000000-E	14000.000 SY	\$2.9500	\$41,300.00
SOIL CEMENT BASE				
0065	1187000000-E	392.000 TON	\$195.6000	\$76,675.20
PORTLAND CEMENT FOR SOIL CE- MENT BASE				
Section 0001 Total				\$260,714.70
Item Total				\$260,714.70

Name: LOPEZ REBAR LLC ID: 12578

Address: 1024 CY CIRCLE , CONCORD, NC 28025

Used As: SubContractor DBE Items Total:\$117,956.39

Items for LOPEZ REBAR LLC

0002				
CULVERT ITEMS				
0390	8245000000-E	113023.000 LB	\$0.3200	\$36,167.36
	REINFORCING STEEL (CULVERT)			
Section 0002 Total				\$36,167.36
0004				
STRUCTURE ITEMS				
0401	8147000000-E	1797.251 SF	\$28.7400	\$51,652.99
	REINFORCED CONCRETE DECK SLAB			
0406	8217000000-E	23829.213 LB	\$0.8900	\$21,208.00
	REINFORCING STEEL (BRIDGE)			
0407	8238000000-E	992.810 LB	\$1.5300	\$1,519.00
	SPIRAL COLUMN REINFORCING STEEL (BRIDGE)			
0412	8503000000-E	44.092 LF	\$97.6600	\$4,306.02
	CONCRETE BARRIER RAIL			
0413	8505000000-E	20.482 LF	\$151.5000	\$3,103.02
	VERTICAL CONCRETE BARRIER RAIL			
Section 0004 Total				\$81,789.03
Item Total				\$117,956.39

THIS PROPOSAL CONTAINS THE FOLLOWING ERRORS/WARNINGS (IF ANY)
DBE List Goal not met.

This Bid contains 0 amendment files

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 _____

Signature _____

Agency _____

Date _____

Signature _____

Agency _____

Date _____

Contract Item Sheets For C204351

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
ROADWAY ITEMS						
0001	0000100000-N	800	MOBILIZATION	Lump Sum LS	1,775,000.00	1,775,000.00
0002	0000400000-N	801	CONSTRUCTION SURVEYING	Lump Sum LS	1,000,000.00	1,000,000.00
0003	0000900000-N	SP	GENERIC MISCELLANEOUS ITEM UTILITY COORDINATOR	Lump Sum LS	1,250,000.00	1,250,000.00
0004	0001000000-E	200	CLEARING & GRUBBING .. ACRE(S)	Lump Sum LS	4,311,305.00	4,311,305.00
0005	0008000000-E	200	SUPPLEMENTARY CLEARING & GRUB- BING	2 ACR	8,600.00	17,200.00
0006	0022000000-E	225	UNCLASSIFIED EXCAVATION	126,500 CY	20.00	2,530,000.00
0007	0028000000-N	SP	TYPE I STANDARD APPROACH FILL STATION ***** (44+35.96 -L- LT)	Lump Sum LS	54,774.63	54,774.63
0008	0028000000-N	SP	TYPE I STANDARD APPROACH FILL STATION ***** (44+35.96 -L- RT)	Lump Sum LS	47,208.84	47,208.84
0009	0036000000-E	225	UNDERCUT EXCAVATION	2,050 CY	4.26	8,733.00
0010	0106000000-E	230	BORROW EXCAVATION	43,000 CY	0.01	430.00
0011	0134000000-E	240	DRAINAGE DITCH EXCAVATION	540 CY	3.54	1,911.60
0012	0141000000-E	240	BERM DITCH CONSTRUCTION	1,000 LF	4.87	4,870.00
0013	0156000000-E	250	REMOVAL OF EXISTING ASPHALT PAVEMENT	49,500 SY	4.25	210,375.00
0014	0192000000-N	260	PROOF ROLLING	20 HR	181.38	3,627.60
0015	0195000000-E	265	SELECT GRANULAR MATERIAL	1,250 CY	31.54	39,425.00
0016	0196000000-E	270	GEOTEXTILE FOR SOIL STABILIZA- TION	5,750 SY	1.01	5,807.50
0017	0199000000-E	SP	TEMPORARY SHORING	2,650 SF	41.21	109,206.50
0018	0223000000-E	275	ROCK PLATING	530 SY	73.11	38,748.30

Contract Item Sheets For C204351

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0019	0234000000-E	SP	GENERIC GRADING ITEM STOCKPILING AND TESTING ONLY OF PCB CONTAMINATED SOIL	540 CY	24.39	13,170.60
0020	0255000000-E	SP	GENERIC GRADING ITEM HAULING AND DISPOSAL OF PETROLEUM CONTAMINATED SOIL	50 TON	76.85	3,842.50
0021	0255000000-E	SP	GENERIC GRADING ITEM STOCKPILING, TESTING, HAULING, AND DISPOSAL OF PCB CONTAMI- NATED SOIL	810 TON	71.87	58,214.70
0022	0318000000-E	300	FOUNDATION CONDITIONING MATE- RIAL, MINOR STRUCTURES	1,870 TON	45.30	84,711.00
0023	0320000000-E	300	FOUNDATION CONDITIONING GEO- TEXTILE	6,406 SY	0.75	4,804.50
0024	0335200000-E	305	15" DRAINAGE PIPE	376 LF	42.05	15,810.80
0025	0335300000-E	305	18" DRAINAGE PIPE	1,688 LF	42.71	72,094.48
0026	0335400000-E	305	24" DRAINAGE PIPE	124 LF	52.40	6,497.60
0027	0335500000-E	305	30" DRAINAGE PIPE	924 LF	66.92	61,834.08
0028	0335600000-E	305	36" DRAINAGE PIPE	28 LF	117.21	3,281.88
0029	0335700000-E	305	42" DRAINAGE PIPE	8 LF	167.29	1,338.32
0030	0366000000-E	310	15" RC PIPE CULVERTS, CLASS III	184 LF	48.58	8,938.72
0031	0372000000-E	310	18" RC PIPE CULVERTS, CLASS III	320 LF	51.63	16,521.60
0032	0378000000-E	310	24" RC PIPE CULVERTS, CLASS III	68 LF	86.48	5,880.64
0033	0384000000-E	310	30" RC PIPE CULVERTS, CLASS III	152 LF	86.27	13,113.04
0034	0390000000-E	310	36" RC PIPE CULVERTS, CLASS III	312 LF	116.29	36,282.48
0035	0414000000-E	310	60" RC PIPE CULVERTS, CLASS III	16 LF	235.72	3,771.52

Contract Item Sheets For C204351

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0036	0448200000-E	310	15" RC PIPE CULVERTS, CLASS IV	5,156 LF	51.63	266,204.28
0037	0448300000-E	310	18" RC PIPE CULVERTS, CLASS IV	3,336 LF	56.77	189,384.72
0038	0448400000-E	310	24" RC PIPE CULVERTS, CLASS IV	388 LF	76.29	29,600.52
0039	0448500000-E	310	30" RC PIPE CULVERTS, CLASS IV	500 LF	110.19	55,095.00
0040	0448600000-E	310	36" RC PIPE CULVERTS, CLASS IV	392 LF	121.61	47,671.12
0041	0448700000-E	310	42" RC PIPE CULVERTS, CLASS IV	48 LF	183.47	8,806.56
0042	0582000000-E	310	15" CS PIPE CULVERTS, 0.064" THICK	240 LF	34.05	8,172.00
0043	0588000000-E	310	18" CS PIPE CULVERTS, 0.064" THICK	584 LF	36.37	21,240.08
0044	0594000000-E	310	24" CS PIPE CULVERTS, 0.064" THICK	180 LF	45.26	8,146.80
0045	0636000000-E	310	*** CS PIPE ELBOWS, ***** THICK (15", 0.064")	10 EA	179.90	1,799.00
0046	0636000000-E	310	*** CS PIPE ELBOWS, ***** THICK (18", 0.064")	22 EA	207.17	4,557.74
0047	0636000000-E	310	*** CS PIPE ELBOWS, ***** THICK (24", 0.064")	6 EA	234.43	1,406.58
0048	0973100000-E	330	*** WELDED STEEL PIPE, ***** THICK, GRADE B IN SOIL (42", 0.625")	188 LF	759.00	142,692.00
0049	0973100000-E	330	*** WELDED STEEL PIPE, ***** THICK, GRADE B IN SOIL (48", 0.688")	144 LF	899.00	129,456.00
0050	0973100000-E	330	*** WELDED STEEL PIPE, ***** THICK, GRADE B IN SOIL (60", 0.844")	160 LF	1,349.00	215,840.00
0051	0973300000-E	330	*** WELDED STEEL PIPE, ***** THICK, GRADE B NOT IN SOIL (42", 0.625")	188 LF	1,189.00	223,532.00

