



PAT McCrory
Governor

NICHOLAS J. TENNYSON
Secretary

August 11, 2016

Addendum No. 1

RE: Contract # C203789

WBS # 40233.3.1

STATE FUNDED

Pender County (B-4929)

Bridge #16 Over The Intracoastal Waterway On NC-50/210 At Surf City

August 16, 2016 Letting

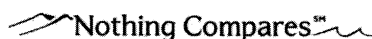
To Whom It May Concern:

Reference is made to the plans and proposal form furnished to you on this project.

The following revision has been made to the plans:

| Sheet No. | Revisions |
|-----------------|--|
| TMP-5 and TMP-6 | Revised the timing of placing Drainage Structure 704 and the pipe going to it |
| UC-8 | Note revised to add "3" Tapping Valve" |
| UC-9 | Note revised to add "12" Tapping Valve" |
| UC-10 | Correct arrow pointing to 12" Force Main Sewer. Correct 4" bends. Change 12" bend to wye. Add 4" pipe. Notes added, "4" Tapping Valve" and "4" Force Main Sewer" |
| UC-11 | Correct 16" encasement. Correct encasement quantities. Note revised to add "12" Tapping Valve" |
| UC-12 | Correct to 6" valve. Note revised to add "6" Tapping Valve" and "10" Valve". |
| UC-14 | Note revised to add "10" Tapping Valve" |
| UC-15 | Note revised to add "6" Tapping Valve" |
| UC-16 | Note revised to add "10" Tapping Valve" |
| S-137 | Notes revised to clarify Navigational Lighting Requirements. |

Please void the above listed sheets in your plans and staple the revised sheets thereto.



The following revisions have been made to the proposal:

| Page No. | Revisions |
|-----------------------|--|
| Proposal Cover | Note added that reads "Includes Addendum No. 1 Dated 08-11-16" |
| G-42 | Added project special provision entitled "Notes To Contractor" |
| GT-0.1 | Revised Table of Contents |
| GT-4.4 | Revised paragraph number "5.2" |
| GT-4.5 | Revised subsection "6.0" now titled "Assistance For Integrity Tests" and renumbered the remaining sections |
| GT-4.6 | Revised the renumbered paragraph "9.0 Method of Measurement and Payment" to remove the mention of "Sonic Caliper Testing" |
| GT-5.1 thru GT-5.2 | Deleted the project special provision for "Sonic Caliper Testing" |
| ST-1 | Revised to add the project special provision entitled "Disc Bearings" and removed the reference to "Sonic Caliper Testing". As a result, all original special provisions after Disc Bearings appear on different pages |
| ST-5 thru ST-53 | Special Provision "Disc Bearings" added as described above |

Please void the Proposal Cover and add new/delete the above mentioned pages in your proposal and replace with the revised pages.

On the item sheets the following pay item quantity changes have been made:

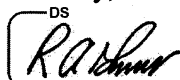
| <u>Item</u> | <u>Description</u> | <u>Old Quantity</u> | <u>New Quantity</u> |
|------------------------|--------------------------|---------------------|---------------------|
| 218-5325400000-E-1510 | 4" WATER LINE | NEW ITEM | 8 LF |
| 114- 5540000000-E-1515 | 6" VALVE | 4 EA | 2 EA |
| 115- 5552000000-E-1515 | 10" VALVE | 6 EA | 3 EA |
| 219-5571000000-E-1515 | 3" TAPPING VALVE | NEW ITEM | 1 EA |
| 220-5571400000-E-1515 | 4" TAPPING VALVE | NEW ITEM | 2 EA |
| 221-5571600000-E-1515 | 6" TAPPING VALVE | NEW ITEM | 2 EA |
| 222-5572000000-E-1515 | 10" TAPPING VALVE | NEW ITEM | 3 EA |
| 223-5572200000-E-1515 | 12" TAPPING VALVE | NEW ITEM | 2 EA |
| 128-5800000000-E-1530 | ABANDON 6" UTILITY PIPE | 606 LF | 835 LF |
| 130-5802000000-E-1530 | ABANDON 10" UTILITY PIPE | 1,333 LF | 1,104 LF |

| <u>Item</u> | <u>Description</u> | <u>Old Quantity</u> | <u>New Quantity</u> |
|-----------------------|---|---------------------|---------------------|
| 135-5871700000-E-1550 | TRENCHLESS INSTALLATION OF 12" IN SOIL | 273 LF | 119 LF |
| 136-5871710000-E-1550 | TRENCHLESS INSTALLATION OF 12" NOT IN SOIL | 30 LF | 13 LF |
| 137-5871900000-E-1550 | TRENCHLESS INSTALLATION OF 16" IN SOIL | 295 LF | 449 LF |
| 138-5871910000-E-1550 | TRENCHLESS INSTALLATION OF 16" NOT IN SOIL | 33 LF | 50 LF |
| 183-8111000000-E-411 | PERMANENT STEEL CASING FOR 4'-0" DIA DRILLED PIER | 2,760.50 LF | 3,518 LF |
| 184-8111000000-E-411 | PERMANENT STEEL CASING FOR 5'-0" DIA DRILLED PIER | 2,216.20 LF | 2,346 LF |

The Contractor's bid must include these pay item quantity changes. The contract will be prepared accordingly.

The Expedite File has been updated to reflect these revisions. Please download the Expedite Addendum File and follow the instructions for applying the addendum. Bid Express will not accept your bid unless the addendum has been applied.

Sincerely,



R. A. Garris, PE
Contract Officer

RAG/jag

| | |
|-----------------------------|-------------------------|
| cc: Mr. Lamar Sylvester, PE | Mr. Ray Arnold, PE |
| Ms. Karen Collette, PE | Ms. Theresa Canales, PE |
| Mr. Rodger Rochelle, PE | Ms. Marsha Sample |
| Mr. R.E. Davenport, PE | Mr. Mike Gwyn |
| Mr. Ken Kennedy, PE | Mr. Mitchell Dixon |
| Ms. Jaci Kincaid | Ms. Penny Higgins |
| Project File (2) | Ms. Lori Strickland |

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

PROPOSAL

INCLUDES ADDENDUM No. 1 DATED 08-11-16

DATE AND TIME OF BID OPENING: **AUGUST 16, 2016 AT 2:00 PM**

CONTRACT ID C203789
WBS 40233.3.1

FEDERAL-AID NO. STATE FUNDED
COUNTY PENDER
T.I.P. NO. B-4929
MILES 0.929
ROUTE NO. NC 50
LOCATION BRIDGE #16 OVER INTRACOASTAL WATERWAY ON NC-50/210.

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

NOTICE:

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

BIDS WILL BE RECEIVED AS SHOWN BELOW:

THIS IS A ROADWAY & STRUCTURE PROPOSAL

5% BID BOND OR BID DEPOSIT REQUIRED

NOTES TO CONTRACTOR:

1. The end of the wood pier as shown on Sheet No. 5 shall be removed to the easement line. The Contractor shall properly dispose of same. All costs associated with this work will be included in the lump sum price for "Clearing and Grubbing".
2. The Contractor is hereby notified that the quantities for the drilled pier casings have been increased and the intent is for the casing to extend down into a solid layer. The plans will be revised after award to reflect this. The Contractor's bid shall include the allowance for extending the casings into a solid layer.

PROJECT SPECIAL PROVISIONS

GEOTECHNICAL

| | |
|---|-----------------|
| MECHANICALLY STABILIZED EARTH RETAINING WALLS (SPECIAL) | GT-1.1 - GT-1.9 |
| PILES (LRFD) - (10/20/2015) | GT-2.1 - GT-2.2 |
| DRILLED PIERS (LRFD) - (10/20/2015) | GT-3.1 - GT-3.2 |
| AXIAL LOAD TEST (SPECIAL) | GT-4.1 - GT-4.7 |

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Geotechnical Engineering Unit
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hand tools as required by Geotechnical Foundation Testing Contractor and the Engineer.

- d) Equipment and labor sufficient to erect the protected work area and reference beam system, to be constructed to the requirements of the Engineer and Geotechnical Foundation Testing Contractor.
- e) Air compressor (minimum 185 cfm, 125 psi) for pump operation during load testing.

5.0 PROCEDURE

- 5.1 Construct the test piers using the approved pier installation procedure.
- 5.2 Perform SPT and SID on the completed drilled pier excavations. See Drilled Piers special provision for SPT and SID testing.
- 5.3 The O-cell, hydraulic supply lines and other attachments shall be assembled and made ready for installation under the direction of Geotechnical Foundation Testing Contractor and the Engineer, in a suitable area, adjacent to the test piers, to be provided by the Contractor. The O-cell assembly shall be welded to the bottom of the cage in conjunction with the construction of the reinforcing steel cage as shown in the plans.
- 5.4 When the test piers excavation has been completed, inspected and accepted by the Engineer, the Contractor shall install the O-cell and the placement frame or reinforcing steel cage assembly in the excavation under the direction of Geotechnical Foundation Testing Contractor and the Engineer so that the O-cell is resting firmly in the concrete. The Contractor shall use the utmost care in handling the placement/test equipment assembly so as not to damage the instrumentation during installation. The Contractor shall limit the deflection of the cage to two (2) feet between pick points while lifting the cage from the horizontal position to vertical. The maximum spacing between pick points shall be 25 feet. The Contractor shall provide support bracing, strong backs, etc. to maintain the deflection within the specified tolerance.
- 5.5 The drilled piers shall be concreted to the elevation as shown in the plans and in accordance to the construction sequence plan for the production drilled piers. In addition to the Department standard number of concrete compression test cylinders, at least six (6) concrete test cylinders shall be made from the concrete used in the test piers. At least one of these test cylinders shall be tested prior to the load test and at least two cylinders shall be tested on the day of the load test.
- 5.6 During the period required to perform the load test, no construction activities may be performed in the foundation area near the load test. If test apparatus shows any signs of negative effects due to construction activities as determined by the Engineer, such activities shall cease immediately.

6.0 ASSISTANCE FOR INTEGRITY TESTS:

The Engineer may perform either caliper testing on the completed test drilled pier excavations or Thermal Integrity Profiling (TIP) on the test piers.

Assist the Engineer in providing access for installing thermal wires on the drilled shaft rebar cage for TIP and handling any associated equipment for caliper testing or TIP. Provide working areas large enough for caliper testing or TIP, associated equipment and personnel. Approximately one hour is required to inspect a completed hole with the caliper after caliper and associated equipment are set up prior to placing drilled shaft rebar cage in the test drilled pier excavations. The data loggers for TIP will be connected to the thermal wires after placing concrete and may remain up to one week.

7.0 COMPLETION OF LOAD TEST:

After the completion of the load test, and at the direction of the Engineer, the Contractor shall remove any equipment, material, and waste, etc., except the test piers. After testing is completed, the load test location shall be cleaned, the reinforcement removed from the top of the piers, and the top of the test drilled piers shall be covered with soil.

8.0 TESTING AND REPORTING

The load testing shall be performed by a qualified Geotechnical Engineer approved in advance by the Engineer. The Geotechnical Engineer must have a demonstrated knowledge of load testing procedures, and have performed at least two O-cell load tests within the past two years. The Geotechnical Engineer shall provide a planned testing procedure for review by the Engineer two weeks before testing. Any deviations from the planned procedure should be explained and justified by the Geotechnical Engineer in the final report.

The load testing shall be performed in general compliance with ASTM D-1143 (Quick Test Method). Initially the loads shall be applied in increments equaling 5% of the anticipated ultimate capacity of the test piers. The magnitude of the load increments may be increased or decreased depending on actual test piers capacity.

Direct movement indicator measurements should be made of the following: downward pier end-bearing movement (min. of two indicators required), upward top-of-pier movement (min. of two indicators required), pier compression (min. of two indicators required).

Loads shall be applied at the prescribed intervals until the ultimate capacity of the pier is reached in either end bearing or side shear, or until the maximum capacity or maximum stroke of the O-cell is reached, unless otherwise directed by the Engineer.

At each load increment, or decrement movement indicators shall be read at 1.0, 2.0 and 4.0, 8.0 minute intervals while the load is held constant.

During unloading cycles the load decrement shall be such that at least four data points are acquired for the load versus movement curve. Additional cycles of loading and unloading using similar procedures may be required by the Engineer following the completion of the initial test cycle.

Dial gages, digital gages, or Linear Vibrating Wire Displacement Transducers (LVWDT's) used to measure end bearing and side shear movement should have a minimum travel of 4 inches and be capable of being read to the nearest 0.001 inch division of displacement. End bearing movement may be alternately monitored using LVWDT's capable of measuring the expansion of the O-cell (6 inches). Dial gages, digital gages or LVWDT's used to measure pier compression should have a minimum travel of 1 inch and be capable of being read to the nearest 0.001 inch division.

The reference beam selected should have a minimum length equal to six times the pier diameter and should be monitored during testing using a surveyor's level.

Unless otherwise specified by the Engineer, the Contractor will supply eight (8) copies of a report of each load test, as prepared by Geotechnical Foundation Testing Contractor or others approved by the Engineer. A preliminary report containing the load-movement curves and test data will be provided to the Engineer within three (3) days of the completion of load testing, to allow evaluation of the test results. A final report on the load testing shall be submitted to the Engineer within two (2) weeks after completion of all load testing on site.

9.0 RESTRICTIONS

If it is determined by the Engineer that either the drilled piers or the load tests are unsatisfactory, due to the Contractor's negligence or poor workmanship, it shall be the Contractor's responsibility to install additional drilled piers and perform additional load tests as required to fulfill this provision.

10.0 METHOD OF MEASUREMENT AND PAYMENT

The "Axial Load Test No. ___", upon acceptance by the Engineer, will be paid for at the lump sum price for "Axial Load Test No. ___". The payment shall be considered as a full compensation for all work required to perform axial load tests as described in this provision, including, but not limited to, furnishing all materials, labor, tools, equipment, and incidentals necessary to complete the work including assembly, installation, conducting of the test, report the results, and removal of test drilled piers to one foot below existing ground. No payment will be made if the axial load test is not accepted by the Engineer based on the requirements specified in the provision. All costs associated with the construction of the test drilled piers will be measured and paid for separately in the contract.

ST-1

Project B-4929

Pender County

Project Special Provisions Structure

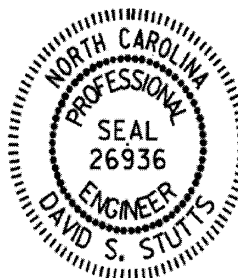
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For MSE Walls, Piles, Drilled Piers, and Axial Load Test,
see Geotechnical special provisions.

For Path Lighting System, see Electrical and Lighting special provisions.

8/1/2016



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David Stutts
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ST-5

of grooving in that area. In this instance, no additional compensation shall be made for underruns in grooving.

5.0 BASIS OF PAYMENT

No separate payment will be made for profilograph testing or diamond grinding of the bridge deck. The cost of the testing procedure, equipment, grinding operation, and removal and disposal of slurry resulting from the grinding operation is considered incidental to the contract bid price for "Reinforced Concrete Deck Slab".

PLACING LOAD ON STRUCTURE MEMBERS

(11-27-12)

The 2012 Standard Specifications shall be revised as follows:

In **Section 420-20 – Placing Load on Structure Members** replace the first sentence of the fifth paragraph with the following:

Do not place vehicles or construction equipment on a bridge deck until the deck concrete develops the minimum specified 28 day compressive strength and attains an age of at least 7 curing days.

STEEL REINFORCED ELASTOMERIC BEARINGS

(11-27-12)

The 2012 Standard Specifications shall be revised as follows:

In **Section 1079-1 – Preformed Bearing Pads** add the following after the second paragraph:

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

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

DISC BEARINGS

(2-3-14)

1.0 GENERAL

This item consists of furnishing, fabrication and installation of disc bearings in accordance with AASHTO LRFD Bridge Design Specifications, the Standard Specifications, the recommendations of the manufacturer, the details shown on the plans and as specified herein. Disc Bearings consist of a polyether urethane structural element (elastomeric disc) confined by upper and lower steel bearing plates. Equip disc bearings with a shear

ST-6

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

ST-7

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

ST-8

on the contract plans and provide an overall bearing height within ½ inch of the bearing assembly height shown on the contract plans. Either combine and cast the sole plate and upper bearing plate (for fixed bearings), the sole plate and guide bars (for expansion bearings), and the lower bearing plate and masonry plate (for fixed and expansion bearings) as a single unit or weld together prior to the installation of the disc.

Ensure access and removal of anchor bolt nut is not in conflict with the upper bearing plate, guide bars or sole plate.

When designing the bearings, use the following allowable bearing stresses:

- On polyether urethane structural element: 5000 psi
- On PTFE Sliding Surface, filled or unfilled PTFE (recessed): 3500 psi

Submit eight sets of shop drawings and one set of design calculations for review, comments and acceptance. Have a North Carolina Registered Professional Engineer check and seal the shop drawings and design calculations.

After the Engineer reviews the drawings and, if necessary, corrections are made, submit one 22" x 34" reproducible set of the working drawings.

4.0 SAMPLING AND TESTING

A. Sampling

The manufacturer is responsible for randomly selecting and testing sample bearings from completed lots of bearings. The manufacturer is also responsible for certifying that the completed bearings and their components have been tested and are in compliance with the requirements of this Special Provision. The manufacturer shall furnish the results of the tests to the Materials and Tests Engineer.

B. Testing

1. Proof Load Test

Load a test bearing to 150% of the bearing's rated design capacity and simultaneously subject it to a rotational range of 0.02 radians (1.146°) for a period of 1 hour.

Have the bearing visually examined both during the test and upon disassembly after the test. Any resultant visual defects, such as extruded or deformed elastomer or PTFE, damaged seals or rings, or cracked steel is cause for rejection.

Keep continuous and uniform contact between the polyether urethane element and the bearing plates and between the stainless steel sheets and the PTFE sheets (for expansion bearings) for the duration of the test. Any observed lift-off or separation is cause for rejection.

ST-9

2. Sliding Coefficient of Friction

For all guided expansion bearings, measure the sliding coefficient of friction at the bearing's design capacity in accordance with the test method described below, and on the fifth and fiftieth cycles, at a sliding speed of 1 in/min.

Calculate the sliding coefficient of friction as the horizontal load required to maintain continuous sliding of one bearing, divided by the bearing's vertical design capacity.

The test results are evaluated as follows:

- A maximum measured sliding coefficient of friction of 3%.
- A visual examination both during and after the test. Any resultant visual defects, such as bond failure, physical destruction, cold flow of PTFE to the point of debonding, or damaged components is cause for rejection of the lot.

Using undamaged test bearings in the work is permitted.

3. Test Method

The test method and equipment shall meet the following requirements:

- a. Arrange the test to determine the coefficient of friction on the first movement of the manufactured bearing.
- b. Clean the bearing surface prior to testing.
- c. Conduct the test at maximum working stress for the PTFE surface with the test load applied continuously for 12 hours prior to measuring friction.
- d. Determine the first movement static and dynamic coefficient of friction of the test bearing at a sliding speed of less than 1 in/min, not to exceed:
 - 0.04 unfilled PTFE
 - 0.08 filled PTFE
- e. Subject the bearing specimen to 100 movements of at least 1 inch of relative movement and, if the test facility permits, the full design movement at a speed of less than 1 ft/min. Following this test determine the static and kinetic coefficient of friction again. The specimen is considered a failure if it exceeds the values measured in (d) above or if it shows any signs of bond failure or other defects.

Bearings represented by test specimens passing the above requirements are approved for use in the structure subject to on-site inspection for visible defects.