Contract Item Sheets For C204351

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0052	0973300000-E	330	*** WELDED STEEL PIPE, ***** THICK, GRADE B NOT IN SOIL (48", 0.688")	144 LF	1,299.00	187,056.00
0053	0973300000-E	330	*** WELDED STEEL PIPE, ***** THICK, GRADE B NOT IN SOIL (60", 0.844")	160 LF	1,899.00	303,840.00
0054	0995000000-E	340	PIPE REMOVAL	4,613 LF	15.70	72,424.10
0055	0996000000-N	350	PIPE CLEAN OUT	10 EA	319.69	3,196.90
0056	1011000000-N	500	FINE GRADING	Lump Sum LS	271,763.90	271,763.90
0057	1044000000-E	501	LIME TREATED SOIL (SLURRY METHOD)	14,000 SY	2.95	41,300.00
0058	1066000000-E	501	LIME FOR LIME TREATED SOIL	170 TON	214.35	36,439.50
0059	1099500000-E	505	SHALLOW UNDERCUT	1,500 CY	7.18	10,770.00
0060	1099700000-E	505	CLASS IV SUBGRADE STABILIZA- TION	4,960 TON	20.83	103,316.80
0061	1110000000-E	510	STABILIZER AGGREGATE	250 TON	25.71	6,427.50
0062	1115000000-E	SP	GEOTEXTILE FOR PAVEMENT STA- BILIZATION	14,778 SY	4.51	66,648.78
0063	1121000000-E	520	AGGREGATE BASE COURSE	33,000 TON	0.01	330.00
0064	1176000000-E	542	SOIL CEMENT BASE	14,000 SY	2.95	41,300.00
0065	1187000000-E	542	PORTLAND CEMENT FOR SOIL CE- MENT BASE	392 TON	195.60	76,675.20
0066	1209000000-E	543	ASPHALT CURING SEAL	4,200 GAL	2.71	11,382.00
0067	1220000000-E	545	INCIDENTAL STONE BASE	200 TON	25.19	5,038.00
0068	1297000000-E	607	MILLING ASPHALT PAVEMENT, ***** DEPTH (1-1/2")	450 SY	18.11	8,149.50
0069	1297000000-E	607	MILLING ASPHALT PAVEMENT, ***** DEPTH (3-3/4")	88,850 SY	2.30	204,355.00

Contract Item Sheets For C204351

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0070	1330000000-E	607	INCIDENTAL MILLING	4,000 SY	11.25	45,000.00
0071	1491000000-E	610	ASPHALT CONC BASE COURSE, TYPE B25.0C	18,000 TON	46.00	828,000.00
0072	1503000000-E	610	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C	20,200 TON	47.00	949,400.00
0073	1519000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5B	2,700 TON	55.00	148,500.00
0074	1523000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5C	11,700 TON	51.00	596,700.00
0075	1524200000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5D	18,900 TON	55.00	1,039,500.00
0076	1526000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S4.75A	4,630 TON	60.00	277,800.00
0077	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	2,990 TON	480.00	1,435,200.00
0078	1577000000-E	620	POLYMER MODIFIED ASPHALT BINDER FOR PLANT MIX	1,080 TON	625.00	675,000.00
0079	1693000000-E	654	ASPHALT PLANT MIX, PAVEMENT REPAIR	540 TON	80.00	43,200.00
0080	1840000000-E	665	MILLED RUMBLE STRIPS (ASPHALT CONCRETE)	25,400 LF	0.44	11,176.00
0081	2000000000-N	806	RIGHT-OF-WAY MARKERS	22 EA	400.00	8,800.00
0082	2020000000-N	806	CONTROL-OF-ACCESS MARKERS	6 EA	400.00	2,400.00
0083	2022000000-E	815	SUBDRAIN EXCAVATION	224 CY	30.27	6,780.48
0084	2026000000-E	815	GEOTEXTILE FOR SUBSURFACE DRAINS	1,000 SY	1.23	1,230.00
0085	2036000000-E	815	SUBDRAIN COARSE AGGREGATE	168 CY	38.59	6,483.12
0086	2044000000-E	815	6" PERFORATED SUBDRAIN PIPE	1,000 LF	12.39	12,390.00
0087	2070000000-N	815	SUBDRAIN PIPE OUTLET	2 EA	342.64	685.28

Contract Item Sheets For C204351

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0088	2077000000-E	815	6" OUTLET PIPE	12 LF	18.44	221.28
0089	2143000000-E	818	BLOTTING SAND	10 TON	50.22	502.20
0090	2209000000-E	838	ENDWALLS	15.9 CY	1,389.85	22,098.62
0091	2220000000-E	838	REINFORCED ENDWALLS	5.6 CY	2,100.92	11,765.15
0092	2253000000-E	840	PIPE COLLARS	3.7 CY	1,513.10	5,598.47
0093	2275000000-E	SP	FLOWABLE FILL	97 CY	175.00	16,975.00
0094	2286000000-N	840	MASONRY DRAINAGE STRUCTURES	173 EA	1,723.82	298,220.86
0095	2297000000-E	840	MASONRY DRAINAGE STRUCTURES	4.5 CY	465.41	2,094.35
0096	2308000000-E	840	MASONRY DRAINAGE STRUCTURES	125.5 LF	432.80	54,316.40
0097	2354000000-N	840	FRAME WITH GRATE, STD 840.22	1 EA	707.69	707.69
0098	2364000000-N	840	FRAME WITH TWO GRATES, STD 840.16	11 EA	643.97	7,083.67
0099	2364200000-N	840	FRAME WITH TWO GRATES, STD 840.20	33 EA	803.74	26,523.42
0100	2365000000-N	840	FRAME WITH TWO GRATES, STD 840.22	32 EA	803.74	25,719.68
0101	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)	6 EA	680.33	4,081.98
0102	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)	41 EA	696.13	28,541.33
0103	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)	40 EA	696.13	27,845.20
0104	2396000000-N	840	FRAME WITH COVER, STD 840.54	15 EA	551.19	8,267.85
0105	2440000000-N	852	CONCRETE TRANSITIONAL SECTION FOR CATCH BASIN	9 EA	2,079.98	18,719.82

Contract Item Sheets For C204351

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0106	2451000000-N	852	CONCRETE TRANSITIONAL SECTION FOR DROP INLET	2 EA	1,500.00	3,000.00
0107	2474000000-N	SP	GENERIC DRAINAGE ITEM FILTRATION BASIN	Lump Sum LS	56,188.42	56,188.42
0108	2542000000-E	846	1'-6" CONCRETE CURB & GUTTER	5,500 LF	18.02	99,110.00
0109	2549000000-E	846	2'-6" CONCRETE CURB & GUTTER	12,900 LF	20.02	258,258.00
0110	2556000000-E	846	SHOULDER BERM GUTTER	6,100 LF	25.02	152,622.00
0111	2591000000-E	848	4" CONCRETE SIDEWALK	5,500 SY	26.53	145,915.00
0112	2605000000-N	848	CONCRETE CURB RAMPS	31 EA	1,800.00	55,800.00
0113	2619000000-E	850	4" CONCRETE PAVED DITCH	11 SY	104.53	1,149.83
0114	2647000000-E	852	5" MONOLITHIC CONCRETE ISLANDS (SURFACE MOUNTED)	1,110 SY	50.00	55,500.00
0115	2752000000-E	SP	GENERIC PAVING ITEM MEDIAN HAZARD PROTECTION	400 LF	99.03	39,612.00
0116	2800000000-N	858	ADJUSTMENT OF CATCH BASINS	1 EA	426.52	426.52
0117	2830000000-N	858	ADJUSTMENT OF MANHOLES	3 EA	426.52	1,279.56
0118	2860000000-N	859	CONVERT EXISTING CATCH BASIN TO JUNCTION BOX	3 EA	1,126.93	3,380.79
0119	2875000000-N	859	CONVERT EXISTING CATCH BASIN TO DROP INLET	3 EA	1,459.81	4,379.43
0120	2905000000-N	859	CONVERT EXISTING DROP INLET TO JUNCTION BOX	1 EA	1,126.93	1,126.93
0121	3001000000-N	SP	IMPACT ATTENUATOR UNITS, TYPE TL-3	2 EA	23,800.00	47,600.00
0122	3030000000-E	862	STEEL BEAM GUARDRAIL	11,300 LF	15.00	169,500.00
0123	3045000000-E	862	STEEL BEAM GUARDRAIL, SHOP CURVED	650 LF	17.50	11,375.00
0124	3150000000-N	862	ADDITIONAL GUARDRAIL POSTS	20 EA	44.00	880.00

Contract Item Sheets For C204351

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0125	3195000000-N	862	GUARDRAIL END UNITS, TYPE AT-1	2 EA	550.00	1,100.00
0126	3210000000-N	862	GUARDRAIL END UNITS, TYPE CAT-1	8 EA	550.00	4,400.00
0127	3215000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE III	2 EA	1,600.00	3,200.00
0128	3287000000-N	SP	GUARDRAIL END UNITS, TYPE TL-3	13 EA	2,800.00	36,400.00
0129	3317000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE B-77	8 EA	1,600.00	12,800.00
0130	3360000000-E	863	REMOVE EXISTING GUARDRAIL	13,900 LF	1.00	13,900.00
0131	3503000000-E	866	WOVEN WIRE FENCE, 47" FABRIC	2,100 LF	3.75	7,875.00
0132	3509000000-E	866	4" TIMBER FENCE POSTS, 7'-6" LONG	120 EA	18.00	2,160.00
0133	3515000000-E	866	5" TIMBER FENCE POSTS, 8'-0" LONG	60 EA	31.00	1,860.00
0134	3628000000-E	876	RIP RAP, CLASS I	735 TON	47.38	34,824.30
0135	3635000000-E	876	RIP RAP, CLASS II	706 TON	48.38	34,156.28
0136	3649000000-E	876	RIP RAP, CLASS B	772 TON	46.88	36,191.36
0137	3656000000-E	876	GEOTEXTILE FOR DRAINAGE	3,988 SY	2.50	9,970.00
0138	4048000000-E	902	REINFORCED CONCRETE SIGN FOUNDATIONS	9 CY	753.75	6,783.75
0139	4054000000-E	902	PLAIN CONCRETE SIGN FOUNDATIONS	3 CY	301.50	904.50
0140	4057000000-E	SP	OVERHEAD FOOTING	285 CY	904.50	257,782.50
0141	4060000000-E	903	SUPPORTS, BREAKAWAY STEEL BEAM	4,141 LB	4.02	16,646.82
0142	4066000000-E	903	SUPPORTS, SIMPLE STEEL BEAM	6,475 LB	2.26	14,633.50
0143	4072000000-E	903	SUPPORTS, 3-LB STEEL U-CHANNEL	1,483 LF	8.04	11,923.32

Contract Item Sheets For C204351

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0144	4078000000-E	903	SUPPORTS, 2-LB STEEL U-CHANNEL	1 EA	72.36	72.36
0145	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (112+38 -Y-)	Lump Sum LS	29,647.50	29,647.50
0146	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (16+90 -RPC-)	Lump Sum LS	54,370.50	54,370.50
0147	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (19+30 -RPA-)	Lump Sum LS	61,003.50	61,003.50
0148	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (32+50 -Y-)	Lump Sum LS	29,647.50	29,647.50
0149	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (37+72 -L-)	Lump Sum LS	110,550.00	110,550.00
0150	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (42+36 -L-)	Lump Sum LS	51,255.00	51,255.00
0151	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (43+00 -Y-)	Lump Sum LS	63,315.00	63,315.00
0152	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (46+13 -L-)	Lump Sum LS	50,802.75	50,802.75
0153	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (51+48 -L-)	Lump Sum LS	57,536.25	57,536.25
0154	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (51+80 -Y-)	Lump Sum LS	57,787.50	57,787.50
0155	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (54+41 -L-)	Lump Sum LS	115,575.00	115,575.00
0156	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (70+00 -Y-)	Lump Sum LS	63,817.50	63,817.50
0157	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ***** (86+00 -Y-)	Lump Sum LS	29,722.88	29,722.88

Contract Item Sheets For C204351

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0158	4096000000-N	904	SIGN ERECTION, TYPE D	10 EA	110.55	1,105.50
0159	4102000000-N	904	SIGN ERECTION, TYPE E	84 EA	34.17	2,870.28
0160	4108000000-N	904	SIGN ERECTION, TYPE F	5 EA	66.33	331.65
0161	4109000000-N	904	SIGN ERECTION, TYPE *** (OVER-HEAD) (A)	33 EA	703.50	23,215.50
0162	4109000000-N	904	SIGN ERECTION, TYPE *** (OVER-HEAD) (B)	9 EA	301.50	2,713.50
0163	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)	14 EA	301.50	4,221.00
0164	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (B)	6 EA	175.88	1,055.28
0165	4114000000-N	904	SIGN ERECTION, MILEMARKERS	1 EA	50.25	50.25
0166	4116000000-N	904	SIGN ERECTION, OVERLAY (GROUND MOUNTED)	5 EA	603.00	3,015.00
0167	4116100000-N	904	SIGN ERECTION, RELOCATE TYPE **** (GROUND MOUNTED) (A)	2 EA	301.50	603.00
0168	4116100000-N	904	SIGN ERECTION, RELOCATE TYPE **** (GROUND MOUNTED) (E)	6 EA	55.28	331.68
0169	4116100000-N	904	SIGN ERECTION, RELOCATE TYPE **** (GROUND MOUNTED) (F)	6 EA	70.35	422.10
0170	4116300000-N	904	SIGN ERECTION, LOGO TO PANEL	56 EA	150.75	8,442.00
0171	4138000000-N	907	DISPOSAL OF SUPPORT, STEEL BEAM	1 EA	1,758.75	1,758.75
0172	4149000000-N	907	DISPOSAL OF SIGN SYSTEM, OVER-HEAD	8 EA	5,025.00	40,200.00
0173	4151000000-N	907	STOCKPILE SIGN SYSTEM, STEEL BEAM	1 EA	402.00	402.00