ST-10

5.0 INSTALLATION

Store disc bearings delivered to the bridge site upright and under cover on a platform above the ground surface. Protect the bearings from injury at all times and, before placing the bearings, dry and clean all dirt, oil, grease or other foreign substances from the bearing. Do not disassemble the bearings during installation, except at the manufacturer's direction. Lift bearing assemblies by their bottom surfaces only, unless lifting brackets that have been designed and approved by the manufacturer are used. Ensure that the polyether urethane disc is not exposed to direct flame or sparks. Place the bearings in accordance with the recommendations of the manufacturer, Contract Drawings, and as directed by the Engineer. If there is any discrepancy between the recommendations of the manufacturer, Special Provisions, and Contract Drawings, the Engineer is the sole judge in reconciling any such discrepancy.

Provide preformed bearing pads under the masonry plates in accordance with Article 1079-1 of the Standard Specifications.

Do not install any bearing before the Engineer approves it.

6.0 BASIS OF PAYMENT

Payment for all disc bearings will be at the lump sum contract price bid for "Disc Bearings" which includes full compensation for furnishing all disc bearings, labor, materials, tools, equipment, testing and incidentals required to complete the work in accordance with the Standard Specifications, this Special Provision, the manufacturer's requirements and as directed by the Engineer.

THERMAL SPRAYED COATINGS (METALLIZATION)

(9-30-11)

1.0 DESCRIPTION

Apply a thermal sprayed coating (TSC) and sealer to metal surfaces as specified herein when called for on the plans or by other Special Provisions, or when otherwise approved by the Engineer in accordance with the SSPC-CS 23.00/AWS C2.23/NACE No. 12 Specification. Only Arc Sprayed application methods are used to apply TSC coatings, the Engineer must approve other methods of application.

2.0 QUALIFICATIONS

Only use NCDOT approved TSC Contractors meeting the following requirements:

1. The capability of blast cleaning steel surfaces to SSPC SP-5 and SP-10 Finishes.

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2. Employ Spray Operator(s) qualified in accordance with AWS C.16/C2.16M2002 and Quality Control Inspector(s) who have documented training in the applicable test procedures of ASTM D-3276 and SSPC-CS 23.00.

A summary of the contractor's related work experience and the documents verifying each Spray Operator's and Quality Control Inspector's qualifications are submitted to the Engineer before any work is performed.

3.0 MATERIALS

Provide wire in accordance with the metallizing equipment manufacturer's recommendations. Use the wire alloy specified on the plans which meets the requirements in Annex C of the SSPC-CS 23.00 Specification. Have the contractor provide a certified analysis (NCDOT Type 2 Certification) for each lot of wire material.

Apply an approved sealer to all metallized surfaces in accordance with Section 9 of SSPC-CS 23. The sealer must either meet SSPC Paint 27 or is an alternate approved by the Engineer.

4.0 SURFACE PREPARATION AND TSC APPLICATION

Grind flame cut edges to remove the carbonized surface prior to blasting. Bevel all flame cut edges in accordance with Article 442-10(D) regardless of included angle. Blast clean surfaces to be metallized with grit or mineral abrasive in accordance with Steel Structures Painting Council SSPC SP-5/10(as specified) to impart an angular surface profile of 2.5 - 4.0 mils. Surface preparation hold times are in accordance with Section 7.32 of SSPC-CS 23. If flash rusting occurs prior to metallizing, blast clean the metal surface again. Apply the thermal sprayed coating only when the surface temperature of the steel is at least 5°F above the dew point.

At the beginning of each work period or shift, conduct bend tests in accordance with Section 6.5 of SSPC-CS 23.00. Any disbonding or delamination of the coating that exposes the substrate requires corrective action, additional testing, and the Engineer's approval before resuming the metallizing process.

Apply TSC with the alloy to the thickness specified on the plans or as provided in the table below. All spot results (the average of 3 to 5 readings) must meet the minimum requirement. No additional tolerance (as allowed by SSPC PA-2) is permitted. (For Steel Beams: For pieces with less than 200 ft² measure 2 spots/surface per piece and for pieces greater than 200 ft² add 1 additional spots/surface for each 500 ft²).

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| Application | Thickness | Alloy | Seal Coat |
|------------------------|-----------|------------------------|-----------|
| Pot Bearings | 8 mil | 85/15 Zinc (W-Zn-Al-2) | 0.5 mil |
| Armored Joint Angles | 8 mil | 85/15 Zinc (W-Zn-Al-2) | 0.5 mil |
| Modular Joints | 8 mil | 99.99% Zn (W-Zn-1) | 0.5 mil |
| Expansion Joint Seals | 8 mil | 99.99% Zn (W-Zn-1) | 0.5 mil |
| Optional Disc Bearings | 8 mil | 85/15 Zinc (W-Zn-Al-2) | 0.5 mil |

When noted on the plans or as specified in the above chart, apply the sealer to all metallized surfaces in accordance with the manufacturer's recommendations and these provisions. Apply the seal coat only when the air temperature is above 40°F and the surface temperature of the steel is at least 5°F above the dew point. If the sealer is not applied within eight hours after the final application of TSC, the applicator verifies acceptable TSC surfaces and obtains approval from the Engineer before applying the sealer.

5.0 INSPECTION FREQUENCY

The TSC Contractor must conduct the following tests at the specified frequency and the results documented in a format approved by the Engineer.

| Test/Standard | Location | Frequency | Specification |
|--|-----------------|--|---|
| Ambient Conditions | Site | Each Process | 5°F above the dew point |
| Abrasive Properties | Site | Each Day | Size, angularity, cleanliness |
| Surface Cleanliness SSPC Vis 1 | All Surfaces | Visual All Surfaces | SSPC-SP-10 Atmospheric Service SSPC-SP - 5 Immersion Service |
| Surface Profile ASTM D-4417 Method C | Random Surfaces | 3 per 500 ft ² | 2.5 - 4.0 mils |
| Bend Test SSPC-CS 23.00 | Site | 5 per shift | Pass Visual |
| Thickness SSPC PA-2R SSPC-CS 23.00 | Each Surface | Use the method in PA-2 Appendix 3 for Girders and Appendix 4 for frames and miscellaneous steel. See Note 1. | Zn - 8 mils minimum Al - 8 mils minimum Zn Al - 8 mils minimum Areas with more than twice the minimum thickness are inspected for compliance to the adhesion and cut testing requirements of this specification. |

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| Test/Standard | Location | Frequency | Specification |
|-------------------------------------|---------------------------------|-------------------------------------|--|
| Adhesion ASTM 4541 | Random Surfaces Splice Areas | 1 set of 3 per 500 ft ² | Zn > 500 psi Al > 1000 psi Zn Al > 750 psi |
| Cut Test - SSPC-CS 23.00 | Random Surfaces | 3 sets of 3 per 500 ft ² | No peeling or delamination |
| Job Reference Std. SSPC-CS 23.00 | Site | 1 per job | Meets all the above requirements |

6.0 REPAIRS

All Repairs are to be performed in accordance with the procedures below, depending on whether the repair surface is hidden or exposed. As an exception to the following, field welded splices on joint angles and field welding bearing plates to girders may be repaired in accordance with the procedures for hidden surfaces.

For hidden surfaces (including but not limited to interior girders, interior faces of exterior girders, and below-grade sections of piles):

1. Welding of metallized surfaces may be performed only if specifically permitted by the Engineer. Remove metallizing at the location of field welds by blast cleaning (SSPC SP-6 finish), or hand (SSPC SP-2 finish) or power tool cleaning (SSPC SP-3 finish) just prior to welding. Clean sufficiently to prevent contamination of the weld. All repairs to welded connections are metallized in accordance with SSPC CS 23.00.
2. Minor areas less than or equal to 0.1 ft² exposing the substrate are metallized in accordance with SSPC CS 23.00 or painted in accordance with ASTM A780, "Repair of Damaged and Uncoated Areas of Hot Dip Galvanized Coatings."
3. Large areas greater than 0.1 ft² exposing the substrate are metallized in accordance with SSPC CS 23.00.
4. Damaged (burnished) areas not exposing the substrate with less than the specified coating thickness are metallized in accordance with SSPC CS 23.00 or painted in accordance with ASTM A780, "Repair of Damaged and Uncoated Areas of Hot Dip Galvanized Coatings."
5. Damaged (burnished) areas not exposing the substrate with more than the specified coating thickness are not repaired.
6. Defective coating is repaired by either method 2 or 3 depending on the area of the defect.

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For Exposed Surfaces (including but not limited to exterior faces of exterior girders and above-grade sections of piles):

1. Welding of metallized surfaces may be performed only if specifically permitted by the Engineer. Remove metallization at the location of field welds by blast cleaning (SSPC SP-6 finish), or hand (SSPC SP-2 finish) or power tool cleaning (SSPC SP-3 finish) just prior to welding. Clean sufficiently to prevent contamination of the weld. All repairs to welded connections are metallized in accordance with SSPC CS 23.00.
2. All areas exposing the substrate are metallized in accordance with SSPC CS 23.00
3. Defective coating is repaired by either method 2 or 3 depending on the area of the defect.

7.0 TWELVE MONTH OBSERVATION PERIOD

The contractor maintains responsibility for the coating system for a twelve (12) month observation period beginning upon the satisfactory completion of all the work required in the plans or as directed by the engineer. The contractor must guarantee the coating system under the payment and performance bond (refer to Article 109-10). To successfully complete the observation period, the coating system must meet the following requirements after twelve(12) months service:

- No visible rust, contamination or application defect is observed in any coated area.
- Painted surfaces have a uniform color and gloss.
- Surfaces have an adhesion of no less than 500 psi when tested in accordance with ASTM D-4541.

8.0 BASIS OF PAYMENT

The contract price bid for the bridge component to which the coating is applied will be full compensation for the thermal sprayed coating.

EXPANSION JOINT SEALS

(9-30-11)

1.0 GENERAL

The work covered by this Special Provision consists of furnishing and installing the expansion joint seals as shown on the contract drawings. All materials, labor, equipment and incidentals necessary for the proper installation of the expansion joint seals are included.

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2.0 MATERIAL

Provide expansion joint seals capable of accommodating a total movement measured parallel to the centerline of the roadway as shown on plans.

Provide an elastomeric component for each expansion joint seal that is a continuous unit for the entire length of the joint. Do not field splice the elastomeric component. Only vulcanized shop splicing of the elastomeric component is permitted. The minimum length of an elastomeric component before shop splicing is 20 feet. However, one piece shorter than 20 feet is permitted. Provide an elastomeric component that is clearly shop marked to indicate the top side and joint location of the elastomeric component. On skewed bridges, or under unsymmetrical conditions, clearly mark the left side of the elastomeric component. Left is defined as being on the left when facing in the direction of increasing station. Inspect the seals upon receipt to ensure that the marks are clearly visible upon installation.

Make sure the convolution of the gland does not project above the top of the hold-down plates when the joint opening is in the most compressed condition. Use either elastic polychloroprene (neoprene) or ethyl propylene diene monomer (EPDM) for the elastomer that meets the following minimum properties:

| | ASTM TEST METHOD | REQUIREMENTS |
|-------------------------------------|------------------|---|
| Hardness, Durometer - Shore A | D2240 | 60 ± 5, Neoprene (upward corrugated shape - fabric reinforced) 75 ± 5, EPDM and Neoprene (upward non-corrugated shape) 80 ± 5, EPDM (upward corrugated shape-fabric reinforced) |
| Tensile Strength | D412 | 2000 psi (min.) |
| Elongation at Break | D412 | 250% (min.) |
| Width of Gland in Relaxed Condition | N/A | 10" ± 0.25" |

| | | |
|--|-----|--|
| Thickness of Upturned portion of gland | N/A | 0.25" non-corrugated shape, -0.032" to +0.032" |
| Thickness of Upturned portion of gland | N/A | 0.1875" corrugated shape, -0.032" to +0.032" |
| Thickness of Flat portion of gland | N/A | 0.1563", -0.032" to +0.032" |

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For fabric reinforced glands, submit one unreinforced sample per lot number, up to 500 feet of Expansion Joint Seal, to the Engineer for testing.

Only field splice hold-down plates at crown points, at abrupt changes in the deck slab cross slope, and on lane lines. Splicing within travel lanes is not permitted and splicing on edge lines is not required. Field splice hold-down plates between the edge line and gutter upturn and where necessary for proper installation and alignment is permitted. Show all splice locations on the working drawings for approval. For the location of lane markings at the expansion joint seal, see the Structure plans. At the splice locations, locate the hold-down bolts 3 inches from the end of the hold-down plate. At splice locations where changes in deck slab cross slope occur, cut the ends of hold-down plates parallel to the bridge centerline for skews less than 80° and greater than 100° .

Do not use welded shop splices in hold-down plates.

3.0 SHOP DRAWINGS

Submit nine sets of working drawings to the Engineer for review, comments and acceptance. Show complete details drawn to scale and include:

- The proposed template details including the makeup of the template
- The proposed method of holding the base angle assembly in place while concrete is cast around it
- The proposed procedure to correct for the effects of beam movement and rotation when setting width of joint opening
- The proposed chronology of installation including the sequence and direction of the concrete casting
- The details of cross connectors between base angles, such as steel bars with slots bolted to angles, to maintain evenness between the adjacent base angles while accommodating movement that occurs when concrete is cast. Indicate when bolts are loosened to allow movement.
- The proposed method for removing the hold-down plate
- A section detail through the joint showing horizontal offset dimensions of the base angles from the centerline joint. This detail is required when the vertical face of the joint opening is not perpendicular to the roadway surface (e.g. when the roadway grade is significant).

Have someone other than the one who prepares the drawing check all detailed drawings and include the signatures of both the drafter and checker on each sheet of the drawings. The Engineer returns unchecked drawings to the Contractor. Provide all completed drawings well in advance of the scheduled installation time for the expansion joint seal.

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4.0 INSTALLATION

Provide supports for the base angle assembly at a maximum spacing of 9 feet. Place supports near field splices of base angles to ensure that field splices are straight and even. Provide base angles with ½" diameter weep holes at 12 inch centers to allow bleeding of trapped air and/or water. Do not obstruct the weep holes with falsework. Make the bottom of the trough parallel to grade and the sides parallel to the sides of the expansion joint seal.

For damaged areas, depressions, spalls, cracks, or irregularities of curbs or decks adjacent to the expansion joint, submit a proposed method of repair and repair material specifications for approval.

If the Engineer deems any aspects of the expansion joint seals unacceptable, make necessary corrections.

5.0 INSPECTION

When concrete is cast, use a non-aluminum, 10 foot, true to line straight edge to check and grade the top of the slab on each side of the joint to ensure smooth transition between spans.

Watertight Integrity Test

- Upon completion of an expansion joint seal, perform a water test on the top surface to detect any leakage. Cover the roadway section of the joint from curb to curb, or barrier rail to barrier rail, with water, either ponded or flowing, not less than 1 inch above the roadway surface at all points. Block sidewalk sections and secure an unnozzled water hose delivering approximately 1 gallon of water per minute to the inside face of the bridge railing, trained in a downward position about 6 inches above the sidewalks, such that there is continuous flow of water across the sidewalk and down the curb face of the joint.
- Maintain the ponding or flowing of water on the roadway and continuous flow across sidewalks and curbs for a period of 5 hours. At the conclusion of the test, the underside of the joint is closely examined for leakage. The expansion joint seal is considered watertight if no obvious wetness is visible on the Engineer's finger after touching a number of underdeck areas. Damp concrete that does not impart wetness to the finger is not a sign of leakage.
- If the joint system leaks, locate the place(s) of leakage and take any repair measures necessary to stop the leakage at no additional cost to the Department. Use repair measures recommended by the manufacturer and approved by the Engineer prior to beginning corrective work.
- If measures to eliminate leakage are taken, perform a subsequent water integrity test subject to the same conditions as the original test. Subsequent tests carry the same responsibility as the original test and are performed at no extra cost to the Department.

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6.0 BASIS OF PAYMENT

Basis of payment for all expansion joint seals will be at the lump sum contract price for "Expansion Joint Seals" which price and payment will be full compensation for furnishing all material, including any steel accessory plates for sidewalks, medians and rails, labor, tools, and incidentals necessary for installing the expansion joint seal in place and including all materials, labor, tools and incidentals for performing the original watertight integrity test.

SECURING OF VESSELS

(10-12-01)

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

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

FALSEWORK AND FORMWORK

(4-5-12)

1.0 DESCRIPTION

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

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

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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 |

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| 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) |
|-------------------|------------------------|-------------------------------|------------------------------------|----------------------------------|---|
| III | 45 | 42 | 14 | 2000 | 35 |
| IV | 54 | 45 | 14 | 2000 | 44 |
| MBT | 63 | 51 | 12 | 2000 | 50 |
| MBT | 72 | 55 | 12 | 1700 | 48 |

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

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

For MBT prestressed concrete girders, 45-degree angle holes for falsework hanger rods shall be cast through the girder top flange and located, measuring along the top of the member, 1'-2 ½" from the edge of the top flange. Hanger hardware and rods must have a minimum safe working load of 6,000 lbs.

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

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

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

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

When staged construction of the bridge deck is required, detail falsework and forms for screed and fluid concrete loads to be independent of any previous deck pour components when the mid-span girder deflection due to deck weight is greater than ¾".

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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.

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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 | | |

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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.

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B. Foundations

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

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

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

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

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

5.0 REMOVAL

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

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

6.0 METHOD OF MEASUREMENT

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

7.0 BASIS OF PAYMENT

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

SUBMITTAL OF WORKING DRAWINGS

(6-19-15)

1.0 GENERAL

Submit working drawings in accordance with Article 105-2 of the *Standard Specifications* and this provision. For this provision, "submittals" refers to only those listed in this provision. The list of submittals contained herein does not represent a list of required

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submittals for the project. Submittals are only necessary for those items as required by the contract. Make submittals that are not specifically noted in this provision directly to the Engineer. Either the Structures Management Unit or the Geotechnical Engineering Unit or both units will jointly review submittals.

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

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

2.0 ADDRESSES AND CONTACTS

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

Via US mail:

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

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

Via other delivery service:

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

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

Submittals may also be made via email.

Send submittals to:

plambert@ncdot.gov (Paul Lambert)

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

jgaither@ncdot.gov (James Gaither)

mrorie@ncdot.gov (Madonna Rorie)

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

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

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Via US mail:

Mr. K. J. Kim, Ph. D., P. E.
Eastern Regional Geotechnical
Manager
North Carolina Department
of Transportation
Geotechnical Engineering Unit
Eastern Regional Office
1570 Mail Service Center
Raleigh, NC 27699-1570

Via other delivery service:

Mr. K. J. Kim, Ph. D., P. E.
Eastern Regional Geotechnical
Manager
North Carolina Department
of Transportation
Geotechnical Engineering Unit
Eastern Regional Office
3301 Jones Sausage Road, Suite 100
Garner, NC 27529

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

Via US mail:

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

Via other delivery service:

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

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

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

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

Secondary Structures Contacts: James Gaither (919) 707 – 6409
Madonna Rorie (919) 707 – 6508

Eastern Regional Geotechnical Contact (Divisions 1-7):

K. J. Kim (919) 662 – 4710
(919) 662 – 3095 facsimile
kkim@ncdot.gov

Western Regional Geotechnical Contact (Divisions 8-14):

Eric Williams (704) 455 – 8902
(704) 455 – 8912 facsimile
ewilliams3@ncdot.gov

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3.0 SUBMITTAL COPIES

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

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

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

STRUCTURE SUBMITTALS

| Submittal | Copies Required by Structures Management Unit | Copies Required by Geotechnical Engineering Unit | Contract Reference Requiring Submittal ¹ |
|--|---|--|--|
| Arch Culvert Falsework | 5 | 0 | Plan Note, SN Sheet & "Falsework and Formwork" |
| Box Culvert Falsework ⁷ | 5 | 0 | Plan Note, SN Sheet & "Falsework and Formwork" |
| Cofferdams | 6 | 2 | Article 410-4 |
| Foam Joint Seals ⁶ | 9 | 0 | "Foam Joint Seals" |
| Expansion Joint Seals (hold down plate type with base angle) | 9 | 0 | "Expansion Joint Seals" |
| Expansion Joint Seals (modular) | 2, then 9 | 0 | "Modular Expansion Joint Seals" |
| Expansion Joint Seals (strip seals) | 9 | 0 | "Strip Seals" |
| Falsework & Forms ² | 8 | 0 | Article 420-3 & "Falsework and Formwork" |

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| | | | |
|--|---------------------------|---|---|
| (substructure) | | | |
| 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 |

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| | | | |
|---|---------------------------|---|--|
| 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 Article 400-3 & “Construction, Maintenance and Removal of Temporary Structure at Station ____” |
| Temporary Detour Structures | 10 | 2 | Article 1072-8 |
| 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) |

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| | | | |
|--|-------------------------------|------------|---|
| Crosshole Sonic Logging (CSL) Reports ² | 1 | 0 | Subarticle 411-5(A)(2) |
| Pile Driving Equipment Data Forms ^{2,3} | 1 | 0 | Subarticle 450-3(D)(2) |
| Pile Driving Analyzer (PDA) Reports ² | 1 | 0 | Subarticle 450-3(F)(3) |
| Retaining Walls ⁴ | 8 drawings, 2 calculations | 2 drawings | Applicable Provisions |
| Temporary Shoring ⁴ | 5 drawings, 2 calculations | 2 drawings | “Temporary Shoring” & “Temporary Soil Nail Walls” |

FOOTNOTES

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

CRANE SAFETY

(8-15-05)

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

Submit all items listed below to the Engineer prior to beginning crane operations involving critical lifts. A critical lift is defined as any lift that exceeds 75 percent of the manufacturer's crane chart capacity for the radius at which the load will be lifted or requires the use of more than one crane. Changes in personnel or equipment must be reported to the Engineer and all applicable items listed below must be updated and submitted prior to continuing with crane operations.

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CRANE SAFETY SUBMITTAL LIST

- A. **Competent Person:** Provide the name and qualifications of the “Competent Person” responsible for crane safety and lifting operations. The named competent person will have the responsibility and authority to stop any work activity due to safety concerns.
- B. **Riggers:** Provide the qualifications and experience of the persons responsible for rigging operations. Qualifications and experience should include, but not be limited to, weight calculations, center of gravity determinations, selection and inspection of sling and rigging equipment, and safe rigging practices.
- C. **Crane Inspections:** Inspection records for all cranes shall be current and readily accessible for review upon request.
- D. **Certifications:** By July 1, 2006, crane operators performing critical lifts shall be certified by NC CCO (National Commission for the Certification of Crane Operators), or satisfactorily complete the Carolinas AGC’s Professional Crane Operator's Proficiency Program. Other approved nationally accredited programs will be considered upon request. All crane operators shall also have a current CDL medical card. Submit a list of anticipated critical lifts and corresponding crane operator(s). Include current certification for the type of crane operated (small hydraulic, large hydraulic, small lattice, large lattice) and medical evaluations for each operator.

GROUT FOR STRUCTURES

(9-30-11)

1.0 DESCRIPTION

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

2.0 MATERIAL REQUIREMENTS

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

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

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

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

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

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

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

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

Unless required elsewhere in the contract the compressive strength at 3 days shall be at least 5000 psi. Compressive strength in the laboratory shall be determined in accordance with ASTM C109 except the test mix shall contain only water and the dry manufactured material. Compressive strength in the field will be determined by molding and testing 4" x 8" cylinders in accordance with AASHTO T22. Construction loading and traffic loading shall not be allowed until the 3 day compressive strength is achieved.

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

3.0 SAMPLING AND PLACEMENT

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

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

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

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

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

4.0 BASIS OF PAYMENT

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

ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES

(12-30-15)

1.0 INSPECTION FOR ASBESTOS CONTAINING MATERIAL

Prior to conducting bridge demolition or renovation activities, the Contractor shall thoroughly inspect the bridge or affected components for the presence of asbestos containing material (ACM) using a firm prequalified by NCDOT to perform asbestos surveys. The inspection must be performed by a N.C. accredited asbestos inspector with experience inspecting bridges or other industrial structures. The N.C. accredited asbestos inspector must conduct a thorough inspection, identifying all asbestos-containing material as required by the Environmental Protection Agency National Emission Standards for Hazardous Air Pollutants (NESHAP) Code of Federal Regulations (CFR) 40 CFR, Part 61, Subpart M.

The Contractor shall submit an inspection report to the Engineer, which at a minimum must include information required in 40 CFR 763.85 (a)(4) vi)(A)-(E), as well as a project location map, photos of existing structure, the date of inspection and the name, N.C. accreditation number, and signature of the N.C. accredited asbestos inspector who performed the inspection and completed the report. The cover sheet of the report shall include project identification information. Place the following notes on the cover sheet of the report and check the appropriate box:

- ACM was found
 ACM was not found

2.0 REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIAL

If ACM is found, notify the Engineer. Compensation for removal and disposal of ACM is considered extra work in accordance with Article 104-7 of the Standard Specifications.

An Asbestos Removal Permit must be obtained from the Health Hazards Control Unit (HHCU) of the N.C. Department of Health & Human Services, Division of Public Health, if more than 35 cubic feet, 160 square feet, or 260 linear feet of regulated ACM (RACM) is

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to be removed from a structure and this work must be completed by a contractor prequalified by NCDOT to perform asbestos abatement. RACM is defined in 40 CFR, Part 61, Subpart M. Note: 40 CFR 763.85 (a)(4) vi)(D) defines ACM as surfacing, TSI and Miscellaneous which does not meet the NESHAP RACM.

3.0 DEMOLITION NOTIFICATION

Even if no ACM is found (or if quantities are less than those required for a permit), a Demolition Notification (DHHS-3768) must be submitted to the HHCUC. Notifications and Asbestos Permit applications require an original signature and must be submitted to the HHCUC 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 HHCUC 3768-R to HHCUC. Reference the North Carolina Administrative Code, Chapter 10A, Subchapter 41C, Article .0605 for directives on revision submissions.

Contact Information

Health Hazards Control Unit (HHCUC)
N.C. Department of Health and Human Services
1912 Mail Service Center
Raleigh, NC 27699-1912
Telephone: (919) 707-5950
Fax: (919) 870-4808

4.0 SPECIAL CONSIDERATIONS

Buncombe, Forsyth, and Mecklenburg counties also have asbestos permitting and NESHAP requirements must be followed. For projects involving permitted RACM removals, both the applicable county and the state (HHCUC) 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

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Mecklenburg County
Land Use and Environmental Services Agency
Mecklenburg Air Quality
700 N. Tryon Street
Charlotte, NC 28202
(704) 336-5430

5.0 ADDITIONAL INFORMATION

Additional information may be found on N.C. asbestos rules, regulations, procedures and N.C. accredited inspectors, as well as associated forms for demolition notifications and asbestos permit applications at the N.C. Asbestos Hazard Management Program website:

www.epi.state.nc.us/epi/asbestos/ahmp.html

6.0 BASIS OF PAYMENT

Payment for the work required in this provision will be at the lump sum contract unit price for "Asbestos Assessment". Such payment will be full compensation for all asbestos inspections, reports, permitting and notifications.

MASS CONCRETE

(1-23-15)

This special provision applies to substructure components (footings, columns or caps) when the smallest dimension of that component is between six feet and eight feet.

The mass concrete temperature after placement shall not exceed 158°F and the temperature difference between the core and exterior surfaces shall not exceed 35°F. Mass concrete should remain covered and monitored until the difference between the core temperature and the average daily ambient temperature is below 35°F. All mass concrete pours shall remain covered and protected a minimum of 7 days unless otherwise directed by the Engineer.

Submit an analysis, for review and approval, of the anticipated thermal developments in the mass concrete based on the proposed mix design, materials and casting procedures. At a minimum the analysis shall provide: an anticipated range of peak temperatures, temperature gradients, time to peak temperature and recommended cure time. The submittal shall also describe the measures and procedures that will be taken to limit the temperature differential to 35°F or less between the core and exterior surfaces.

Methods for reducing thermal differential may involve but are not limited to a combination of the following:

- A. Selecting materials that minimize the heat generated by hydration of the cement.
- B. Cooling materials to reduce the temperature of the concrete in its plastic state.

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- C. Controlling the rate of concrete placement.
- D. Insulating the concrete surface to prevent heat loss.
- E. Providing supplemental heat at the concrete surface to prevent heat loss.
- F. Other acceptable methods which may be developed by the Contractor.

The temperature of mass concrete at the time of placement shall not be less than 40°F nor more than 75°F.

Mass concrete shall contain an approved set-retarding, water-reducing admixture, and flyash or ground granulated blast furnace slag in the amount of 25% by weight of the total cementitious material (portland cement plus flyash). Flyash or ground granulated blast furnace slag used in the mass concrete mix shall meet the requirements of Articles 1024-5 and 1024-6 of the Standard Specifications. Portland Cement shall meet the requirements of AASHTO M85 for Type II. The total cementitious material shall not exceed 600 lbs. per cubic yard of concrete. The Contractor shall test and submit results for the compressive strength of his proposed mix design for review and approval. The strength must be taken as the average of at least three cylinders made in the laboratory and meet the minimum 28 day strength requirements noted in the contract plans.

The Contractor shall provide and install a minimum of six temperature sensing devices in each mass concrete pour to monitor temperature differentials between the core and exterior surfaces. These devices shall have an accuracy of $\pm 2^\circ\text{F}$ within the temperature range of 40°F to 180°F. One temperature sensing probe shall be placed near the core of the pour, and the remaining temperature sensing probes shall be placed at approximately two inches clear from the surface of the concrete furthest from the core. The Engineer shall approve the locations of the temperature sensing probes.

Readings from the temperature sensing devices shall be recorded at one-hour intervals, from the time casting is complete until the maximum temperature is established. After the maximum temperature is established, record readings from temperature sensing devices at two-hour intervals until consecutive readings indicated the temperature difference between the core and all exterior surfaces is less than 35°F. At the option of the Contractor, the temperature may be recorded by an approved strip-chart recorder furnished by the Contractor.

If monitoring indicates the 35°F differential has been exceeded, the Contractor shall take immediate action to reduce the temperature differential to less than 35°F and revise the thermal plan to ensure future mass concrete pours meet the temperature limits. All revisions to the approved plan must be approved by the Engineer prior to implementation.

At the discretion of the Engineer, all temperature monitoring requirements may be waived provided the Contractor has proven to the satisfaction of the Engineer that the temperature after

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placement will not exceed 158°F and the temperature difference between the core and all exterior surfaces will not exceed 35°F.

Placement of mass concrete shall be continuous resulting in a footing, column or cap that is monolithic and homogeneous.

The entire cost of this work shall be included in the unit contract price bid for the class of concrete associated with the mass concrete.

CORROSION PROTECTION OF BRIDGE AT STATION 38+13.81 -L2- (SPECIAL)

1.0 GENERAL

Corrosion protection for the bridge shall be in accordance with the plans, the applicable sections of the Standard Specifications and this special provision.

2.0 PORTLAND CEMENT CONCRETE COMPOSITION AND DESIGN

Use calcium nitrite [Ca(NO₂)₂] corrosion inhibitor and substitute fly ash and microsilica for a portion of the portland cement. Apply the following rates of pozzolans at the locations shown:

| | Ca(NO ₂) ₂ (gal/yd ³) | Microsilica | Fly Ash |
|---|---|-----------------|------------------|
| Deck Slab | 3.0 | - | 20% ¹ |
| End Diaphragms | 3.0 | - | 20% ¹ |
| Bent Diaphragms | 3.0 | - | 20% ¹ |
| Parapets and Curbs | 3.0 | - | 20% ¹ |
| All Prestressed Concrete Girders | 3.0 | - | - |
| All Interior Bent Caps | 3.0 | - | 20% ¹ |
| Bents 1-5, & 23-28 Columns and Drilled Piers | 3.0 | 5% ² | 30% ¹ |
| Bents 6-22 Columns | 3.0 | 5% ² | 20% ² |
| Bents 6-22 Footings | 3.0 | 5% ² | 30% ² |
| Bents 6-22 Drilled Piers | 3.0 | 5% ² | 30% ² |

¹ The rate of substitution shall be 1.2 lb. of pozzolan per 1.0 lb. of cement.

² The rate of substitution shall be 1.0 lb. of pozzolan per 1.0 lb. of cement.

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3.0 PAYMENT

No separate payment will be made for corrosion protection of the bridge. The cost of furnishing and incorporating the corrosion protection of the bridge is considered incidental to the various pay items.

MAINTENANCE OF WATER TRAFFIC

(SPECIAL)

1.0 DESCRIPTION

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

2.0 BASIS OF PAYMENT

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

WORK IN, OVER OR ADJACENT TO NAVIGABLE WATERS

(SPECIAL)

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

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

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

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

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

VERTICAL CLEARANCE GAGES

(SPECIAL)

1.0 GENERAL

Vertical clearance gages will be required over the navigational channel. Gages will be furnished and installed by Division Bridge Maintenance forces within thirty days prior to completion of the bridge crossing the channel.

The Contractor shall be responsible for notifying, coordinating, and arranging access for Division Bridge Maintenance personnel to complete the work.

2.0 MEASUREMENT AND PAYMENT

No separate measurement will be made for the above work. Payment will be considered as incidental to the construction of the project.

EPOXY RESIN INJECTION

(SPECIAL)

1.0 GENERAL

For repairing cracks, an approved applicator is required to perform the epoxy resin injection. Make certain the supervisor and the workmen have completed an instruction program in the methods of restoring concrete structures utilizing the epoxy injection process and have a record of satisfactory performance on similar projects.

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

2.0 SCOPE OF WORK

Using Epoxy Resin Injection, repair all cracks 5 mils (125 μm) wide or greater in the cast-in-place substructure units within 30 days of Engineer's notification.

Make the underwater repairs when water surface elevation is low and the water is still. For underwater repairs, use manufacturer recommended materials.

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3.0 COOPERATION

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

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

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

4.0 TESTING

The North Carolina Department of Transportation Material and Tests Unit obtains test cores from the repaired concrete. If the failure plane is located at the repaired crack, a minimum compressive strength of 3000 psi (20.7 MPa) is required of these cores.

5.0 MATERIAL PROPERTIES OF EPOXY RESIN

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

| | Test Method | Specification Requirements |
|--|---------------------------------------|----------------------------|
| Viscosity @ $40 \pm 3^\circ\text{F}$ ($4 \pm 1^\circ\text{C}$), cps | Brookfield RVT Spindle No. 4 @ 20 rpm | 6000 - 8000 |
| Viscosity @ $77 \pm 3^\circ\text{F}$ ($25 \pm 1^\circ\text{C}$), cps | Brookfield RVT Spindle No. 2 @ 20 rpm | 400 - 700 |
| Epoxide Equivalent Weight | ASTM D1652 | 152 - 168 |
| Ash Content, % | ASTM D482 | 1 max. |

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

| | Test Method | Specification Requirements |
|--|---------------------------------------|----------------------------|
| Viscosity @ $40 \pm 3^\circ\text{F}$ ($4 \pm 1^\circ\text{C}$), cps | Brookfield RVT Spindle No. 2 @ 20 rpm | 700 - 1400 |
| Viscosity @ $77 \pm 3^\circ\text{F}$ ($25 \pm 1^\circ\text{C}$), cps | Brookfield RVT Spindle No. 2 @ 20 rpm | 105 - 240 |
| Amine Value, mg KOH/g | ASTM D664* | 490 - 560 |
| Ash Content, % | ASTM D482 | 1 max. |
| * Method modified to use perchloric acid in acetic acid. | | |

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

Pot Life (60 gram mass)

@ $77 \pm 3^\circ\text{F}$ ($25 \pm 1^\circ\text{C}$) 15 minutes minimum

@ $100 \pm 3^\circ\text{F}$ ($38 \pm 1^\circ\text{C}$) 5 minutes minimum

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Certify that the Adhesive, when cured for 7 days at $77 \pm 3^\circ\text{F}$ ($25 \pm 1^\circ\text{C}$) unless otherwise specified, has the following properties:

| | Test Method | Specification Requirements |
|---|-------------|--|
| Ultimate Tensile Strength | ASTM D638 | 7000 psi (48.3 MPa) min. |
| Tensile Elongation at Break | ASTM D638 | 4% max. |
| Flexural Strength | ASTM D790 | 10,000 psi (69.0 MPa) min. |
| Flexural Modulus | ASTM D790 | 3.5×10^5 psi (2413.2 MPa) |
| Compressive Yield Strength | ASTM D695 | 11,000 psi (75.8 MPa) min. |
| Compressive Modulus | ASTM D695 | $2.0 - 3.5 \times 10^5$ psi (1379.0 - 2413.2 MPa) |
| Heat Deflection Temperature Cured 28 days @ $77 \pm 3^\circ\text{F}$ ($25 \pm 1^\circ\text{C}$) | ASTM D648* | 125°F (52°C) min. 135°F (57°C) min. |
| Slant Shear Strength, 5000 psi (34.5 MPa) compressive strength concrete Cured 3 days @ 40°F (4°C) wet concrete Cured 7 days @ 40°F (4°C) wet concrete Cured 1 day @ 77°F (25°C) dry concrete | AASHTO T237 | 3500 psi (24.1 MPa) min. 4000 psi (27.6 MPa) min. 5000 psi (34.5 MPa) min. |
| * Cure test specimens so that the peak exothermic temperature of the adhesive does not exceed 77°F (25°C). | | |

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

6.0 MATERIAL PROPERTIES OF SURFACE SEAL

Use a two-component paste epoxy bonding agent for the epoxy resin conforming to the following requirements:

| | |
|--|----------------------|
| Density, lbs/gal (kg/liter) | 10.5 (1.25) |
| Specific Gravity | 1.3 |
| Minimum Application Temperature, °F (°C) | 50 (10) |
| Application Temperature Range, °F (°C) | 60 to 105 (16 to 41) |
| Shelf Life | 1 year (min.) |

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| | @ 60°F (16°C) | @ 85°F (29°C) | @ 105°F (41°C) |
|---|------------------|------------------|-------------------|
| Potlife, hr., 1 gallon (3.8 liters) | 2½ | 1 | ½ |
| Open Time ¹ , minimum: hr. | 4 | 1¾ | ¾ |
| Non-sag Thickness, inches (mm) (ASTM D2730) | 1 (25) | ¾ (19) | ½ (13) |
| Initial Cure ² , days (AASHTO T237) | 10 | 6 | 3 |
| Cure Time ³ , days (ASTM D695) | 20 | 10 | 7 |

| Typical Mechanical Properties ⁴ | |
|--|--|
| Tensile Strength, psi (MPa) Elongation at Break (ASTM D638) | 1,500 (10.3) 4% |
| Compressive Yield Strength, psi (MPa) Compressive Modulus, psi (MPa) (ASTM D695) | 8,000 (55.2) 4.0 x 10 ⁵ (2757.9) |
| Heat Deflection Temperature ⁵ , °F (°C) (ASTM D648) | 105 (41) |
| Slant Shear Strength, psi (MPa) Damp to Damp Concrete (AASHTO T237) | 5,000 (34.5) 100% Concrete Failure |

1. From start of mixing to completion of repair
2. 5,000 psi (34.5 MPa) minimum
3. Isothermal cure to eliminate effect of exotherm
4. Cure schedule 7 days @ 77°F (25°C), test temperature 77°F (25°C)
5. 128°F (53°C) after 28 day cure

7.0 EQUIPMENT FOR INJECTION

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

Use injection equipment with automatic pressure control capable of discharging the mixed adhesive at any pre-set pressure up to 200 ± 5 psi (1380 ± 35 kPa) and equipped with a manual pressure control override.