Contract Item Sheets For C204351

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0174	4152000000-N	907	DISPOSAL OF SIGN SYSTEM, STEEL BEAM	16 EA	1,065.30	17,044.80
0175	4155000000-N	907	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	61 EA	1.00	61.00
0176	4192000000-N	907	DISPOSAL OF SUPPORT, U-CHANNEL	12 EA	1.01	12.12
0177	4234000000-N	907	DISPOSAL OF SIGN, A OR B (OVERHEAD)	7 EA	577.88	4,045.16
0178	4236000000-N	907	DISPOSAL OF SIGN, A & B (GROUND MOUNTED)	1 EA	381.90	381.90
0179	4360000000-N	SP	GENERIC SIGNING ITEM SIGN ERECTION, LOGO MILEAGE PANEL TO SIGN	49 EA	180.90	8,864.10
0180	4400000000-E	1110	WORK ZONE SIGNS (STATIONARY)	1,479 SF	7.10	10,500.90
0181	4405000000-E	1110	WORK ZONE SIGNS (PORTABLE)	2,600 SF	8.30	21,580.00
0182	4410000000-E	1110	WORK ZONE SIGNS (BARRICADE MOUNTED)	560 SF	6.25	3,500.00
0183	4415000000-N	1115	FLASHING ARROW BOARD	11 EA	1,950.00	21,450.00
0184	4420000000-N	1120	PORTABLE CHANGEABLE MESSAGE SIGN	20 EA	9,200.00	184,000.00
0185	4423000000-N	SP	WORK ZONE DIGITAL SPEED LIMIT SIGNS	7 EA	4,100.00	28,700.00
0186	4430000000-N	1130	DRUMS	850 EA	40.00	34,000.00
0187	4434000000-N	SP	SEQUENTIAL FLASHING WARNING LIGHTS	120 EA	120.00	14,400.00
0188	4445000000-E	1145	BARRICADES (TYPE III)	320 LF	25.00	8,000.00
0189	4447000000-E	SP	PEDESTRIAN CHANNELIZING DEVICES	228 LF	32.00	7,296.00
0190	4455000000-N	1150	FLAGGER	400 DAY	217.82	87,128.00
0191	4465000000-N	1160	TEMPORARY CRASH CUSHIONS	7 EA	9,365.63	65,559.41

Contract Item Sheets For C204351

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0192	4470000000-N	1160	REMOVE & RESET TEMPORARY CRASH CUSHION	8 EA	2,885.63	23,085.04
0193	4480000000-N	1165	TMA	11 EA	11,046.10	121,507.10
0194	4485000000-E	1170	PORTABLE CONCRETE BARRIER	6,020 LF	32.55	195,951.00
0195	4490000000-E	1170	PORTABLE CONCRETE BARRIER (ANCHORED)	6,020 LF	52.90	318,458.00
0196	4500000000-E	1170	REMOVE & RESET PORTABLE CONCRETE BARRIER	4,860 LF	6.58	31,978.80
0197	4505000000-E	1170	REMOVE & RESET PORTABLE CONCRETE BARRIER (ANCHORED)	4,860 LF	20.40	99,144.00
0198	4507000000-E	1170	WATER FILLED BARRIER	553 LF	52.00	28,756.00
0199	4508000000-E	SP	REMOVE & RESET WATER FILLED BARRIER	77 LF	9.50	731.50
0200	4510000000-N	1190	LAW ENFORCEMENT	160 HR	50.05	8,008.00
0201	4520000000-N	1266	TUBULAR MARKERS (FIXED)	40 EA	42.00	1,680.00
0202	4600000000-N	SP	GENERIC TRAFFIC CONTROL ITEM AUDIBLE WARNING DEVICE	18 EA	275.00	4,950.00
0203	4600000000-N	SP	GENERIC TRAFFIC CONTROL ITEM PEDESTRIAN TRANSPORT SERVICE (PER TRIP)	2,250 EA	51.55	115,987.50
0204	4650000000-N	1251	TEMPORARY RAISED PAVEMENT MARKERS	7,000 EA	5.50	38,500.00
0205	4685000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)	16,632 LF	1.00	16,632.00
0206	4688000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (6", 90 MILS)	43,453 LF	1.20	52,143.60
0207	4695000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)	4,422 LF	1.50	6,633.00
0208	4700000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (12", 90 MILS)	7,768 LF	1.75	13,594.00

Contract Item Sheets For C204351

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0209	4720000000-E	1205	THERMOPLASTIC PAVEMENT MARKING CHARACTER (90 MILS)	94 EA	100.00	9,400.00
0210	4725000000-E	1205	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)	249 EA	135.00	33,615.00
0211	4770000000-E	1205	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (II)	1,679 LF	2.00	3,358.00
0212	4770000000-E	1205	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV)	2,700 LF	2.00	5,400.00
0213	4775000000-E	1205	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (6") (IV)	3,500 LF	2.50	8,750.00
0214	4780000000-E	1205	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (8") (II)	89 LF	3.00	267.00
0215	4780000000-E	1205	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (8") (IV)	100 LF	3.00	300.00
0216	4800000000-N	1205	COLD APPLIED PLASTIC PAVEMENT MARKING CHARACTER, TYPE ** (II)	8 EA	125.00	1,000.00
0217	4805000000-N	1205	COLD APPLIED PLASTIC PAVEMENT MARKING SYMBOL, TYPE ** (II)	4 EA	250.00	1,000.00
0218	4810000000-E	1205	PAINT PAVEMENT MARKING LINES (4")	144,280 LF	0.31	44,726.80
0219	4820000000-E	1205	PAINT PAVEMENT MARKING LINES (8")	5,170 LF	0.75	3,877.50
0220	4825000000-E	1205	PAINT PAVEMENT MARKING LINES (12")	1,370 LF	0.75	1,027.50
0221	4835000000-E	1205	PAINT PAVEMENT MARKING LINES (24")	5,490 LF	3.00	16,470.00
0222	4840000000-N	1205	PAINT PAVEMENT MARKING CHARACTER	28 EA	35.00	980.00
0223	4845000000-N	1205	PAINT PAVEMENT MARKING SYMBOL	380 EA	35.00	13,300.00

Contract Item Sheets For C204351

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0224	4847500000-E	SP	WORK ZONE PERFORMANCE PAVEMENT MARKING LINES, 6"	98,150 LF	0.95	93,242.50
0225	4847600000-E	SP	WORK ZONE PERFORMANCE PAVEMENT MARKING LINES, 12"	9,880 LF	1.50	14,820.00
0226	4850000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (4")	73,490 LF	0.15	11,023.50
0227	4855000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (6")	46,075 LF	0.20	9,215.00
0228	4860000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (8")	2,635 LF	0.50	1,317.50
0229	4865000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (12")	5,625 LF	0.50	2,812.50
0230	4870000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (24")	2,800 LF	3.00	8,400.00
0231	4875000000-N	1205	REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS	244 EA	25.00	6,100.00
0232	4891000000-E	1205	GENERIC PAVEMENT MARKING ITEM THERMOPLASTIC PAVEMENT MARKING LINES (24", 90 MILS)	2,492 LF	10.00	24,920.00
0233	4900000000-N	1251	PERMANENT RAISED PAVEMENT MARKERS	487 EA	5.50	2,678.50
0234	4905000000-N	1253	SNOWPLOWABLE PAVEMENT MARKERS	676 EA	30.00	20,280.00
0235	4935000000-N	1267	FLEXIBLE DELINEATORS (CRYSTAL)	38 EA	55.31	2,101.78
0236	4940000000-N	1267	FLEXIBLE DELINEATORS (YELLOW)	28 EA	54.88	1,536.64
0237	4945000000-N	1267	FLEXIBLE DELINEATORS (CRYSTAL & RED)	10 EA	60.20	602.00
0238	4950000000-N	1267	FLEXIBLE DELINEATORS (YELLOW & RED)	16 EA	53.00	848.00
0239	5005000000-E	1401	80' HIGH MOUNT STANDARD	3 EA	22,110.00	66,330.00
0240	5010000000-E	1401	100' HIGH MOUNT STANDARD	4 EA	26,130.00	104,520.00