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Use equipment capable of maintaining the volume ratio for the injection adhesive as prescribed by the manufacturer. A tolerance of $\pm 5\%$ by volume at any discharge pressure up to 200 psi (1380 kPa) is permitted.

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

8.0 PREPARATION

Follow these steps prior to injecting the epoxy resin:

Remove all dirt, dust, grease, oil, efflorescence and other foreign matter detrimental to the bond of the epoxy injection surface seal system from the surfaces adjacent to the cracks or other areas of application. Acids and corrosives are not permitted.

Provide entry ports along the crack at intervals not less than the thickness of the concrete at that location.

Apply surface seal material to the face of the crack between the entry ports. For through cracks, apply surface seal to both faces.

Allow enough time for the surface seal material to gain adequate strength before proceeding with the injection.

9.0 EPOXY INJECTION

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

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

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

Perform epoxy adhesive injection continuously until cracks are completely filled.

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

10.0 FINISHING

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

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

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

11.0 BASIS OF PAYMENT

No separate payment for will be made for epoxy resin injection. The cost of this work shall be considered incidental to the construction of the cast-in-place substructure units.

PLASTIC LUMBER FENDER BOARDS AT CHANNEL BENTS

(SPECIAL)

1.0 DESCRIPTION

The work for providing plastic and composite lumber consists of furnishing and installing the materials and all miscellaneous hardware to complete the work in accordance with the plans and this special provision.

2.0 MATERIALS

Plastic and composite lumber shall be made of polyethylene, contain appropriate colorants and UV inhibitors, and shall meet the material property requirements specified in Table 1. Plastic and composite lumber shall contain glass filament. The lumber must not corrode, rot, warp, splinter or crack. The outer surface of the lumber shall be black in color unless otherwise specified in the Contract Documents. The skin shall be generally smooth, uniform and consolidated but may contain occasional small blisters or pockmarks. Small voids shall be repaired as directed by the Engineer with a repair procedure approved by the Engineer.

Manufacture plastic and composite lumber as one continuous piece with no joints or splices. Plastic and composite lumber shall be free of twist and curvature. Steel reinforcement in the lumber is not permitted.

Plastic and composite lumber must meet the minimum structural properties listed in Table 3 and the dimensions and tolerances of Table 2.

| Applicable ASTM Code | Applies To | Requirement |
|-------------------------------|----------------|-------------------------------|
| Density ASTM D792 | Skin of lumber | 55 pcf min. |
| Density ASTM D792 | Core of lumber | 48 pcf min. |
| Water Absorption ASTM D570 | Skin of lumber | 24 hrs: <3.0% weight increase |

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| Table 1 Plastic and Composite Lumber Material Properties | | |
|--|--|--|
| Impact Resistance ASTM D256 Method A or ASTM D256 Method D | Skin of lumber | Greater than 0.55 ft-lbs/in |
| Hardness ASTM D2240 | Skin of lumber | 44-75 (Shore D) |
| Ultraviolet Light ASTM D4329 UVA | Skin of lumber | 500 hours <10% change in Shore D Durometer Hardness |
| Abrasion ASTM D4060 | Skin of lumber | Weight Loss: < 0.03 oz Cycles = 10,000 Wheel = CS17 Load: 2.2 lbs |
| Chemical Resistance ASTM D756 or ASTM D543 | Skin and Core of lumber Sea Water Gasoline No. 2 Diesel | < 1.5% weight increase < 9.5% weight increase < 6.0% weight increase |
| Tensile Properties ASTM D638 | Core of lumber | Minimum 2200 psi at break |
| Compressive Modulus ASTM D695 | Core of lumber | Minimum 40 ksi |
| Static Coefficient of Friction ASTM D1894 | Skin of lumber | Maximum 0.25, wet |
| Nail Pull-Out or Screw Withdrawal ASTM D6117 | Skin and Core of lumber | Minimum 60 lbs (nail) Minimum 400 lbs (screw) |

| Table 2 Dimensions and Tolerances | | |
|--|----------------------|---------------------|
| Plastic and Composite lumber | Dimension | Tolerance |
| Length | Per order (80ft max) | +6 -0 in |
| Width | See Contract Plans | ± ¼ in |
| Height | See Contract Plans | ± ¼ in |
| Corner Radius –Lumber with reinforcing rods | 1 ¼ in | ± ½ in |
| - Lumber without reinforcing rods | ¼ in | ± 1/16 in |
| Outer Skin Thickness – (if reinforced with rods) | 3/16 in | ± 1/8 in |
| Distance from outer surface to rod elements (if reinforced with rods) | 1 ½ in | ± 5/8 in |
| Straightness (gap, bend or inside while lying on a flat surface) | | <1 ½ in per 10 feet |

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Determine the modulus of elasticity for plastic and composite lumber by conducting a three point or four point bend test as per ASTM D790 or D6109. The modulus for lumber with reinforcing rods is to be taken at a strain of 0.01 inches per inch. The modulus for lumber reinforced without reinforcing rods may be taken by one of the methods suggested in ASTM D6109.

| | |
|------------------------------------|--|
| Modulus of Elasticity (ASTM D6109) | 300 ksi min. |
| Flexural Strength (ASTM D6109) | No fracture at 2500 psi |
| Compressive Strength (ASTM D6108) | 2200 psi min. parallel to grain 700 psi min. perpendicular to grain |

3.0 ACCEPTANCE

The Contractor shall submit the following information to the Resident Engineer and Steve Walton of Materials & Tests (336-993-2300) at least 20 days prior to shipping any plastic and composite lumber:

- Copies of the plastic and composite lumber manufacturer's standards and most recent brochure for the lumber products covered by these specifications.
- Independent test lab report confirming the plastic and composite lumber products meet the plastic material properties found in Table 1.
- Independent test lab report confirming the submitted lumber products meet the minimum structural property requirements found in Table 3.
- Written certification from the manufacturer that the submitted plastic and composite lumber products satisfy the requirements of this.

The independent test lab reports must be no older than five (5) years.

The Department reserves the right to place a duly authorized inspector in the plant prior to shipment of any plastic and composite lumber product for the purpose of determining preapproval. Notify the Engineer at least 7 days in advance of any shipment. Preapproval of lumber products shall be on the basis of tests of materials, inspection of lumber products, conformance with specified dimensions, appearance, and freedom from defect. Each individual plastic and composite lumber piece shall be available for inspection by the inspector. The inspector shall have the authority to reject any or all lumber products not manufactured in accordance with these specifications. Any plastic and composite lumber products found to be defective in any manner at any time shall be rejected and replaced by an acceptable plastic and composite lumber product or repaired in a manner approved by

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the Engineer. All lumber products preapproved by the inspector shall be stamped as approved. Preapproval does not guarantee final acceptance.

Final acceptance of all plastic and composite lumber products shall be determined by the Engineer.

4.0 CONSTRUCTION DETAILS

Protect materials at all times against exposure to extreme heat or impact. Transport plastic and composite lumber in a manner that will minimize scratching or damage to the outer surfaces, stack on dunnage above ground so that it may be easily inspected and store in a manner that will avoid damage. Lumber damaged in shipping or handling will be rejected.

Cut, bevel, drill, countersink, and otherwise fabricate plastic and composite lumber in accordance with the manufacturer's recommendations. Set all material accurately to required levels and lines, with members plumb and true and accurately cut and fitted. Securely attach all composite lumber to substrate by anchoring and fastening as shown on plans. Perform all cutting and drilling in a manner that allows for the collection of all debris and dispose of properly.

5.0 BASIS OF PAYMENT

The lump sum price bid for "Plastic Lumber Fender Boards At Channel Bents" will be the full compensation for all lumber and all equipment, tools, and work necessary for their installation. The lump sum price bid for "Plastic Lumber Fender Boards At Channel Bents" will be full compensation for all other work including but not limited to material, equipment, tools, disposal, fasteners, plates, spare parts package, and other necessary items or effort required for completing the work.

72" F.I.B. and 78" F.I.B. PRESTRESSED CONCRETE GIRDERS (SPECIAL)

The Contractor shall provide girders in accordance with the plans and standard specifications.

Measurement and Payment will be for the actual number of linear feet of prestressed concrete girders.

Payment will be made under:

72" F.I.B. Prestressed Concrete Girders.....Linear Feet
78" F.I.B. Prestressed Concrete Girders.....Linear Feet

NAVIGATIONAL CLEARANCE VERIFICATION & WATERWAY INSPECTION (SPECIAL)

The Contractor is responsible for the following requirements:

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Upon removal of the existing bridge and all temporary work bridges, inspect the waterway bottom to insure that all construction waste materials have been completely removed. Remove any bridge-related debris discovered during this survey. Provide a certification in writing by a licensed engineer or licensed surveyor in the State of North Carolina that the waterway has not been impaired and all construction related debris has been cleared from it. The certification shall include the actual method used to conduct the inspection.

Upon completion of the proposed bridge, verify as-built clearances for the navigational channel and provide a certification by a licensed surveyor or registered professional engineer in the State of North Carolina attesting to the correctness of the clearances.

No separate payment or compensation will be made for this work. Include all costs for performing this work in the various pay items.

PEDESTRIAN RAILING

(SPECIAL)

1.0 GENERAL

Provide pedestrian handrails in accordance with the Standard Specifications, the details shown in the contract plans, and this Special Provision.

2.0 BASIS OF PAYMENT

The quantity for which payment is made is shown in linear feet on the plans for "Pedestrian Railing". The unit bid per linear foot is full compensation for all materials, tools, labor, equipment and incidentals necessary to complete this item.

ASTM A1010 STRUCTURAL STEEL

(SPECIAL)

1.0 DESCRIPTION

This special provision addresses materials, handling requirements, and fabrication requirements specific to ASTM A1010 structural steel. Requirements will follow the standard NCDOT Specifications (2012) for structural steel except as noted below.

SECTION 105 – CONTROL OF WORK of the Specifications is revised as follows:

SECTION 105-2 PLANS AND WORKING DRAWINGS is amended to include the following:

Materials shall conform to Section 105 of the Specifications except:

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WORKING DRAWINGS: The spacing and height of shear stud connectors shall be shown on the shop plans (working drawings). Reviewed working drawings for A1010 structural steel will be returned to the Contractor within 60 days from the date of receipt by the Department.

SECTION 1072 – STEEL STRUCTURES of the Specifications is revised as follows:

Material shall conform to Section 1072 of the Specifications except:

SECTION 1072-2 – SHAPES, PLATES, BARS, AND SHEETS is amended to include the following:

Plate material (including fabricated diaphragms, crossframes, or bracing materials) shall conform to the requirements of ASTM A1010 Grade 50 steel in accordance with ASTM A1010 specifications. The steel shall have a Young's modulus of 29,000 ksi and satisfy minimum Charpy V-notch fracture toughness requirements. Quenched and tempered process required for all plates.

For each sheet of ASTM A1010 steel plate material, 1-ft of additional plate length is required for physical and mechanical testing by NCDOT.

SECTION 1072-5 – HIGH STRENGTH BOLTS, NUTS, WASHERS is amended to include the following:

Contractor shall perform a bolt prequalification test on a minimum of five bolt, nut, and washer assemblies in the presence of the Engineer and Construction Inspector for each length of bolt to be used. This shall be performed within 60 days after project is awarded. Each assembly shall contain one bolt, one nut, and two washers. The qualification test shall follow the ASTM A325 Procedures for Performing Rotational Capacity Test listed under the High Strength Bolts by the Federal Highway Administration, with the test description provided at <https://www.fhwa.dot.gov/bridge/rotational.cfm>. This test will include a minimum of five assemblies tested using the procedures for Long Bolts in Tension Calibrator and five assemblies using the procedures for Bolts too Short to fit Tension Calibrator. The results from this test will be used to determine the proper tightening requirements for bolted connections on this project.

Anti-seizing lubricant shall be formulated for usage on stainless steels and shall have a temperature resistance of at least 2200° F. Never-Seez High Temperature Stainless Lubricating Compound, Loctite LB 8013, Saf-T-

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Eze Nickel Grade Anti-Seize, or other approved equivalent product shall be used.

- A. **Stainless Steel Bolts** – Provide stainless steel bolts in accordance with ASTM A 193 Grade B8*, Class 2. (*=A, M, MA, M2, M3, N, NA, MN, MNA).

- B. **Stainless Steel Nuts** – Provide stainless steel heavy hex nuts in accordance with ASTM A194 Grade 8. Carbide solution treating and strain hardening is required.

- C. **Stainless Steel Washers** – Provide stainless steel washers meeting the requirement of stainless steel AISI Type 304. Strain hardening process is required for stainless steel washers.

SECTION 1072-6 – WELDED SHEAR CONNECTORS is amended to include the following:

All shear stud connectors shall be shop applied and structural steel shall be erected in accordance with Section 1072-18 of the Specifications. The Contractor shall take this into account when preparing worker protection plans.

SECTION 1072-18 – WELDING is amended to include the following:

Submerged arc welding electrode and flux shall be specified for stainless steel and shall meet the requirements of AWS A5.9 for Bare Stainless Steel Welding Electrodes and Rods.

Fillet welding electrode shall be specified for stainless steel and shall meet the requirements of AWS A5.9 for Bare Stainless Steel Welding Electrodes and Rods. Fillet welding process shall be performed with submerged arc welding process listed above unless approved by the Engineer.

Field Welding utilizing any welding process other than SAW as outlined above, shall be subject to the procedure qualification testing outlined herein and must be approved by the engineer.

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Cutting: Oxyfuel cutting of ASTM A1010 is not allowed, but instead, ASTM A1010 shall be plasma cut.

Perform all welded connection to ASTM A1010 in accordance with AWS D1.5-2010 modified as follows:

Maximum preheat and interpass temperature is limited to 300-degree F.

Inspection of ASTM A1010 full penetration weld is qualified by mock-up testing developed by the fabricator and approved by the Engineer. Inspection of full penetration welds will be done by both ultrasonic testing and radiographic testing in accordance with AWS D1.5-2010 and the NCDOT 2012 Standard Specifications.

Perform inspection identified in AWS D1.5-2010 section 6.7.2 by ASTM E 165 Standard Test Method for Liquid Penetration Examination.

Perform fabrication of ASTM A1010 with new tools (Grinding and sanding disc, weld cleaning tool) or tools dedicated for ASTM A1010. Do not use carbon steel tools unless approved by the Engineer.

Fabricator Qualification: This bridge uses martensitic stainless steel plate welded with an austenitic stainless steel electrode. The fabricator shall have the following experience in order to submit a bid for this project:

Fabricator shall be certified to meet the requirements of advanced bridges under AISC certification program for structural steel fabricators.

Perform welder qualification test per AWS D1.5-2010 Part B on ASTM A1010 steel plate in presence of the Engineer. Welders must be qualified for groove welds per Section 5.23.1.2 of AWS D1.5. Give four weeks' notice to the Engineer prior to test performance. Welders, Welding Operators, and Tack Welders who have not passed the qualification test with ASTM A1010 steel base and filler shall not perform work on ASTM A1010 steel materials.

Fabricator shall demonstrate through the qualification Section 5.1, D1.5-2010 successful welding procedure qualification test on ASTM A1010 steel materials.

Proof of acceptable experience performing submerged arc welding of ASTM A1010 plate by using the specified electrodes or acceptable equivalent. Acceptable experience is proven by one of the following:

1. Passing the welder procedure and performance qualification test per AWS D1.5-2010 Section 5, Part A and Part B on ASTM A1010 using

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the specified electrode.

2. Historical proof of successfully welding ASTM A1010 plate using the specified electrode or equivalent for actual plate girder structural applications on at least one previous bridge project.

SECTION 1072-20 – PAINTING AND OTHER PROTECTIVE COATINGS is amended to include the following:

Blast media for ASTM A1010 steel materials shall be aluminum oxide.

All exposed surfaces of corrosion resistant plate girders shall be washed to remove any alkaline product resulting from concrete placement operations, or other surface films that would alter the formation of a uniform patina.

Galvanizing is not required.

2.0 BASIS OF PAYMENT

A1010 Steel will be paid for at the contract lump sum price for “Approximately _____ LBS A1010 Steel”. The approximate quantity shown in the contract pay item is an estimate based on the computed weight of the A1010 steel necessary to complete the work. No measurement for payment will be made for this pay item, and no adjustment in the contract lump sum price will be made for any variation from the approximate quantity shown except for revisions in the plans which affect the quantity of structural steel necessary to complete the work.

When revisions in the plans have been made which affect the quantities of A1010 steel, adjustments in compensation will be made by supplemental agreement.

The above prices and payments will be full compensation for all work covered by this section including but not limited to furnishing, fabricating, delivering, placing, erecting, cleaning; furnishing, erecting, and removing falsework; setting bearings and anchorages; welding; and assembling all structural joints.

Payment will be made under:

ASTM A1010 Structural Steel.....Lump Sum

County: Pender

| 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 INSPECTION VESSEL | Lump Sum | L.S. | |
| 0004 | 0036000000-E | 225 | UNDERCUT EXCAVATION | 3,100 CY | | |
| 0005 | 0050000000-E | 226 | SUPPLEMENTARY CLEARING & GRUB- BING | 1 ACR | | |
| 0006 | 0063000000-N | SP | GRADING | Lump Sum | L.S. | |
| 0007 | 0106000000-E | 230 | BORROW EXCAVATION | 23,000 CY | | |
| 0008 | 0134000000-E | 240 | DRAINAGE DITCH EXCAVATION | 12 CY | | |
| 0009 | 0194000000-E | SP | SELECT GRANULAR MATERIAL, CLASS III | 3,850 CY | | |
| 0010 | 0196000000-E | 270 | GEOTEXTILE FOR SOIL STABILIZA- TION | 6,850 SY | | |
| 0011 | 0248000000-N | SP | GENERIC GRADING ITEM PERMANENT INFILTRATION BASIN | Lump Sum | L.S. | |
| 0012 | 0318000000-E | 300 | FOUNDATION CONDITIONING MATE- RIAL, MINOR STRUCTURES | 360 TON | | |
| 0013 | 0320000000-E | 300 | FOUNDATION CONDITIONING GEO- TEXTILE | 1,120 SY | | |
| 0014 | 0448200000-E | 310 | 15" RC PIPE CULVERTS, CLASS IV | 2,316 LF | | |
| 0015 | 0448300000-E | 310 | 18" RC PIPE CULVERTS, CLASS IV | 688 LF | | |
| 0016 | 0448400000-E | 310 | 24" RC PIPE CULVERTS, CLASS IV | 92 LF | | |
| 0017 | 0448600000-E | 310 | 36" RC PIPE CULVERTS, CLASS IV | 76 LF | | |
| 0018 | 0995000000-E | 340 | PIPE REMOVAL | 679 LF | | |
| 0019 | 0996000000-N | 350 | PIPE CLEAN-OUT | 3 EA | | |

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| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|--------|--------------|-------|---|--------------|-----------|--------|
| 0020 | 1099500000-E | 505 | SHALLOW UNDERCUT | 1,000 CY | | |
| 0021 | 1099700000-E | 505 | CLASS IV SUBGRADE STABILIZATION | 1,900 TON | | |
| 0022 | 1121000000-E | 520 | AGGREGATE BASE COURSE | 119 TON | | |
| 0023 | 1297000000-E | 607 | MILLING ASPHALT PAVEMENT, **** DEPTH (1-1/2") | 5,250 SY | | |
| 0024 | 1330000000-E | 607 | INCIDENTAL MILLING | 1,900 SY | | |
| 0025 | 1489000000-E | 610 | ASPHALT CONC BASE COURSE, TYPE B25.0B | 4,710 TON | | |
| 0026 | 1498000000-E | 610 | ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B | 1,890 TON | | |
| 0027 | 1519000000-E | 610 | ASPHALT CONC SURFACE COURSE, TYPE S9.5B | 1,630 TON | | |
| 0028 | 1525000000-E | 610 | ASPHALT CONC SURFACE COURSE, TYPE SF9.5A | 1,850 TON | | |
| 0029 | 1575000000-E | 620 | ASPHALT BINDER FOR PLANT MIX | 520 TON | | |
| 0030 | 1693000000-E | 654 | ASPHALT PLANT MIX, PAVEMENT REPAIR | 26 TON | | |
| 0031 | 2022000000-E | 815 | SUBDRAIN EXCAVATION | 230 CY | | |
| 0032 | 2026000000-E | 815 | GEOTEXTILE FOR SUBSURFACE DRAINS | 1,000 SY | | |
| 0033 | 2036000000-E | 815 | SUBDRAIN COARSE AGGREGATE | 170 CY | | |
| 0034 | 2044000000-E | 815 | 6" PERFORATED SUBDRAIN PIPE | 1,000 LF | | |
| 0035 | 2070000000-N | 815 | SUBDRAIN PIPE OUTLET | 2 EA | | |
| 0036 | 2077000000-E | 815 | 6" OUTLET PIPE | 12 LF | | |
| 0037 | 2275000000-E | SP | FLOWABLE FILL | 3 CY | | |

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| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|--------|--------------|-------|--|-------------|-----------|--------|
| 0038 | 2286000000-N | 840 | MASONRY DRAINAGE STRUCTURES | 51 EA | | |
| 0039 | 2308000000-E | 840 | MASONRY DRAINAGE STRUCTURES | 3.85 LF | | |
| 0040 | 2364000000-N | 840 | FRAME WITH TWO GRATES, STD 840.16 | 3 EA | | |
| 0041 | 2366000000-N | 840 | FRAME WITH TWO GRATES, STD 840.24 | 4 EA | | |
| 0042 | 2367000000-N | 840 | FRAME WITH TWO GRATES, STD 840.29 | 6 EA | | |
| 0043 | 2374000000-N | 840 | FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E) | 7 EA | | |
| 0044 | 2374000000-N | 840 | FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F) | 13 EA | | |
| 0045 | 2374000000-N | 840 | FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G) | 10 EA | | |
| 0046 | 2396000000-N | 840 | FRAME WITH COVER, STD 840.54 | 3 EA | | |
| 0047 | 2407000000-N | 840 | STEEL FRAME WITH TWO GRATES, STD 840.37 | 3 EA | | |
| 0048 | 2451000000-N | 852 | CONCRETE TRANSITIONAL SECTION FOR DROP INLET | 1 EA | | |
| 0049 | 2535000000-E | 846 | ***X *** CONCRETE CURB (9" X 18") | 790 LF | | |
| 0050 | 2542000000-E | 846 | 1'-6" CONCRETE CURB & GUTTER | 560 LF | | |
| 0051 | 2549000000-E | 846 | 2'-6" CONCRETE CURB & GUTTER | 4,490 LF | | |
| 0052 | 2591000000-E | 848 | 4" CONCRETE SIDEWALK | 1,450 SY | | |
| 0053 | 2605000000-N | 848 | CONCRETE CURB RAMP | 47 EA | | |
| 0054 | 2612000000-E | 848 | 6" CONCRETE DRIVEWAY | 220 SY | | |

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| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|--------|--------------|-------|---|-------------|-----------|--------|
| 0055 | 2655000000-E | 852 | 5" MONOLITHIC CONCRETE ISLANDS (KEYED IN) | 1,720 SY | | |
| 0056 | 2738000000-E | SP | GENERIC PAVING ITEM 10' MULTIUSE PATH | 2,440 SY | | |
| 0057 | 2738000000-E | SP | GENERIC PAVING ITEM 7" CONCRETE TRUCK APRON | 420 SY | | |
| 0058 | 2766000000-N | SP | GENERIC PAVING ITEM 32" CONCRETE BARRIER WITH MOMENT SLAB | Lump Sum | L.S. | |
| 0059 | 3030000000-E | 862 | STEEL BM GUARDRAIL | 287.5 LF | | |
| 0060 | 3045000000-E | 862 | STEEL BM GUARDRAIL, SHOP CURVED | 25 LF | | |
| 0061 | 3105000000-N | 862 | STEEL BM GUARDRAIL TERMINAL SECTIONS | 6 EA | | |
| 0062 | 3150000000-N | 862 | ADDITIONAL GUARDRAIL POSTS | 5 EA | | |
| 0063 | 3165000000-N | SP | GUARDRAIL ANCHOR UNITS, TYPE ***** (350, TL-2) | 1 EA | | |
| 0064 | 3195000000-N | 862 | GUARDRAIL ANCHOR UNITS, TYPE AT-1 | 1 EA | | |
| 0065 | 3215000000-N | 862 | GUARDRAIL ANCHOR UNITS, TYPE III | 2 EA | | |
| 0066 | 3360000000-E | 863 | REMOVE EXISTING GUARDRAIL | 40 LF | | |
| 0067 | 3536000000-E | 866 | CHAIN LINK FENCE, 48" FABRIC | 328 LF | | |
| 0068 | 3542000000-E | 866 | METAL LINE POSTS FOR 48" CHAIN LINK FENCE | 27 EA | | |
| 0069 | 3548000000-E | 866 | METAL TERMINAL POSTS FOR 48" CHAIN LINK FENCE | 10 EA | | |
| 0070 | 3575000000-E | SP | GENERIC FENCING ITEM PEDESTRIAN SAFETY RAIL | 370 LF | | |
| 0071 | 3649000000-E | 876 | RIP RAP, CLASS B | 19 TON | | |

County : Pender

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|--------|--------------|-------|--|-------------|-----------|--------|
| 0072 | 3656000000-E | 876 | GEOTEXTILE FOR DRAINAGE | 2,321 SY | | |
| 0073 | 4072000000-E | 903 | SUPPORTS, 3-LB STEEL U-CHANNEL | 1,235 LF | | |
| 0074 | 4096000000-N | 904 | SIGN ERECTION, TYPE D | 3 EA | | |
| 0075 | 4102000000-N | 904 | SIGN ERECTION, TYPE E | 81 EA | | |
| 0076 | 4108000000-N | 904 | SIGN ERECTION, TYPE F | 4 EA | | |
| 0077 | 4155000000-N | 907 | DISPOSAL OF SIGN SYSTEM, U-CHANNEL | 40 EA | | |
| 0078 | 4400000000-E | 1110 | WORK ZONE SIGNS (STATIONARY) | 611 SF | | |
| 0079 | 4405000000-E | 1110 | WORK ZONE SIGNS (PORTABLE) | 320 SF | | |
| 0080 | 4410000000-E | 1110 | WORK ZONE SIGNS (BARRICADE MOUNTED) | 302 SF | | |
| 0081 | 4420000000-N | 1120 | PORTABLE CHANGEABLE MESSAGE SIGN | 2 EA | | |
| 0082 | 4422000000-N | 1120 | PORTABLE CHANGEABLE MESSAGE SIGN (SHORT TERM) | 28 DAY | | |
| 0083 | 4430000000-N | 1130 | DRUMS | 100 EA | | |
| 0084 | 4435000000-N | 1135 | CONES | 20 EA | | |
| 0085 | 4445000000-E | 1145 | BARRICADES (TYPE III) | 256 LF | | |
| 0086 | 4455000000-N | 1150 | FLAGGER | 540 DAY | | |
| 0087 | 4507000000-E | 1170 | WATER FILLED BARRIER | 250 LF | | |
| 0088 | 4510000000-N | SP | LAW ENFORCEMENT | 16 HR | | |
| 0089 | 4516000000-N | 1180 | SKINNY DRUM | 130 EA | | |
| 0090 | 4590000000-E | SP | GENERIC TRAFFIC CONTROL ITEM FIXED OBJECT DELINEATION | 50 LF | | |

County : Pender

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|--------|--------------|-------|---|----------|-----------|--------|
| 0091 | 4650000000-N | 1251 | TEMPORARY RAISED PAVEMENT MARKERS | 125 | EA | |
| 0092 | 4685000000-E | 1205 | THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS) | 13,600 | LF | |
| 0093 | 4686000000-E | 1205 | THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS) | 4,900 | LF | |
| 0094 | 4695000000-E | 1205 | THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS) | 950 | LF | |
| 0095 | 4697000000-E | 1205 | THERMOPLASTIC PAVEMENT MARKING LINES (8", 120 MILS) | 229 | LF | |
| 0096 | 4702000000-E | 1205 | THERMOPLASTIC PAVEMENT MARKING LINES (12", 120 MILS) | 126 | LF | |
| 0097 | 4710000000-E | 1205 | THERMOPLASTIC PAVEMENT MARKING LINES (24", 120 MILS) | 2,725 | LF | |
| 0098 | 4725000000-E | 1205 | THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS) | 90 | EA | |
| 0099 | 4770000000-E | 1205 | COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV) | 20,400 | LF | |
| 0100 | 4805000000-N | 1205 | COLD APPLIED PLASTIC PAVEMENT MARKING SYMBOL, TYPE ** (II) | 4 | EA | |
| 0101 | 4805000000-N | 1205 | COLD APPLIED PLASTIC PAVEMENT MARKING SYMBOL, TYPE ** (IV) | 20 | EA | |
| 0102 | 4810000000-E | 1205 | PAINT PAVEMENT MARKING LINES (4") | 28,030 | LF | |
| 0103 | 4820000000-E | 1205 | PAINT PAVEMENT MARKING LINES (8") | 320 | LF | |
| 0104 | 4835000000-E | 1205 | PAINT PAVEMENT MARKING LINES (24") | 100 | LF | |
| 0105 | 4845000000-N | 1205 | PAINT PAVEMENT MARKING SYMBOL | 50 | EA | |
| 0106 | 4847000000-E | 1205 | POLYUREA PAVEMENT MARKING LINES (4", *****) (HIGHLY REFLECTIVE ELEMENTS) | 11,920 | LF | |

County : Pender

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|--------|--------------|-------|---|-------------|-----------|--------|
| 0107 | 4847110000-E | 1205 | POLYUREA PAVEMENT MARKING LINES (8", *****) (HIGHLY REFLECTIVE ELEMENTS) | 260 LF | | |
| 0108 | 4850000000-E | 1205 | REMOVAL OF PAVEMENT MARKING LINES (4") | 2,000 LF | | |
| 0109 | 4860000000-E | 1205 | REMOVAL OF PAVEMENT MARKING LINES (8") | 100 LF | | |
| 0110 | 4900000000-N | 1251 | PERMANENT RAISED PAVEMENT MARKERS | 150 EA | | |
| 0111 | 5325600000-E | 1510 | 6" WATER LINE | 34 LF | | |
| 0112 | 5326000000-E | 1510 | 10" WATER LINE | 763 LF | | |
| 0113 | 5326200000-E | 1510 | 12" WATER LINE | 372 LF | | |
| 0114 | 5540000000-E | 1515 | 6" VALVE | 2 EA | | |
| 0115 | 5552000000-E | 1515 | 10" VALVE | 3 EA | | |
| 0116 | 5648000000-N | 1515 | RELOCATE WATER METER | 1 EA | | |
| 0117 | 5649000000-N | 1515 | RECONNECT WATER METER | 7 EA | | |
| 0118 | 5666000000-E | 1515 | FIRE HYDRANT | 2 EA | | |
| 0119 | 5691400000-E | 1520 | 10" SANITARY GRAVITY SEWER | 557 LF | | |
| 0120 | 5691500000-E | 1520 | 12" SANITARY GRAVITY SEWER | 827 LF | | |
| 0121 | 5709300000-E | 1520 | 6" FORCE MAIN SEWER | 481 LF | | |
| 0122 | 5709400000-E | 1520 | 8" FORCE MAIN SEWER | 680 LF | | |
| 0123 | 5709600000-E | 1520 | 12" FORCE MAIN SEWER | 1,250 LF | | |
| 0124 | 5775000000-E | 1525 | 4' DIA UTILITY MANHOLE | 13 EA | | |
| 0125 | 5781000000-E | 1525 | UTILITY MANHOLE WALL, 4' DIA | 69.4 LF | | |

County : Pender

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|--------|--------------|-------|---|-------------|-----------|--------|
| 0126 | 5798000000-E | 1530 | ABANDON *** UTILITY PIPE (3") | 236 LF | | |
| 0127 | 5798000000-E | 1530 | ABANDON *** UTILITY PIPE (4") | 402 LF | | |
| 0128 | 5800000000-E | 1530 | ABANDON 6" UTILITY PIPE | 835 LF | | |
| 0129 | 5801000000-E | 1530 | ABANDON 8" UTILITY PIPE | 1,217 LF | | |
| 0130 | 5802000000-E | 1530 | ABANDON 10" UTILITY PIPE | 1,104 LF | | |
| 0131 | 5804000000-E | 1530 | ABANDON 12" UTILITY PIPE | 679 LF | | |
| 0132 | 5816000000-N | 1530 | ABANDON UTILITY MANHOLE | 4 EA | | |
| 0133 | 5835600000-E | 1540 | 12" ENCASEMENT PIPE | 133 LF | | |
| 0134 | 5835700000-E | 1540 | 16" ENCASEMENT PIPE | 499 LF | | |
| 0135 | 5871700000-E | 1550 | TRENCHLESS INSTALLATION OF 12" IN SOIL | 119 LF | | |
| 0136 | 5871710000-E | 1550 | TRENCHLESS INSTALLATION OF 12" NOT IN SOIL | 13 LF | | |
| 0137 | 5871900000-E | 1550 | TRENCHLESS INSTALLATION OF 16" IN SOIL | 449 LF | | |
| 0138 | 5871910000-E | 1550 | TRENCHLESS INSTALLATION OF 16" NOT IN SOIL | 50 LF | | |
| 0139 | 5882000000-N | SP | GENERIC UTILITY ITEM 10" INSERT VALVE | 3 EA | | |
| 0140 | 5882000000-N | SP | GENERIC UTILITY ITEM 12" INSERT VALVE | 3 EA | | |
| 0141 | 5882000000-N | SP | GENERIC UTILITY ITEM 12" PLUG VALVE | 2 EA | | |
| 0142 | 5882000000-N | SP | GENERIC UTILITY ITEM 3" INSERT VALVE | 1 EA | | |
| 0143 | 5882000000-N | SP | GENERIC UTILITY ITEM 4" INSERT VALVE | 2 EA | | |

County : Pender

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|--------|--------------|-------|--|--------------|-----------|--------|
| 0144 | 5882000000-N | SP | GENERIC UTILITY ITEM 6" INSERT VALVE | 2 EA | | |
| 0145 | 5882000000-N | SP | GENERIC UTILITY ITEM 6" PLUG VALVE | 2 EA | | |
| 0146 | 5882000000-N | SP | GENERIC UTILITY ITEM 8" INSERT VALVE | 1 EA | | |
| 0147 | 5882000000-N | SP | GENERIC UTILITY ITEM SALVAGE FIRE HYDRANT | 2 EA | | |
| 0148 | 5882000000-N | SP | GENERIC UTILITY ITEM SALVAGE WATER METER | 1 EA | | |
| 0149 | 6000000000-E | 1605 | TEMPORARY SILT FENCE | 17,625 LF | | |
| 0150 | 6006000000-E | 1610 | STONE FOR EROSION CONTROL, CLASS A | 750 TON | | |
| 0151 | 6009000000-E | 1610 | STONE FOR EROSION CONTROL, CLASS B | 505 TON | | |
| 0152 | 6012000000-E | 1610 | SEDIMENT CONTROL STONE | 940 TON | | |
| 0153 | 6015000000-E | 1615 | TEMPORARY MULCHING | 23.5 ACR | | |
| 0154 | 6018000000-E | 1620 | SEED FOR TEMPORARY SEEDING | 900 LB | | |
| 0155 | 6021000000-E | 1620 | FERTILIZER FOR TEMPORARY SEED- ING | 4.5 TON | | |
| 0156 | 6024000000-E | 1622 | TEMPORARY SLOPE DRAINS | 470 LF | | |
| 0157 | 6029000000-E | SP | SAFETY FENCE | 3,300 LF | | |
| 0158 | 6030000000-E | 1630 | SILT EXCAVATION | 420 CY | | |
| 0159 | 6036000000-E | 1631 | MATTING FOR EROSION CONTROL | 2,500 SY | | |
| 0160 | 6037000000-E | SP | COIR FIBER MAT | 100 SY | | |
| 0161 | 6042000000-E | 1632 | 1/4" HARDWARE CLOTH | 3,540 LF | | |
| 0162 | 6048000000-E | SP | FLOATING TURBIDITY CURTAIN | 100 SY | | |

County : Pender

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|-------------------|--------------|-------|--|----------|-----------|--------|
| 0163 | 6071012000-E | SP | COIR FIBER WATTLE | 280 | LF | |
| 0164 | 6071030000-E | 1640 | COIR FIBER BAFFLE | 260 | LF | |
| 0165 | 6084000000-E | 1660 | SEEDING & MULCHING | 15 | ACR | |
| 0166 | 6087000000-E | 1660 | MOWING | 18 | ACR | |
| 0167 | 6090000000-E | 1661 | SEED FOR REPAIR SEEDING | 250 | LB | |
| 0168 | 6093000000-E | 1661 | FERTILIZER FOR REPAIR SEEDING | 0.75 | TON | |
| 0169 | 6096000000-E | 1662 | SEED FOR SUPPLEMENTAL SEEDING | 350 | LB | |
| 0170 | 6108000000-E | 1665 | FERTILIZER TOPDRESSING | 10.25 | TON | |
| 0171 | 6117000000-N | SP | RESPONSE FOR EROSION CONTROL | 150 | EA | |
| 0172 | 6132000000-N | SP | GENERIC EROSION CONTROL ITEM CONCRETE WASHOUT STRUCTURE | 12 | EA | |
| 0218 | 5325400000-E | 1510 | 4" WATER LINE | 8 | LF | |
| 0219 | 5571000000-E | 1515 | *** TAPPING VALVE (3") | 1 | EA | |
| 0220 | 5571400000-E | 1515 | 4" TAPPING VALVE | 2 | EA | |
| 0221 | 5571600000-E | 1515 | 6" TAPPING VALVE | 2 | EA | |
| 0222 | 5572000000-E | 1515 | 10" TAPPING VALVE | 3 | EA | |
| 0223 | 5572200000-E | 1515 | 12" TAPPING VALVE | 2 | EA | |
| WALL ITEMS | | | | | | |
| 0173 | 8801000000-E | SP | MSE RETAINING WALL NO **** (1) | 786 | SF | |

County : Pender

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|------------------------|--------------|-------|---|----------|-----------|--------|
| 0174 | 8801000000-E | SP | MSE RETAINING WALL NO **** (2) | 755 | SF | |
| 0175 | 8801000000-E | SP | MSE RETAINING WALL NO **** (3) | 349 | SF | |
| 0176 | 8801000000-E | SP | MSE RETAINING WALL NO **** (4) | 757 | SF | |
| STRUCTURE ITEMS | | | | | | |
| 0177 | 5260000000-N | SP | GENERIC LIGHTING ITEM PATH LIGHTING SYSTEM AT STA 18+40.00 -L2- | Lump Sum | L.S. | |
| 0178 | 5260000000-N | SP | GENERIC LIGHTING ITEM PATH LIGHTING SYSTEM AT STA 57+76.00 -L2- | Lump Sum | L.S. | |
| 0179 | 8017000000-N | SP | CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMP ACCESS AT STA ***** (38+13.81 -L2-) | Lump Sum | L.S. | |
| 0180 | 8035000000-N | 402 | REMOVAL OF EXISTING STRUCTURE AT STATION ***** (38+13.81 -L2-) | Lump Sum | L.S. | |
| 0181 | 8108000000-E | 411 | ***-*** DIA DRILLED PIERS (4'-0") | 10,716.7 | LF | |
| 0182 | 8108000000-E | 411 | ***-*** DIA DRILLED PIERS (5'-0") | 6,705.7 | LF | |
| 0183 | 8111000000-E | 411 | PERMANENT STEEL CASING FOR ***-*** DIA DRILLED PIER (4'-0") | 3,518 | LF | |
| 0184 | 8111000000-E | 411 | PERMANENT STEEL CASING FOR ***-*** DIA DRILLED PIER (5'-0") | 2,346 | LF | |
| 0185 | 8112730000-N | 450 | PDA TESTING | 2 | EA | |
| 0186 | 8113000000-N | 411 | SID INSPECTIONS | 49 | EA | |