Contract Item Sheets For C204351

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0241	5020000000-N	1401	PORTABLE DRIVE UNIT	2 EA	5,025.00	10,050.00
0242	5025000000-E	SP	HIGH MOUNT FOUNDATIONS	49 CY	1,005.00	49,245.00
0243	5050000000-N	1404	LIGHT STANDARDS, TYPE MTLT ***** (45' SA, 15' ARM)	15 EA	3,618.00	54,270.00
0244	5070000000-N	SP	STANDARD FOUNDATION ***** (R1)	13 EA	1,708.50	22,210.50
0245	5070000000-N	SP	STANDARD FOUNDATION ***** (R2)	2 EA	1,708.50	3,417.00
0246	5120000000-N	1407	ELECTRIC SERVICE POLE ***** (30' CLASS 4)	1 EA	1,708.50	1,708.50
0247	5125000000-E	1407	ELECTRIC SERVICE LATERAL ***** (3 #1/0 USE)	25 LF	55.28	1,382.00
0248	5155000000-E	1409	ELECTRICAL DUCT, TYPE BD, SIZE ***** (2")	590 LF	6.78	4,000.20
0249	5160000000-E	1409	ELECTRICAL DUCT, TYPE JA, SIZE ***** (3")	385 LF	25.13	9,675.05
0250	5160000000-E	1409	ELECTRICAL DUCT, TYPE JA, SIZE ***** (4")	450 LF	30.15	13,567.50
0251	5175000000-E	1410	** #6 W/G FEEDER CIRCUIT (2)	470 LF	3.52	1,654.40
0252	5180000000-E	1410	** #4 W/G FEEDER CIRCUIT (2)	540 LF	5.03	2,716.20
0253	5185000000-E	1410	** #2 W/G FEEDER CIRCUIT (2)	530 LF	7.03	3,725.90
0254	5210000000-E	1410	** #6 W/G FEEDER CIRCUIT IN ***** CONDUIT (2, 1.5")	4,310 LF	9.55	41,160.50
0255	5215000000-E	1410	** #4 W/G FEEDER CIRCUIT IN ***** CONDUIT (2, 1.5")	6,580 LF	10.55	69,419.00

Contract Item Sheets For C204351

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0256	5220000000-E	1410	** #2 W/G FEEDER CIRCUIT IN ***** CONDUIT (2, 1.5")	2,130 LF	12.81	27,285.30
0257	5240000000-N	1411	ELECTRICAL JUNCTION BOXES ***** (CS36)	1 EA	1,005.00	1,005.00
0258	5240000000-N	1411	ELECTRICAL JUNCTION BOXES ***** (HM18)	6 EA	552.75	3,316.50
0259	5240000000-N	1411	ELECTRICAL JUNCTION BOXES ***** (HM30)	2 EA	753.75	1,507.50
0260	5240000000-N	1411	ELECTRICAL JUNCTION BOXES ***** (IG18)	17 EA	552.75	9,396.75
0261	5240000000-N	1411	ELECTRICAL JUNCTION BOXES ***** (IG30)	5 EA	753.75	3,768.75
0262	5240000000-N	1411	ELECTRICAL JUNCTION BOXES ***** (LS18)	15 EA	552.75	8,291.25
0263	5252000000-N	1412	UNDERPASS LUMINARIES ***** (WM)	8 EA	954.75	7,638.00
0264	5253000000-N	1412	UNDERPASS CIRCUITRY AT ***** (I-40/AIRPORT BLVD INTER- CHANGE)	Lump Sum LS	10,050.00	10,050.00
0265	5270000000-N	SP	GENERIC LIGHTING ITEM 100' HIGH MOUNT LUMINAIRE - LED	24 EA	1,909.50	45,828.00
0266	5270000000-N	SP	GENERIC LIGHTING ITEM 80' HIGH MOUNT LUMINAIRE - LED	24 EA	1,457.25	34,974.00
0267	5270000000-N	SP	GENERIC LIGHTING ITEM COMMUNICATION GATEWAY	1 EA	10,050.00	10,050.00
0268	5270000000-N	SP	GENERIC LIGHTING ITEM CONTROL NODE	64 EA	351.75	22,512.00
0269	5270000000-N	SP	GENERIC LIGHTING ITEM LIGHTING CONTROL SYSTEM	1 EA	15,075.00	15,075.00

Contract Item Sheets For C204351

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0270	5270000000-N	SP	GENERIC LIGHTING ITEM REMOVE RDU HIGH MOUNT STANDARD	1 EA	6,030.00	6,030.00
0271	5270000000-N	SP	GENERIC LIGHTING ITEM REPLACE RDU HIGH MOUNT STAND- ARD	1 EA	29,145.00	29,145.00
0272	5270000000-N	SP	GENERIC LIGHTING ITEM ROADWAY LIGHT STANDARD LUMIN- AIRE - 285W LED	15 EA	703.50	10,552.50
0273	5325800000-E	1510	8" WATER LINE	140 LF	97.07	13,589.80
0274	5326600000-E	1510	16" WATER LINE	3,058 LF	92.86	283,965.88
0275	5329000000-E	1510	DUCTILE IRON WATER PIPE FITTINGS	15,316 LB	3.38	51,768.08
0276	5540000000-E	1515	6" VALVE	1 EA	2,369.53	2,369.53
0277	5546000000-E	1515	8" VALVE	3 EA	2,754.45	8,263.35
0278	5558600000-E	1515	16" VALVE	5 EA	10,123.54	50,617.70
0279	5571800000-E	1515	8" TAPPING SLEEVE & VALVE	2 EA	4,810.09	9,620.18
0280	5589200000-E	1515	2" AIR RELEASE VALVE	1 EA	4,715.33	4,715.33
0281	5649000000-N	1515	RECONNECT WATER METER	3 EA	1,021.31	3,063.93
0282	5672000000-N	1515	RELOCATE FIRE HYDRANT	2 EA	2,130.62	4,261.24
0283	5673000000-E	1515	FIRE HYDRANT LEG	15 LF	145.20	2,178.00
0284	5709400000-E	1520	8" FORCE MAIN SEWER	362 LF	64.95	23,511.90
0285	5801000000-E	1530	ABANDON 8" UTILITY PIPE	595 LF	4.25	2,528.75
0286	5804000000-E	1530	ABANDON 12" UTILITY PIPE	339 LF	6.48	2,196.72
0287	5810000000-E	1530	ABANDON 16" UTILITY PIPE	1,974 LF	10.31	20,351.94
0288	5815000000-N	1530	REMOVE WATER METER	1 EA	298.15	298.15

Contract Item Sheets For C204351

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0289	5835700000-E	1540	16" ENCASEMENT PIPE	210 LF	90.96	19,101.60
0290	5836000000-E	1540	24" ENCASEMENT PIPE	265 LF	132.55	35,125.75
0291	5836400000-E	1540	36" ENCASEMENT PIPE	525 LF	227.70	119,542.50
0292	5872500000-E	1550	BORE AND JACK OF *** (36")	350 LF	1,152.66	403,431.00
0293	5882000000-N	SP	GENERIC UTILITY ITEM 8" INSERTION VALVE	2 EA	12,025.93	24,051.86
0294	5882000000-N	SP	GENERIC UTILITY ITEM RECONNECT 6" WATER LINE	1 EA	3,071.40	3,071.40
0295	5882000000-N	SP	GENERIC UTILITY ITEM REMOVE BLACKFLOW PREVENTER	2 EA	252.19	504.38
0296	5882000000-N	SP	GENERIC UTILITY ITEM THRUST COLLAR	8 EA	207.04	1,656.32
0297	5888000000-E	SP	GENERIC UTILITY ITEM CONCRETE PROTECTION ON WATER MAIN	10 LF	52.27	522.70
0298	6000000000-E	1605	TEMPORARY SILT FENCE	46,245 LF	1.75	80,928.75
0299	6006000000-E	1610	STONE FOR EROSION CONTROL, CLASS A	255 TON	26.65	6,795.75
0300	6009000000-E	1610	STONE FOR EROSION CONTROL, CLASS B	3,645 TON	37.23	135,703.35
0301	6012000000-E	1610	SEDIMENT CONTROL STONE	3,655 TON	28.44	103,948.20
0302	6015000000-E	1615	TEMPORARY MULCHING	9.5 ACR	1,500.00	14,250.00
0303	6018000000-E	1620	SEED FOR TEMPORARY SEEDING	600 LB	1.00	600.00
0304	6021000000-E	1620	FERTILIZER FOR TEMPORARY SEED- ING	4 TON	400.00	1,600.00
0305	6024000000-E	1622	TEMPORARY SLOPE DRAINS	1,795 LF	19.02	34,140.90
0306	6029000000-E	SP	SAFETY FENCE	3,000 LF	2.00	6,000.00