County : Pender

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|--------|--------------|-------|--|----------------|-----------|--------|
| 0187 | 8114000000-N | 411 | SPT TESTING | 86 EA | | |
| 0188 | 8115000000-N | 411 | CSL TESTING | 49 EA | | |
| 0189 | 8147000000-E | 420 | REINFORCED CONCRETE DECK SLAB | 202,470 SF | | |
| 0190 | 8161000000-E | 420 | GROOVING BRIDGE FLOORS | 169,397 SF | | |
| 0191 | 8210000000-N | 422 | BRIDGE APPROACH SLABS, STATION ***** (38+13.81 -L2-) | Lump Sum | L.S. | |
| 0192 | 8265000000-E | 430 | 54" PRESTRESSED CONCRETE GIR- DERS | 3,360.75 LF | | |
| 0193 | 8329000000-E | 450 | 12" PRESTRESSED CONCRETE PILES | 870 LF | | |
| 0194 | 8393000000-N | 450 | PILE REDRIVES | 13 EA | | |
| 0195 | 8475000000-E | 460 | TWO BAR METAL RAIL | 3,789 LF | | |
| 0196 | 8505000000-E | 460 | VERTICAL CONCRETE BARRIER RAIL | 3,796.99 LF | | |
| 0197 | 8517000000-E | 460 | 1'-**X ***** CONCRETE PARA- PET (2'-0" X 2'-6") | 3,804.06 LF | | |
| 0198 | 8706000000-N | SP | EXPANSION JOINT SEALS | Lump Sum | L.S. | |
| 0199 | 8860000000-N | SP | GENERIC STRUCTURE ITEM ASBESTOS ASSESSMENT | Lump Sum | L.S. | |
| 0200 | 8860000000-N | SP | GENERIC STRUCTURE ITEM AXIAL LOAD TEST NO 1 | Lump Sum | L.S. | |
| 0201 | 8860000000-N | SP | GENERIC STRUCTURE ITEM AXIAL LOAD TEST NO 2 | Lump Sum | L.S. | |
| 0202 | 8860000000-N | SP | GENERIC STRUCTURE ITEM PLASTIC LUMBER FENDER BOARDS AT CHANNEL BENTS | Lump Sum | L.S. | |
| 0203 | 8867000000-E | SP | GENERIC STRUCTURE ITEM 72" FLORIDA I-BEAM PRESTRESSED CONCRETE GIRDERS | 7,175.37 LF | | |

County : Pender

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|--------|-------------|-------|-------------|----------|-----------|--------|
|--------|-------------|-------|-------------|----------|-----------|--------|

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|------|--------------|----|--|----------|----|--|
| 0204 | 8867000000-E | SP | GENERIC STRUCTURE ITEM PEDESTRIAN RAILING | 3,813.16 | LF | |
|------|--------------|----|--|----------|----|--|

***** BEGIN SCHEDULE IA *****
***** (2 ALTERNATES) *****

| | | | | | | |
|------|--------------|-----|----------------------------|---------|----|--|
| 0205 | 8175000000-E | 420 | CLASS AA CONCRETE (BRIDGE) | 8,957.8 | CY | |
|------|--------------|-----|----------------------------|---------|----|--|

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|------|--------------|-----|--|-----------|----|--|
| 0206 | 8224000000-E | 425 | EPOXY COATED REINFORCING STEEL (BRIDGE) | 5,417,195 | LB | |
|------|--------------|-----|--|-----------|----|--|

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|------|--------------|-----|--|---------|----|--|
| 0207 | 8226000000-E | 425 | EPOXY COATED SPIRAL COLUMN RE- INFORCING STEEL (BRIDGE) | 506,375 | LB | |
|------|--------------|-----|--|---------|----|--|

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|------|--------------|-----|----------------------|----------|------|--|
| 0208 | 8657000000-N | 430 | ELASTOMERIC BEARINGS | Lump Sum | L.S. | |
|------|--------------|-----|----------------------|----------|------|--|

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|------|--------------|----|--|---------|----|--|
| 0209 | 8867000000-E | SP | GENERIC STRUCTURE ITEM 78" FLORIDA I-BEAM PRESTRESSED CONCRETE GIRDERS | 8,882.8 | LF | |
|------|--------------|----|--|---------|----|--|

*** OR ***

| | | | | | | |
|------|--------------|-----|----------------------------|---------|----|--|
| 0210 | 8175000000-E | 420 | CLASS AA CONCRETE (BRIDGE) | 9,090.5 | CY | |
|------|--------------|-----|----------------------------|---------|----|--|

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|------|--------------|-----|--|-----------|----|--|
| 0211 | 8224000000-E | 425 | EPOXY COATED REINFORCING STEEL (BRIDGE) | 5,427,463 | LB | |
|------|--------------|-----|--|-----------|----|--|

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|------|--------------|-----|--|---------|----|--|
| 0212 | 8226000000-E | 425 | EPOXY COATED SPIRAL COLUMN RE- INFORCING STEEL (BRIDGE) | 506,105 | LB | |
|------|--------------|-----|--|---------|----|--|

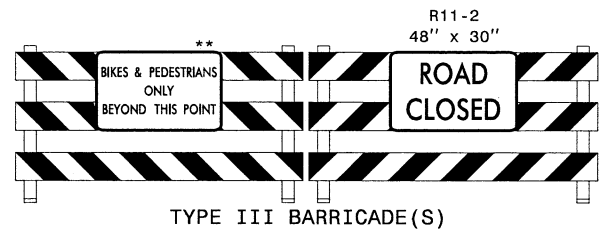
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| 0213 | 8654000000-N | SP | DISC BEARINGS | Lump Sum | L.S. | |
|------|--------------|----|---------------|----------|------|--|

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|------|--------------|-----|----------------------|----------|------|--|
| 0214 | 8657000000-N | 430 | ELASTOMERIC BEARINGS | Lump Sum | L.S. | |
|------|--------------|-----|----------------------|----------|------|--|

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|------|--------------|----|---|----------|------|--|
| 0215 | 8860000000-N | SP | GENERIC STRUCTURE ITEM ASTM A1010 STRUCTURAL STEEL | Lump Sum | L.S. | |
|------|--------------|----|---|----------|------|--|

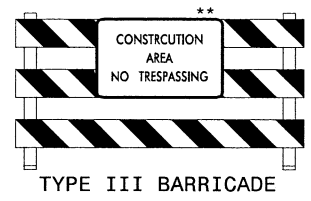
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|------|--------------|----|--|----------|----|--|
| 0216 | 8867000000-E | SP | GENERIC STRUCTURE ITEM 78" FLORIDA I-BEAM PRESTRESSED CONCRETE GIRDERS | 2,191.85 | LF | |
|------|--------------|----|--|----------|----|--|

***** END SCHEDULE IA *****



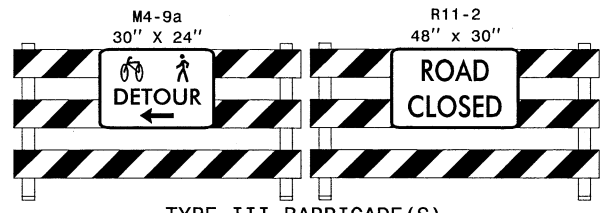
TYPE III BARRICADE(S)

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TYPE III BARRICADE

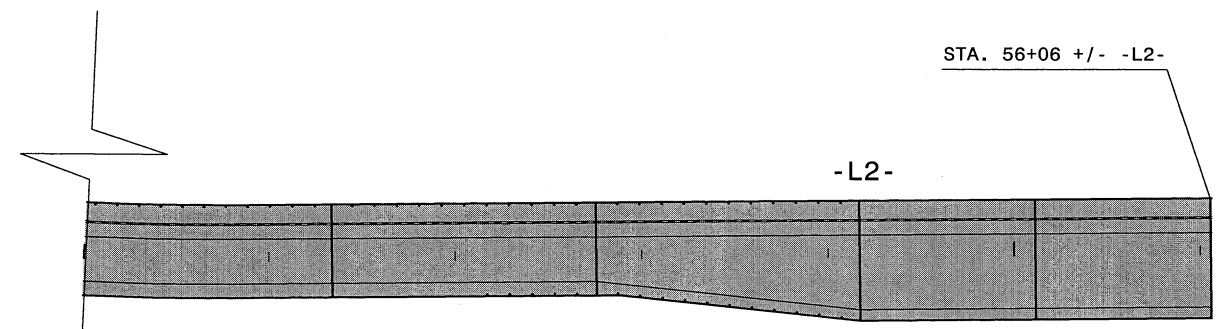
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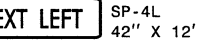
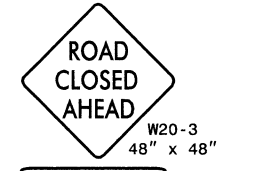
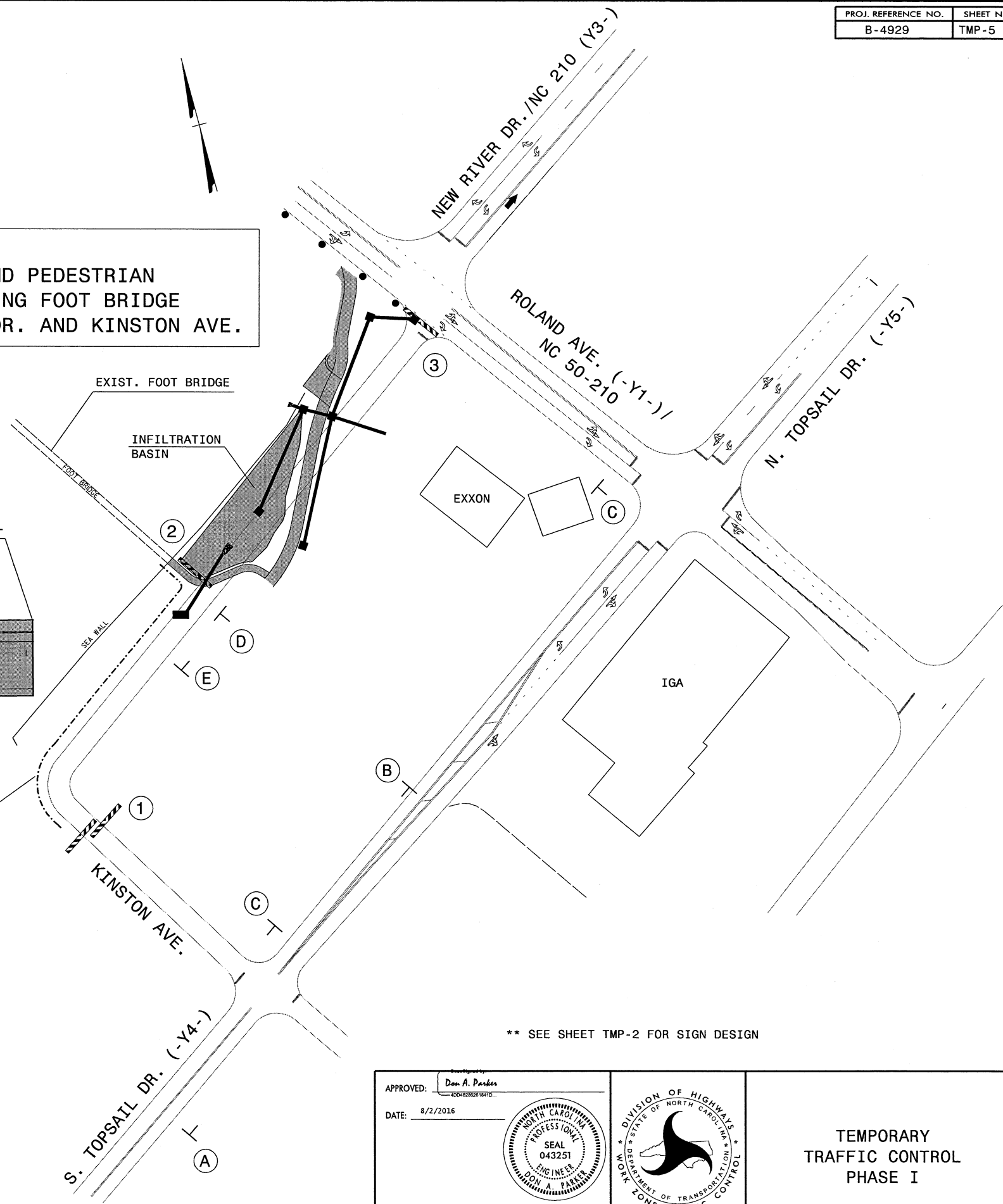
TYPE III BARRICADE(S)

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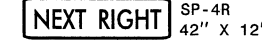
NOTE:
 MAINTAIN BIKE AND PEDESTRIAN
 ACCESS TO EXISTING FOOT BRIDGE
 VIA N. TOPSAIL DR. AND KINSTON AVE.



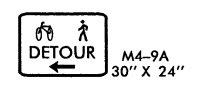
ORANGE SAFETY FENCE



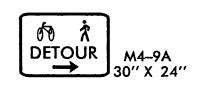
(A)



(B)



(C)



(D)



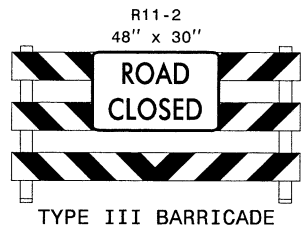
(E)

** SEE SHEET TMP-2 FOR SIGN DESIGN

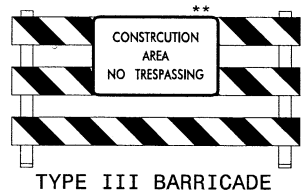
APPROVED: *Don A. Parker*
 DATE: 8/2/2016

DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED

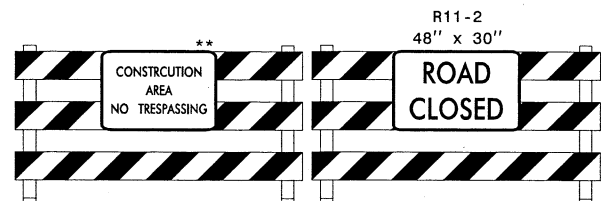
TEMPORARY
 TRAFFIC CONTROL
 PHASE I



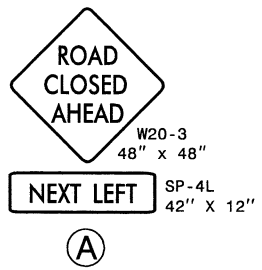
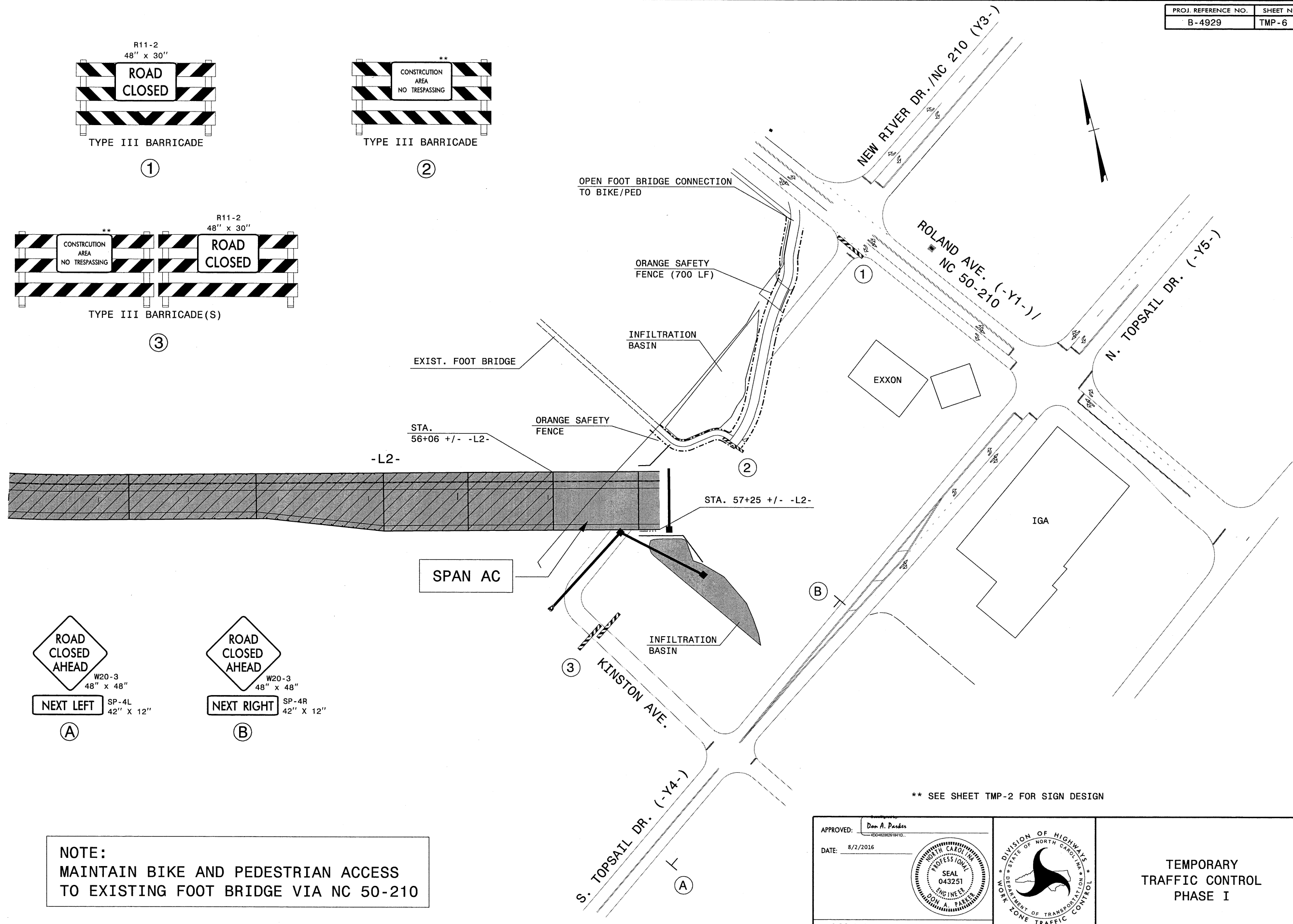
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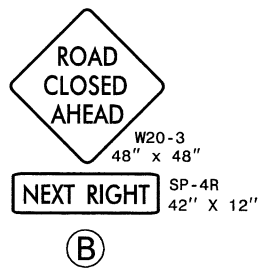
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NOTE:
 MAINTAIN BIKE AND PEDESTRIAN ACCESS
 TO EXISTING FOOT BRIDGE VIA NC 50-210

** SEE SHEET TMP-2 FOR SIGN DESIGN

APPROVED: *Don A. Parker*
Professional Engineer License No. 04042802919410

DATE: 8/2/2016

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 UNLESS ALL SIGNATURES COMPLETED**

**TEMPORARY
 TRAFFIC CONTROL
 PHASE I**

8/2/2016
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2016-B-7

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UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO. B-4929 SHEET NO. UC-8