Contract Item Sheets For C204351

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0307	6030000000-E	1630	SILT EXCAVATION	4,900 CY	7.47	36,603.00
0308	6036000000-E	1631	MATTING FOR EROSION CONTROL	101,685 SY	0.70	71,179.50
0309	6037000000-E	SP	COIR FIBER MAT	100 SY	9.00	900.00
0310	6042000000-E	1632	1/4" HARDWARE CLOTH	10,530 LF	4.26	44,857.80
0311	6045000000-E	SP	*** TEMPORARY PIPE (42")	65 LF	7.34	477.10
0312	6045000000-E	SP	*** TEMPORARY PIPE (48")	500 LF	7.34	3,670.00
0313	6070000000-N	1639	SPECIAL STILLING BASINS	10 EA	582.69	5,826.90
0314	6071020000-E	SP	POLYACRYLAMIDE (PAM)	90 LB	11.00	990.00
0315	6071030000-E	1640	COIR FIBER BAFFLE	1,155 LF	6.00	6,930.00
0316	6071050000-E	SP	*** SKIMMER (2-1/2")	1 EA	1,030.41	1,030.41
0317	6084000000-E	1660	SEEDING & MULCHING	21 ACR	4,200.00	88,200.00
0318	6087000000-E	1660	MOWING	12 ACR	250.00	3,000.00
0319	6090000000-E	1661	SEED FOR REPAIR SEEDING	100 LB	9.00	900.00
0320	6093000000-E	1661	FERTILIZER FOR REPAIR SEEDING	0.75 TON	1,250.00	937.50
0321	6096000000-E	1662	SEED FOR SUPPLEMENTAL SEEDING	475 LB	4.00	1,900.00
0322	6108000000-E	1665	FERTILIZER TOPDRESSING	14 TON	900.00	12,600.00
0323	6111000000-E	SP	IMPERVIOUS DIKE	830 LF	57.42	47,658.60
0324	6114500000-N	1667	SPECIALIZED HAND MOWING	10 MHR	95.00	950.00
0325	6117000000-N	SP	RESPONSE FOR EROSION CONTROL	25 EA	300.00	7,500.00
0326	6117500000-N	SP	CONCRETE WASHOUT STRUCTURE	4 EA	667.79	2,671.16

Contract Item Sheets For C204351

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0327	6123000000-E	1670	REFORESTATION	2 ACR	2,000.00	4,000.00
0328	7048500000-E	1705	PEDESTRIAN SIGNAL HEAD (16", 1 SECTION W/COUNTDOWN)	25 EA	1,065.75	26,643.75
0329	7060000000-E	1705	SIGNAL CABLE	20,050 LF	3.30	66,165.00
0330	7120000000-E	1705	VEHICLE SIGNAL HEAD (12", 3 SECTION)	91 EA	761.25	69,273.75
0331	7132000000-E	1705	VEHICLE SIGNAL HEAD (12", 4 SECTION)	12 EA	989.63	11,875.56
0332	7144000000-E	1705	VEHICLE SIGNAL HEAD (12", 5 SECTION)	6 EA	1,065.75	6,394.50
0333	7252000000-E	1710	MESSENGER CABLE (1/4")	3,800 LF	2.28	8,664.00
0334	7264000000-E	1710	MESSENGER CABLE (3/8")	3,175 LF	4.31	13,684.25
0335	7279000000-E	1715	TRACER WIRE	13,100 LF	0.81	10,611.00
0336	7300000000-E	1715	UNPAVED TRENCHING (*****)(1, 2")	2,950 LF	6.60	19,470.00
0337	7300000000-E	1715	UNPAVED TRENCHING (*****)(2, 2")	8,000 LF	7.11	56,880.00
0338	7301000000-E	1715	DIRECTIONAL DRILL (*****)(1, 2")	1,075 LF	15.73	16,909.75
0339	7301000000-E	1715	DIRECTIONAL DRILL (*****)(2, 2")	2,975 LF	17.26	51,348.50
0340	7324000000-N	1716	JUNCTION BOX (STANDARD SIZE)	41 EA	279.13	11,444.33
0341	7348000000-N	1716	JUNCTION BOX (OVER-SIZED, HEAVY DUTY)	34 EA	558.25	18,980.50
0342	7360000000-N	1720	WOOD POLE	13 EA	1,116.50	14,514.50
0343	7372000000-N	1721	GUY ASSEMBLY	35 EA	329.88	11,545.80
0344	7396000000-E	1722	1/2" RISER WITH WEATHERHEAD	4 EA	228.38	913.52
0345	7408000000-E	1722	1" RISER WITH WEATHERHEAD	4 EA	329.88	1,319.52

Contract Item Sheets For C204351

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0346	7420000000-E	1722	2" RISER WITH WEATHERHEAD	6 EA	431.38	2,588.28
0347	7432000000-E	1722	2" RISER WITH HEAT SHRINK TUBING	3 EA	456.75	1,370.25
0348	7444000000-E	1725	INDUCTIVE LOOP SAWCUT	6,150 LF	5.84	35,916.00
0349	7456000000-E	1726	LEAD-IN CABLE (*****)(14-2)	25,825 LF	1.37	35,380.25
0350	7481000000-N	SP	SITE SURVEY	5 EA	609.00	3,045.00
0351	7481240000-N	SP	CAMERA WITHOUT INTERNAL LOOP EMULATOR PROCESSING UNIT	20 EA	2,943.50	58,870.00
0352	7481260000-N	SP	EXTERNAL LOOP EMULATOR PROCESSING UNIT	5 EA	5,278.00	26,390.00
0353	7481280000-N	SP	RELOCATE CAMERA SENSOR UNIT	17 EA	862.75	14,666.75
0354	7516000000-E	1730	COMMUNICATIONS CABLE (**FIBER)(12)	3,400 LF	2.28	7,752.00
0355	7516000000-E	1730	COMMUNICATIONS CABLE (**FIBER)(144)	8,525 LF	3.30	28,132.50
0356	7516000000-E	1730	COMMUNICATIONS CABLE (**FIBER)(24)	11,925 LF	2.49	29,693.25
0357	7528000000-E	1730	DROP CABLE	4,325 LF	2.39	10,336.75
0358	7540000000-N	1731	SPLICE ENCLOSURE	8 EA	4,161.50	33,292.00
0359	7552000000-N	1731	INTERCONNECT CENTER	5 EA	1,877.75	9,388.75
0360	7566000000-N	1733	DELINEATOR MARKER	33 EA	126.88	4,187.04
0361	7575142010-N	1736	900MHZ SERIAL/ETHERNET SPREAD SPECTRUM RADIO	5 EA	3,451.00	17,255.00
0362	7575160000-E	1734	REMOVE EXISTING COMMUNICATIONS CABLE	20,950 LF	0.86	18,017.00
0363	7576000000-N	SP	METAL STRAIN SIGNAL POLE	4 EA	11,165.00	44,660.00

Contract Item Sheets For C204351

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0364	7588000000-N	SP	METAL POLE WITH SINGLE MAST ARM	5 EA	13,195.00	65,975.00
0365	7590000000-N	SP	METAL POLE WITH DUAL MAST ARM	2 EA	22,330.00	44,660.00
0366	7613000000-N	SP	SOIL TEST	12 EA	913.50	10,962.00
0367	7614100000-E	SP	DRILLED PIER FOUNDATION	72 CY	862.75	62,118.00
0368	7631000000-N	SP	MAST ARM WITH METAL POLE DESIGN	7 EA	355.25	2,486.75
0369	7636000000-N	1745	SIGN FOR SIGNALS	43 EA	355.25	15,275.75
0370	7642100000-N	1743	TYPE I POST WITH FOUNDATION	3 EA	1,827.00	5,481.00
0371	7642200000-N	1743	TYPE II PEDESTAL WITH FOUNDATION	16 EA	2,131.50	34,104.00
0372	7684000000-N	1750	SIGNAL CABINET FOUNDATION	4 EA	862.75	3,451.00
0373	7852000000-N	1751	DETECTOR CARD (NEMA TS-2)	26 EA	137.03	3,562.78
0374	7980000000-N	SP	GENERIC SIGNAL ITEM CCTV CAMERA ASSEMBLY	2 EA	5,582.50	11,165.00
0375	7980000000-N	SP	GENERIC SIGNAL ITEM CCTV EQUIPMENT CABINET	1 EA	5,075.00	5,075.00
0376	7980000000-N	SP	GENERIC SIGNAL ITEM CCTV METAL POLE (40')	1 EA	15,225.00	15,225.00
0377	7980000000-N	SP	GENERIC SIGNAL ITEM CCTV WOOD POLE	1 EA	2,131.50	2,131.50
0378	7980000000-N	SP	GENERIC SIGNAL ITEM CONTRLER W/CABINET NEMA TS-2, TYPE 2070E CONTRLER, TYPE 1 CABINET BASE MOUNT	4 EA	22,330.00	89,320.00
0379	7980000000-N	SP	GENERIC SIGNAL ITEM ETHERNET EDGE SWITCH	1 EA	2,131.50	2,131.50
0380	7980000000-N	SP	GENERIC SIGNAL ITEM GROUNDING SYSTEM	1 EA	1,218.00	1,218.00

Contract Item Sheets For C204351

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0381	7980000000-N	SP	GENERIC SIGNAL ITEM METER BASE/DISCONNECT COMBINA- TION PANEL	1 EA	1,218.00	1,218.00
0382	7990000000-E	SP	GENERIC SIGNAL ITEM 3-WIRE COPPER FEEDER CONDUCTORS	150 LF	6.09	913.50
0383	7990000000-E	SP	GENERIC SIGNAL ITEM ETHERNET CABLE	375 LF	2.03	761.25

Contract Item Sheets For C204351

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0384	8126000000-N	414	CULVERT EXCAVATION, STA ***** (29+90.00-Y3-)	Lump Sum LS	15,000.00	15,000.00
0385	8126000000-N	414	CULVERT EXCAVATION, STA ***** (33+31.33-L-)	Lump Sum LS	15,000.00	15,000.00
0386	8126000000-N	414	CULVERT EXCAVATION, STA ***** (53+39.00-L-)	Lump Sum LS	15,000.00	15,000.00
0387	8126000000-N	414	CULVERT EXCAVATION, STA ***** (86+76.00-Y-)	Lump Sum LS	15,000.00	15,000.00
0388	8133000000-E	414	FOUNDATION CONDITIONING MATERIAL, BOX CULVERT	519 TON	55.00	28,545.00
0389	8196000000-E	420	CLASS A CONCRETE (CULVERT)	1,039.8 CY	700.00	727,860.00
0390	8245000000-E	425	REINFORCING STEEL (CULVERT)	113,023 LB	1.05	118,674.15

Contract Item Sheets For C204351

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0391	8035000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (44+35.96 -L- RT)	Lump Sum LS	144,584.60	144,584.60
0392	8065000000-N	SP	ASBESTOS ASSESSMENT	Lump Sum LS	750.00	750.00
0393	8096000000-E	450	PILE EXCAVATION IN SOIL	41 LF	93.78	3,844.98
0394	8097000000-E	450	PILE EXCAVATION NOT IN SOIL	9 LF	256.81	2,311.29
0395	8105560000-E	411	4'-0" DIA DRILLED PIERS IN SOIL	78 LF	444.29	34,654.62
0396	8105660000-E	411	4'-0" DIA DRILLED PIERS NOT IN SOIL	90 LF	1,520.51	136,845.90
0397	8113000000-N	411	SID INSPECTIONS	2 EA	510.00	1,020.00
0398	8114000000-N	411	SPT TESTING	6 EA	510.00	3,060.00
0399	8115000000-N	411	CSL TESTING	2 EA	3,570.00	7,140.00
0400	8121000000-N	412	UNCLASSIFIED STRUCTURE EXCAVA- TION AT STATION ***** (44+35.96 -L- RT)	Lump Sum LS	15,236.51	15,236.51
0401	8147000000-E	420	REINFORCED CONCRETE DECK SLAB	34,860 SF	28.74	1,001,876.40
0402	8161000000-E	420	GROOVING BRIDGE FLOORS	36,152 SF	0.41	14,822.32
0403	8182000000-E	420	CLASS A CONCRETE (BRIDGE)	596.1 CY	595.43	354,935.82
0404	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (44+35.96 -L- LT)	Lump Sum LS	66,684.03	66,684.03
0405	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (44+35.96 -L- RT)	Lump Sum LS	56,588.98	56,588.98
0406	8217000000-E	425	REINFORCING STEEL (BRIDGE)	106,041 LB	0.89	94,376.49
0407	8238000000-E	425	SPIRAL COLUMN REINFORCING STEEL (BRIDGE)	7,597 LB	1.53	11,623.41
0408	8280000000-E	440	APPROX LBS STRUCTURAL STEEL	1,734,220 LS	2,209,519.19	2,209,519.19

Contract Item Sheets For C204351

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0409	8328200000-E	450	PILE DRIVING EQUIPMENT SETUP FOR *** STEEL PILES (HP 12 X 53)	20 EA	272.69	5,453.80
0410	8364000000-E	450	HP12X53 STEEL PILES	317.8 LF	78.83	25,052.17
0411	8391000000-N	450	STEEL PILE POINTS	20 EA	107.25	2,145.00
0412	8503000000-E	460	CONCRETE BARRIER RAIL	909.72 LF	97.66	88,843.26
0413	8505000000-E	460	VERTICAL CONCRETE BARRIER RAIL	706.7 LF	151.50	107,065.05
0414	8531000000-E	462	4" SLOPE PROTECTION	1,350 SY	62.66	84,591.00
0415	8654000000-N	SP	DISC BEARINGS	Lump Sum LS	46,106.79	46,106.79
0416	8657000000-N	430	ELASTOMERIC BEARINGS	Lump Sum LS	26,140.71	26,140.71
0417	8692000000-N	SP	FOAM JOINT SEALS	Lump Sum LS	29,337.90	29,337.90

TOTAL AMOUNT OF BID FOR ENTIRE PROJECT

\$34,895,402.71

Contract No. C204351

Rev. 1-16-18

County Wake

**EXECUTION OF CONTRACT
NON-COLLUSION, DEBARMENT AND GIFT BAN CERTIFICATION**

CORPORATION

The Contractor declares (or certifies, verifies, or states) under penalty of perjury under the laws of the United States 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 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

Kathryn Cordova
Secretary Assistant Secretary
Select appropriate title

By

Paul Newman
President/Vice President/Assistant Vice President
Select appropriate title

Kathryn Cordova

Print or type Signer's name

Paul Newman

Print or type Signer's name

CORPORATE SEAL



DEBARMENT CERTIFICATION

Conditions for certification:

1. The prequalified bidder shall provide immediate written notice to the Department if at any time the bidder learns that his certification was erroneous when he submitted his debarment certification or explanation 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.

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 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. C204351

County (ies): Wake

ACCEPTED BY THE
DEPARTMENT OF TRANSPORTATION

DocuSigned by:

Ronald E. Davenport, Jr.

F81B0038A47A442...

Contract Officer

12/9/2019

Date

Execution of Contract and Bonds
Approved as to Form:

DocuSigned by:

Kacy Hunt

78E172257DB0415...