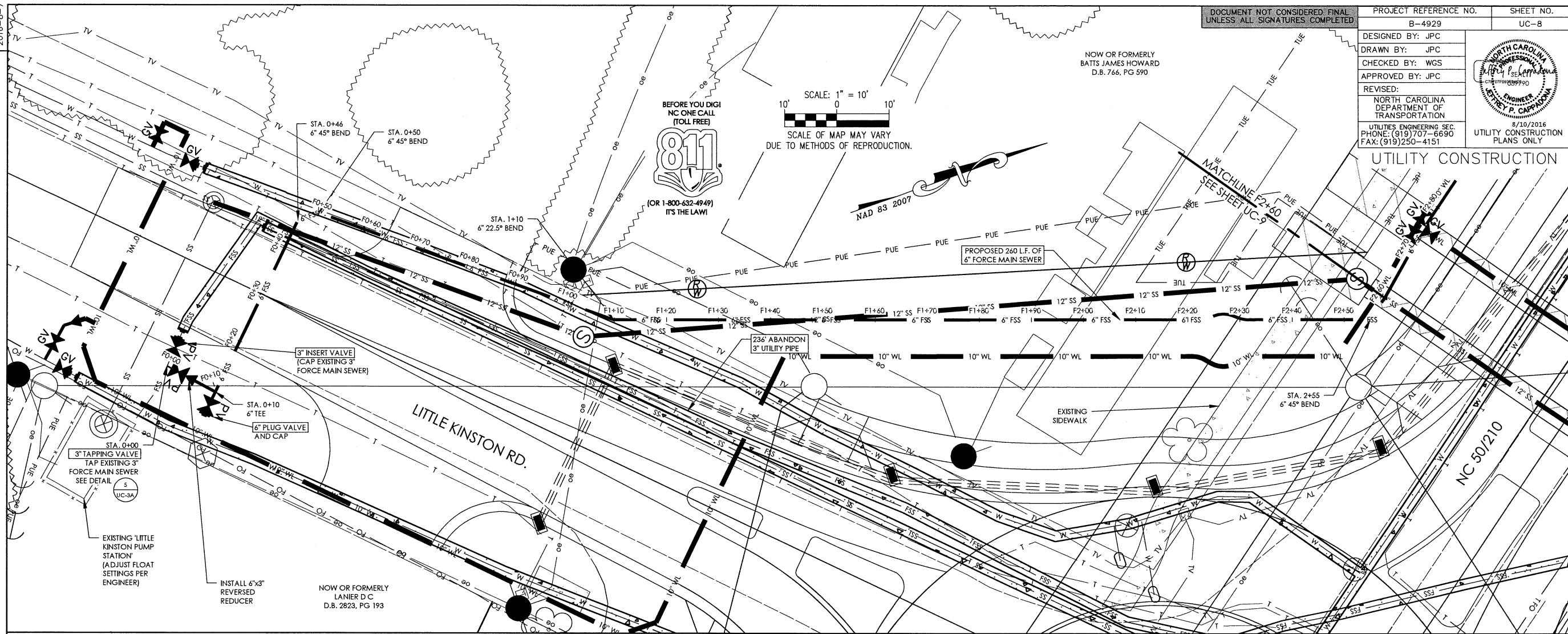
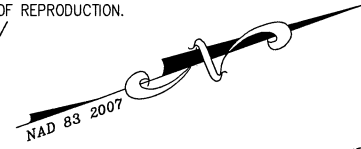
DESIGNED BY: JPC
DRAWN BY: JPC
CHECKED BY: WGS
APPROVED BY: JPC
REVISED:
NORTH CAROLINA
DEPARTMENT OF
TRANSPORTATION
UTILITIES ENGINEERING SEC.
PHONE: (919) 707-6690
FAX: (919) 250-4151



8/10/2016
UTILITY CONSTRUCTION
PLANS ONLY

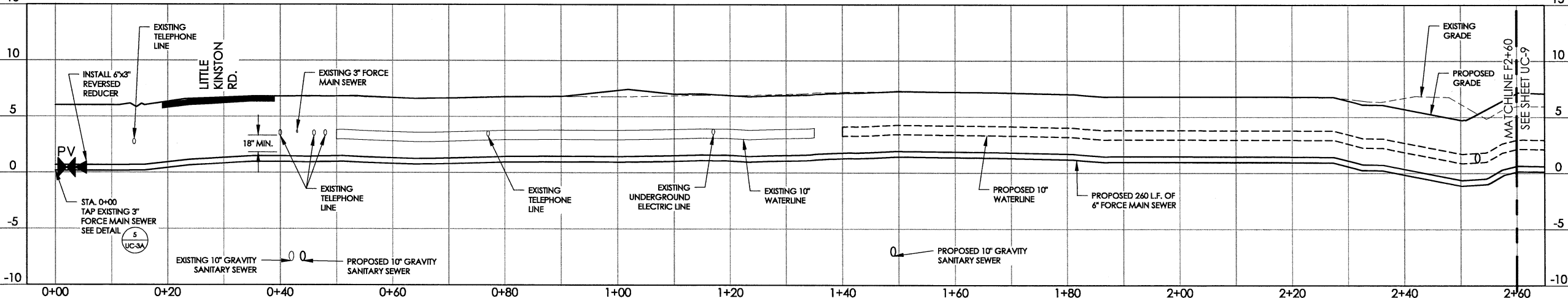
NOW OR FORMERLY
BATTS JAMES HOWARD
D.B. 766, PG 590

SCALE: 1" = 10'
0 10'
SCALE OF MAP MAY VARY
DUE TO METHODS OF REPRODUCTION.

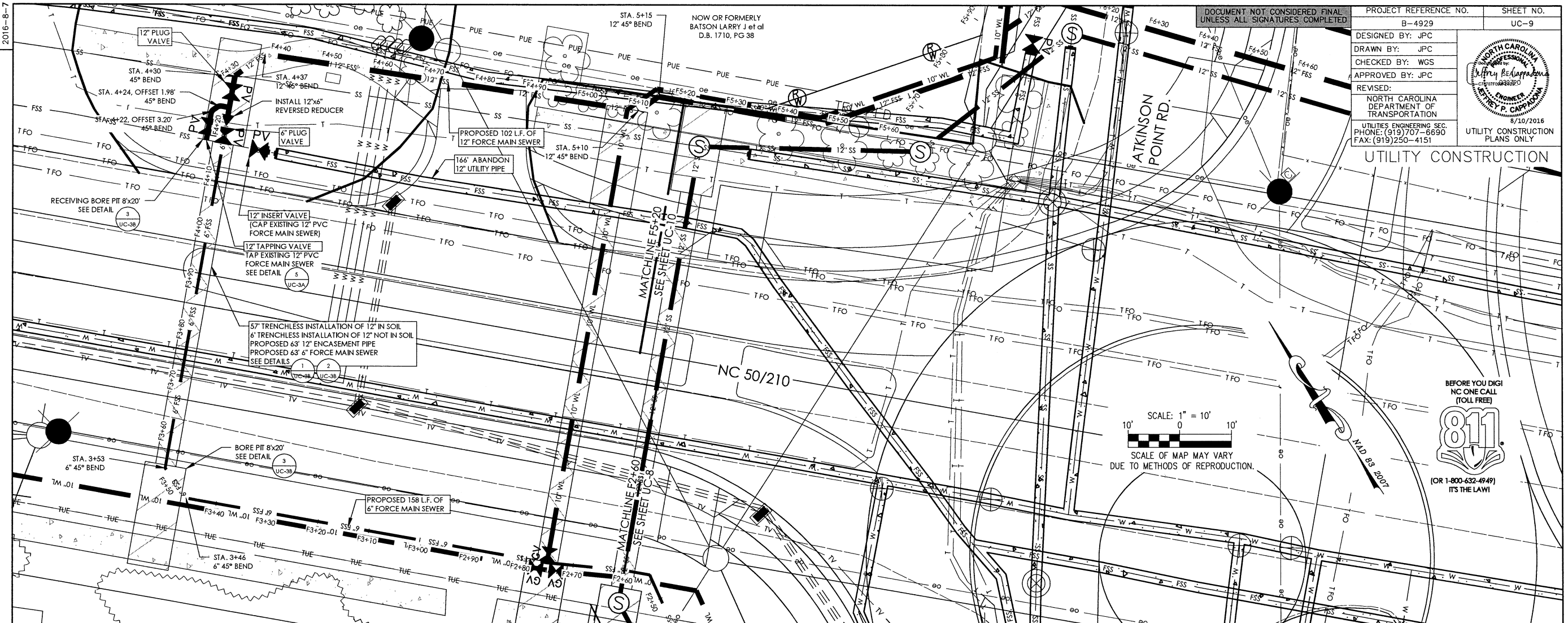



REVISIONS

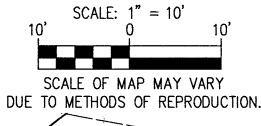
15 NOTE: TOPOGRAPHICAL INFORMATION PROVIDED BY NCDOT HORIZONTAL: 1" = 10' VERTICAL: 1" = 5' 15



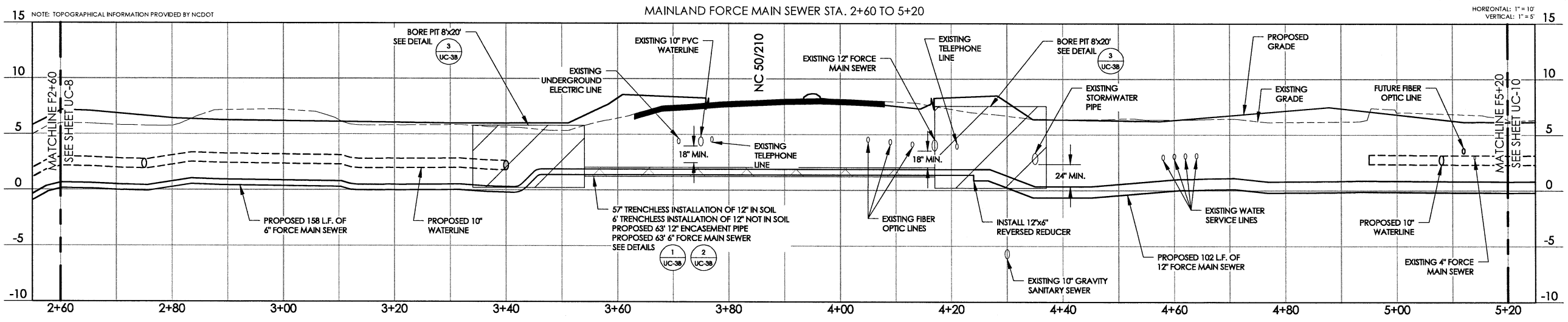
2016-8-7



| | | | |
|---------------------------------|--------|---|------|
| PROJECT REFERENCE NO. | B-4929 | SHEET NO. | UC-9 |
| DESIGNED BY: | JPC |  | |
| DRAWN BY: | JPC | | |
| CHECKED BY: | WGS | | |
| APPROVED BY: | JPC | NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151 | |
| REVISED: | | 8/10/2016 | |
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15 NOTE: TOPOGRAPHICAL INFORMATION PROVIDED BY NCDOT

MAINLAND FORCE MAIN SEWER STA. 2+60 TO 5+20

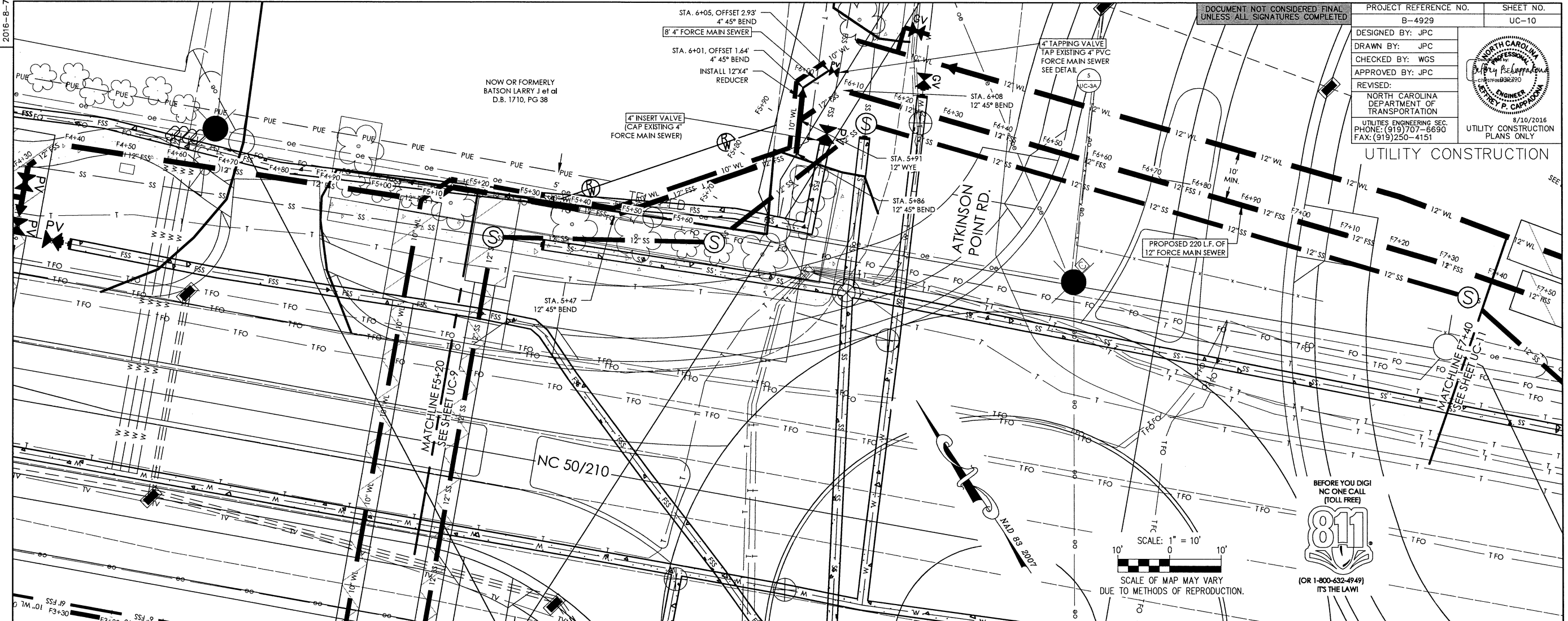
HORIZONTAL: 1" = 10' VERTICAL: 1" = 5'

2016-8-7

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| | | | |
|---|--------|---|-------|
| PROJECT REFERENCE NO. | B-4929 | SHEET NO. | UC-10 |
| DESIGNED BY: | JPC |  | |
| DRAWN BY: | JPC | | |
| CHECKED BY: | WGS | | |
| APPROVED BY: | JPC | | |
| REVISED: | | | |
| NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151 | | | |
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UTILITY CONSTRUCTION



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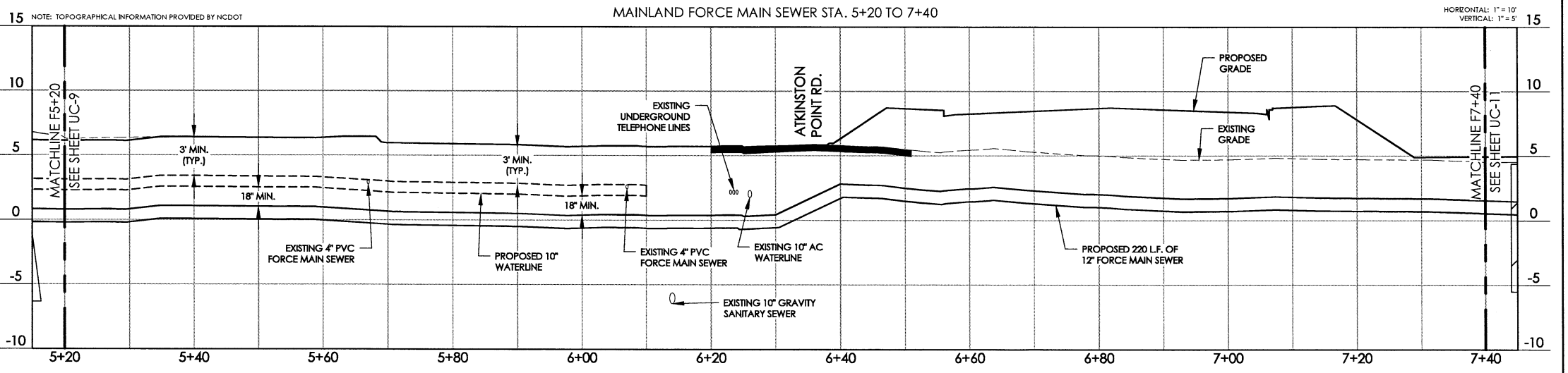
NOW OR FORMERLY BATSON LARRY J et al D.B. 1710, PG 38

ATKINSON POINT RD.

NC 50/210

SCALE: 1" = 10'

SCALE OF MAP MAY VARY DUE TO METHODS OF REPRODUCTION.



2016-8-7

NOW OR FORMERLY
BATTS ALDRICH ALVIN
D.B. 1486, PG 44

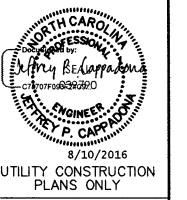
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D.B. 1486, PG 44

NOW OR FORMERLY
BATTS ALDRICH ALVIN
D.B. 1486, PG 44

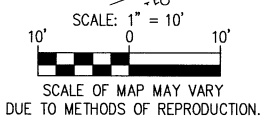
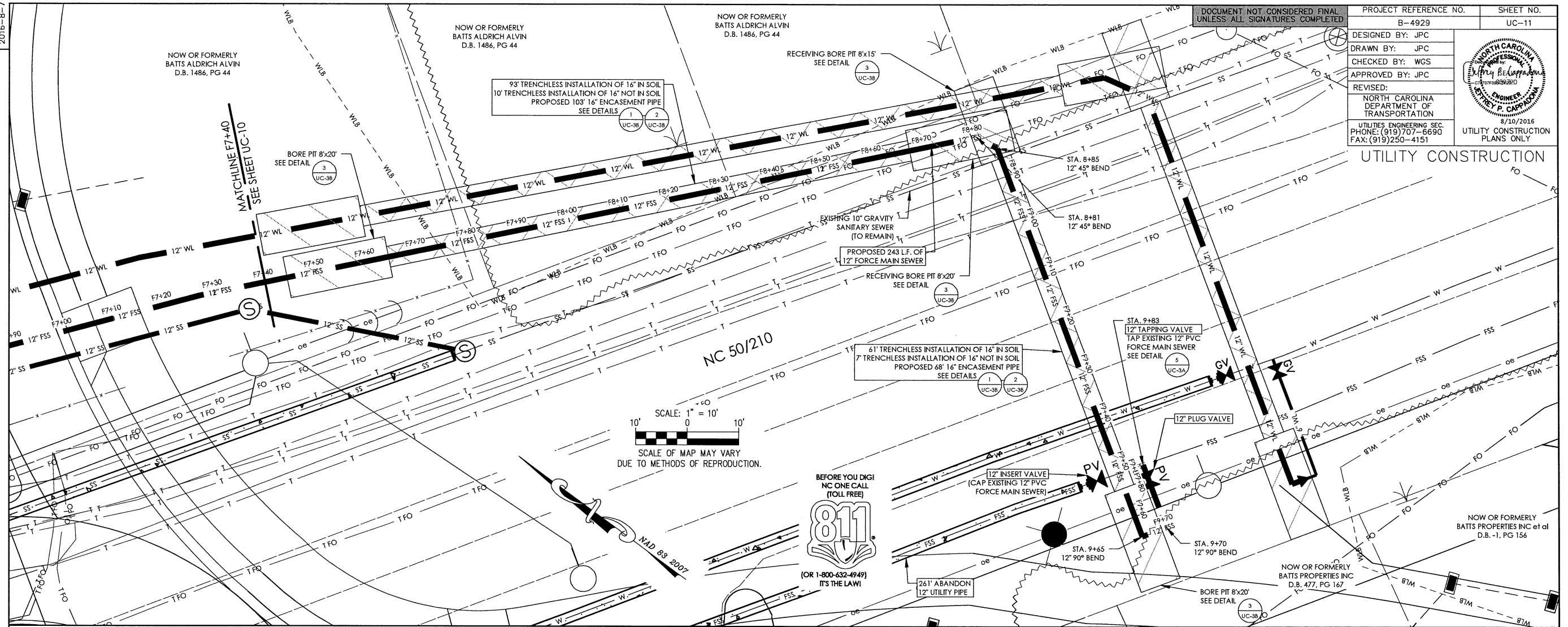
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO. B-4929 SHEET NO. UC-11