Attorney General

12/9/2019

Date

Signature Sheet (Bid - Acceptance by Department)

Contract No. C204351
County Wake

Rev 5-17-11

Bond Number: 9264726-Zurich
82392360-Pacific

CONTRACT PAYMENT BOND

Date of Payment Bond Execution December 3, 2019

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: \$34,895,402.71

Contract ID No.: C204351

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. C204351
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



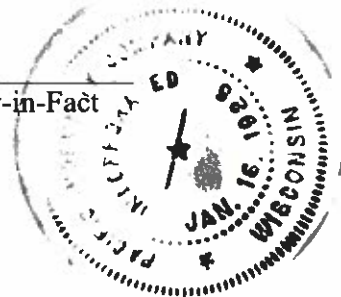
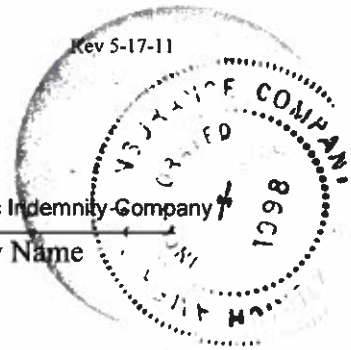
Signature of Witness

Deborah L. Jung

Print or type Signer's name

131 Interpark Blvd.
San Antonio, TX 78216

Address of Attorney-in-Fact



Contract No.
County

C204351

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

Address as prequalified

By


Signature of ~~President~~, Vice President, Assistant Vice President
Select appropriate title


Bryan S. Golla
Vice President & Controller

Print or type Signer's name



Affix Corporate Seal

Attest


Signature of ~~Secretary~~, Assistant Secretary
Select appropriate title


Print or type Signer's name

Contract No. C204351
County Wake

Rev 5-17-11

Bond Number: 9264726-Zurich
82392360-Pacific

CONTRACT PERFORMANCE BOND

Date of Performance Bond Execution: December 3, 2019

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: \$34,895,402.71

Contract ID No.: C204351

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. C204351
County Wake

Rev 5/1/85

CONTRACT PERFORMANCE BOND

Affix Seal of Surety Company

Zurich American Insurance Company, Pacific Indemnity Company

Print or type Surety Company Name

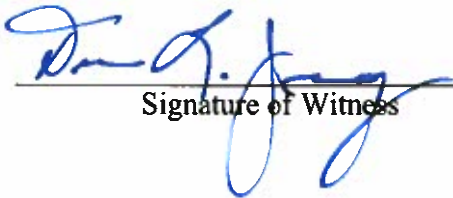
By

Donald E. Miller, Jr.

Print, stamp or type name of Attorney-in-Fact



Signature of Attorney-in-Fact



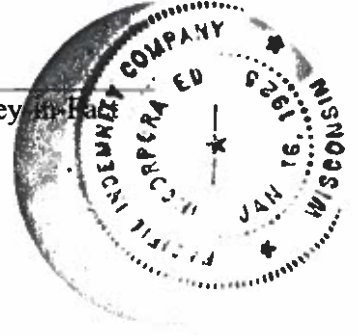
Signature of Witness

Deborah L. Jung

Print or type Signer's name

131 Interpark Blvd.
San Antonio, TX 78216

Address of Attorney-in-Fact



Contract No.
County

C204351
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

Address as prequalified

By


Signature of ~~President~~, Vice President, Assistant Vice President
Select appropriate title

Bryan S. Golia
Vice President & Controller



Print or type Signer's name

Affix Corporate Seal

Attest



Signature of ~~Secretary~~, Assistant Secretary
Select appropriate title



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 Illinois, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND a corporation of the State of Illinois (herein collectively called the "Companies"), by **ROBERT D. MURRAY, 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 3rd day of September, A.D. 2019.

ATTEST:

**ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND**



By:

Dawn E. Brown

*Assistant Secretary
Dawn E. Brown*

Robert D. Murray

*Vice President
Robert D. Murray*

State of Maryland
County of Baltimore

On this 3rd day of September, A.D. 2019, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, **ROBERT D. MURRAY, Vice President, and DAWN E. BROWN, Assistant 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, depose 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.

Constance A. Dunn

*Constance A. Dunn, Notary Public
My Commission Expires: July 9, 2023*



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 or 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 3rd day of December, 2017.



Brian M. Hodges

Brian M. Hodges, Vice President

TO REPORT A CLAIM WITH REGARD TO A SURETY BOND, PLEASE SUBMIT ALL REQUIRED INFORMATION TO:

Zurich American Insurance Co.
Attn: Surety Claims
1299 Zurich Way
Schaumburg, IL 60196-1056

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 1st day of August, 2018.

Dawn M. Chloros

Dawn M. Chloros, Assistant Secretary

Stephen M. Haney

Stephen M. Haney, Vice President



STATE OF NEW JERSEY

County of Hunterdon

SS.

On this 1st day of August, 2018, 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 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 Stephen M. Haney, and knows him to be Vice President of said Companies; and that the signature of Stephen M. Haney, subscribed to said Power of Attorney is in the genuine handwriting of Stephen M. Haney, and was thereto subscribed by authority of said Companies and in deponent's presence.

Notarial Seal



KATHERINE J. ADELAAR
NOTARY PUBLIC OF NEW JERSEY
No. 2510055
Commission Expires July 10, 2019

Katherine J. Adelaar

Notary Public

CERTIFICATION

Resolutions adopted by the Boards of Directors of **FEDERAL INSURANCE COMPANY**, **VIGILANT INSURANCE COMPANY**, and **PACIFIC INDEMNITY COMPANY** on August 30, 2016:

"RESOLVED, that the following authorizations relate to the execution, for and on behalf of the Company, of bonds, undertakings, recognizances, contracts and other written commitments of the Company entered into in the ordinary course of business (each a "Written Commitment"):

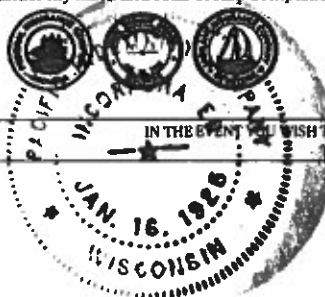
- (1) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise.
- (2) Each duly appointed attorney-in-fact of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise, to the extent that such action is authorized by the grant of powers provided for in such person's written appointment as such attorney-in-fact.
- (3) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to appoint in writing any person the attorney-in-fact of the Company with full power and authority to execute, for and on behalf of the Company, under the seal of the Company or otherwise, such Written Commitments of the Company as may be specified in such written appointment, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.
- (4) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to delegate in writing to any other officer of the Company the authority to execute, for and on behalf of the Company, under the Company's seal or otherwise, such Written Commitments of the Company as are specified in such written delegation, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.
- (5) The signature of any officer or other person executing any Written Commitment or appointment or delegation pursuant to this Resolution, and the seal of the Company, may be affixed by facsimile on such Written Commitment or written appointment or delegation.

FURTHER RESOLVED, that the foregoing Resolution shall not be deemed to be an exclusive statement of the powers and authority of officers, employees and other persons to act for and on behalf of the Company, and such Resolution shall not limit or otherwise affect the exercise of any such power or authority otherwise validly granted or vested."

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 Resolutions adopted by the Board of Directors of the Companies are true, correct and in full force and effect,
- (ii) the foregoing Power of Attorney is true, correct and in full force and effect.

Given under my hand and seals of said Companies at Whitehouse Station, NJ, this December 3, 2019



Dawn M. Chloros

Dawn M. Chloros, Assistant Secretary

IN THE EVENT YOU WISH TO VERIFY THE AUTHENTICITY OF THIS BOND OR NOTIFY US OF ANY OTHER MATTER, PLEASE CONTACT US AT:

Telephone (908) 903-3493 Fax (908) 903-3656 e-mail: surety@chubb.com