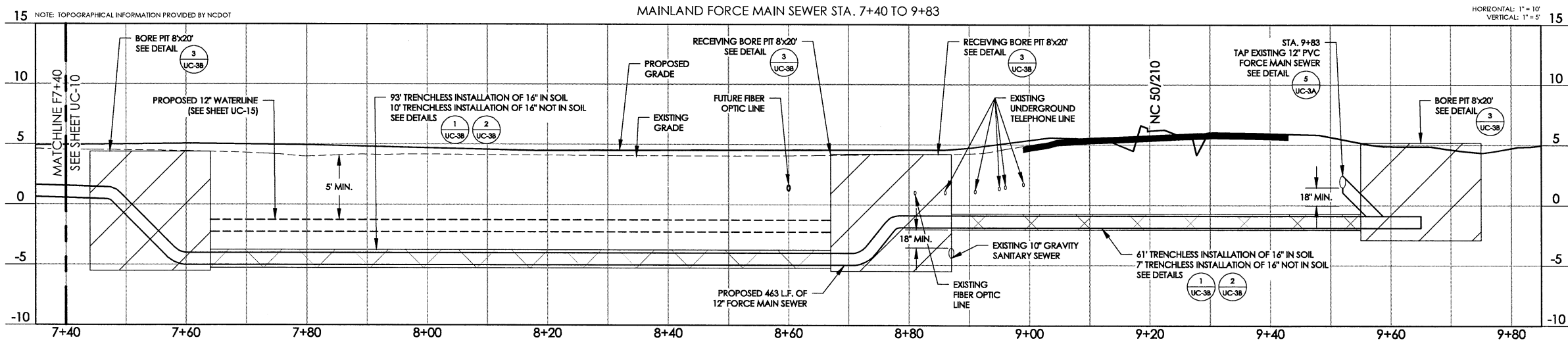
DESIGNED BY: JPC
DRAWN BY: JPC
CHECKED BY: WGS
APPROVED BY: JPC
REVISED:
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TRANSPORTATION
UTILITIES ENGINEERING SEC.
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FAX: (919) 250-4151



UTILITY CONSTRUCTION



REVISIONS




15 NOTE: TOPOGRAPHICAL INFORMATION PROVIDED BY NCDOT MAINLAND FORCE MAIN SEWER STA. 7+40 TO 9+83 HORIZONTAL: 1"=10' VERTICAL: 1"=5'

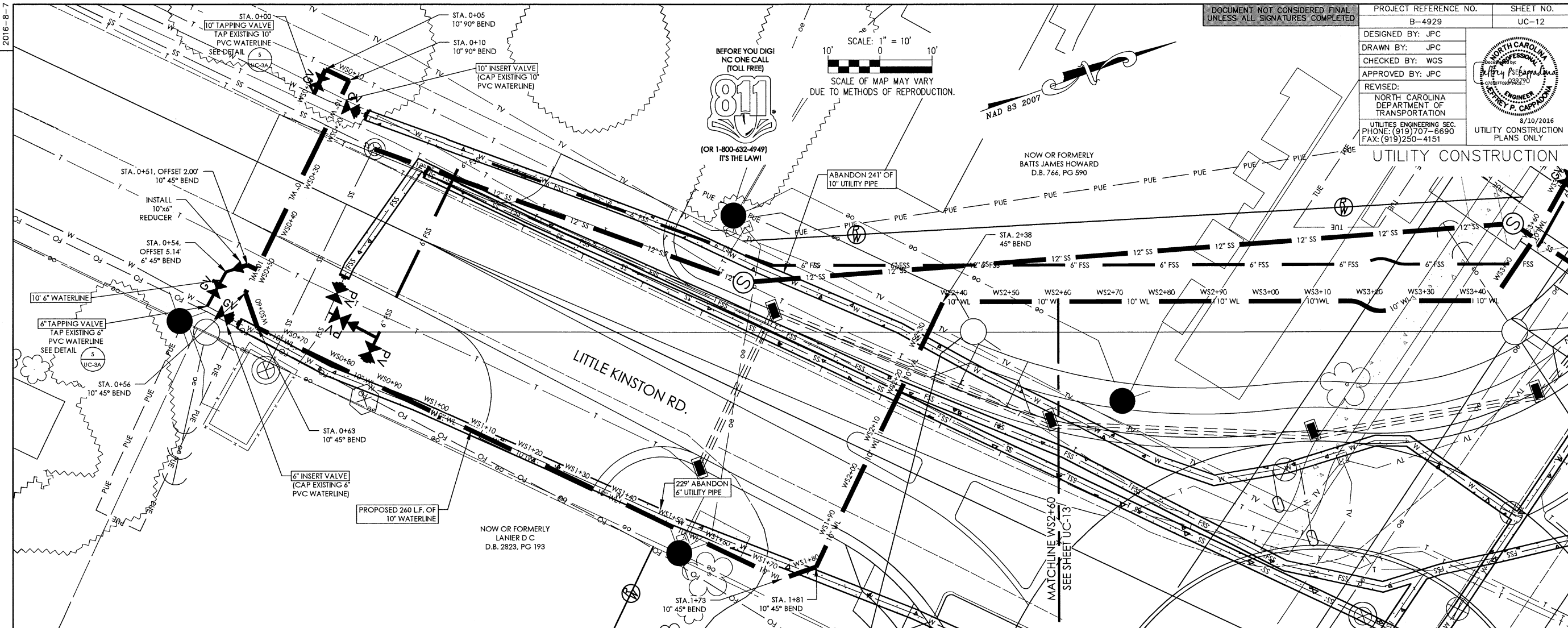
NOW OR FORMERLY
BATTS PROPERTIES INC et al
D.B. -1, PG 156

NOW OR FORMERLY
BATTS PROPERTIES INC
D.B. 477, PG 167

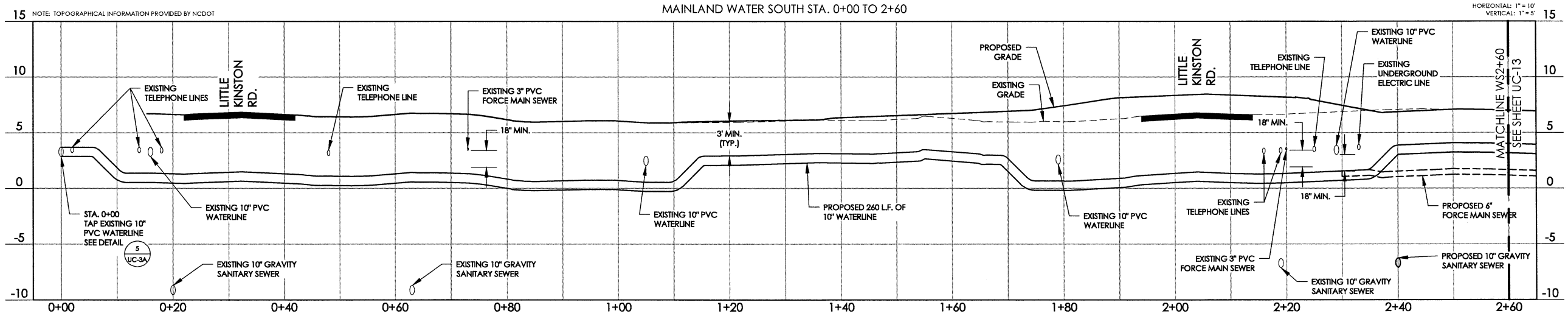
2016-B-7

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| PROJECT REFERENCE NO. | B-4929 | SHEET NO. | UC-12 |
| DESIGNED BY: | JPC |  | |
| DRAWN BY: | JPC | | |
| CHECKED BY: | WGS | | |
| APPROVED BY: | JPC | | |
| REVISED: | | | |
| NORTH CAROLINA DEPARTMENT OF TRANSPORTATION | | 8/10/2016 | |
| UTILITIES ENGINEERING SEC. PHONE: (919)707-6690 FAX: (919)250-4151 | | UTILITY CONSTRUCTION PLANS ONLY | |



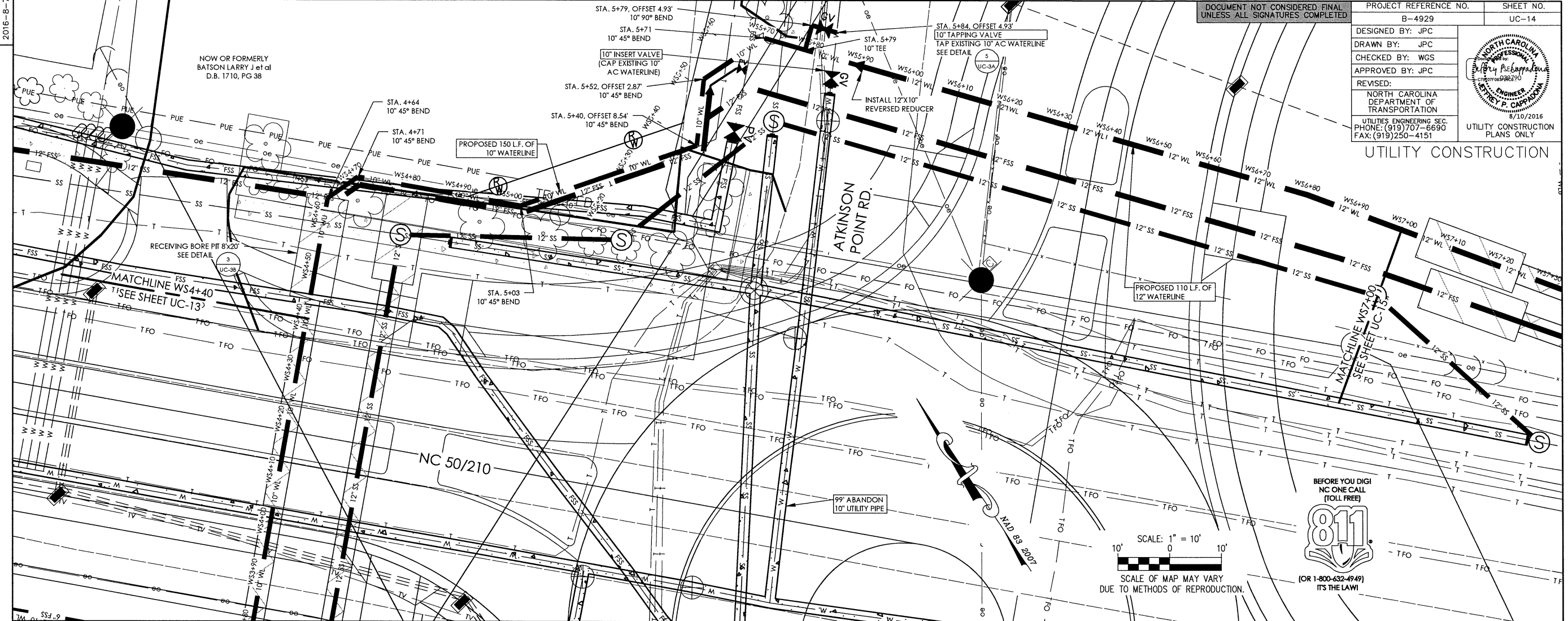
REVISIONS



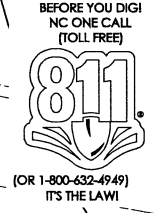
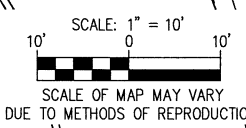
2016-8-7

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| PROJECT REFERENCE NO. | B-4929 | SHEET NO. | UC-14 |
| DESIGNED BY: | JPC | | |
| DRAWN BY: | JPC | | |
| CHECKED BY: | WGS | | |
| APPROVED BY: | JPC | | |
| REVISED: | NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151 | | |
| UTILITY CONSTRUCTION | | | |



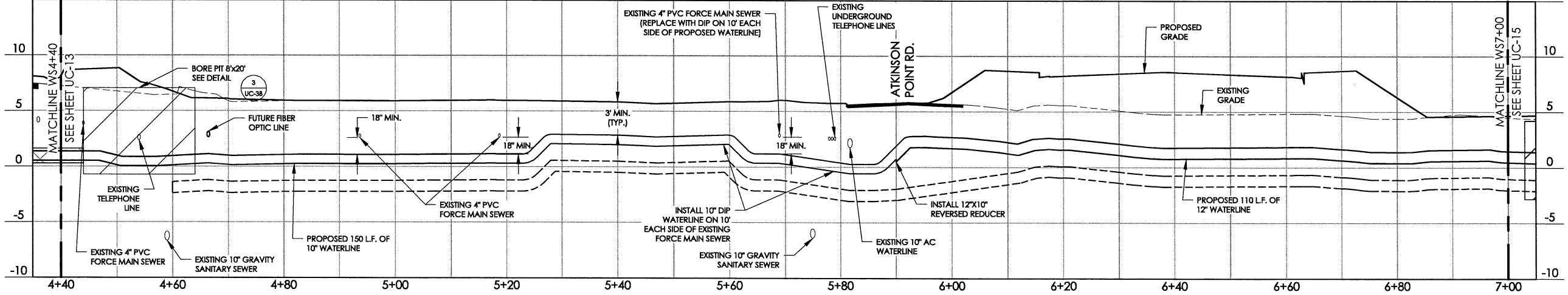
REVISIONS



15 NOTE: TOPOGRAPHICAL INFORMATION PROVIDED BY NCDOT

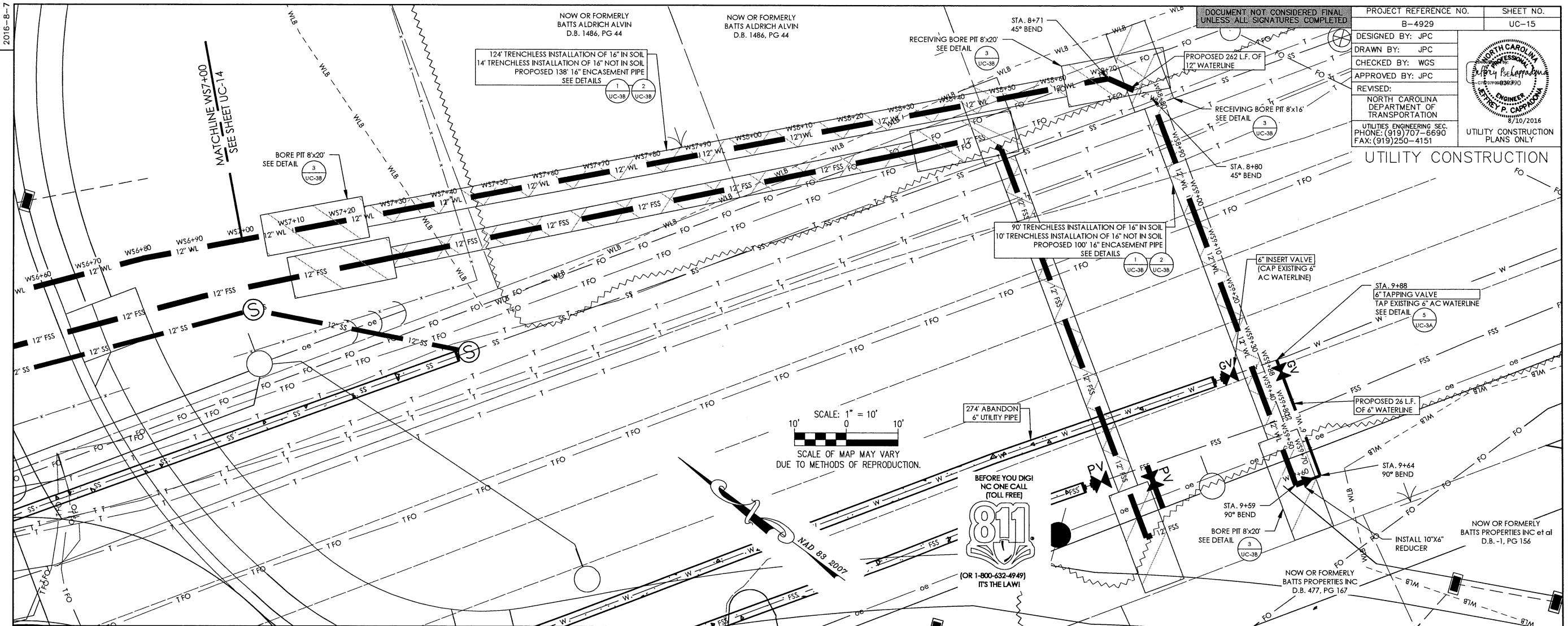
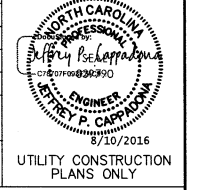
MAINLAND WATER SOUTH STA. 4+40 TO 7+20

HORIZONTAL: 1" = 10'
VERTICAL: 1" = 5'



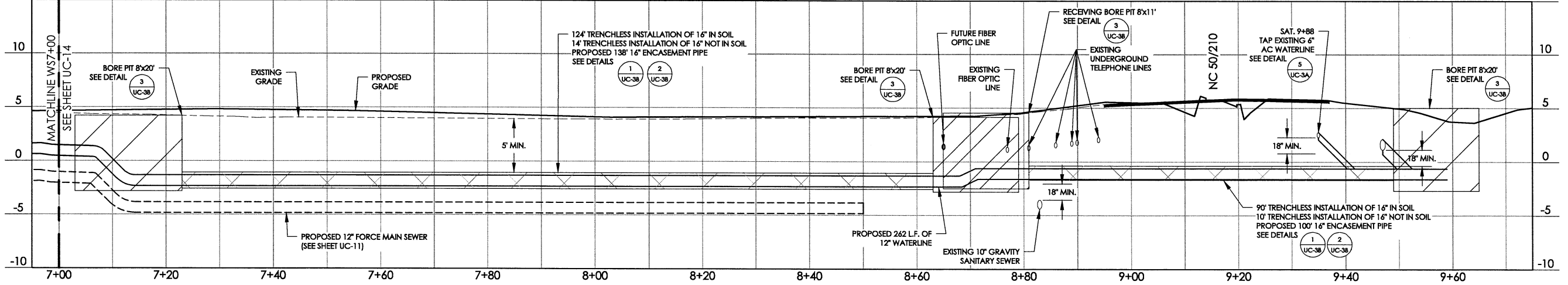
2016-B-7

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| PROJECT REFERENCE NO. | B-4929 | SHEET NO. | UC-15 |
| DESIGNED BY: | JPC | | |
| CHECKED BY: | JPC | | |
| APPROVED BY: | JPC | | |
| REVISED: | | | |
| NORTH CAROLINA DEPARTMENT OF TRANSPORTATION 8/10/2016 UTILITY CONSTRUCTION PLANS ONLY | | | |



REVISIONS

15 NOTE: TOPOGRAPHICAL INFORMATION PROVIDED BY NCDOT MAINLAND WATER SOUTH STA. 7+00 TO 9+88 HORIZONTAL: 1" = 10' VERTICAL: 1" = 5'

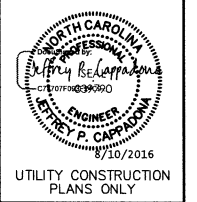


2016-B-7

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PROJECT REFERENCE NO. B-4929 SHEET NO. UC-16

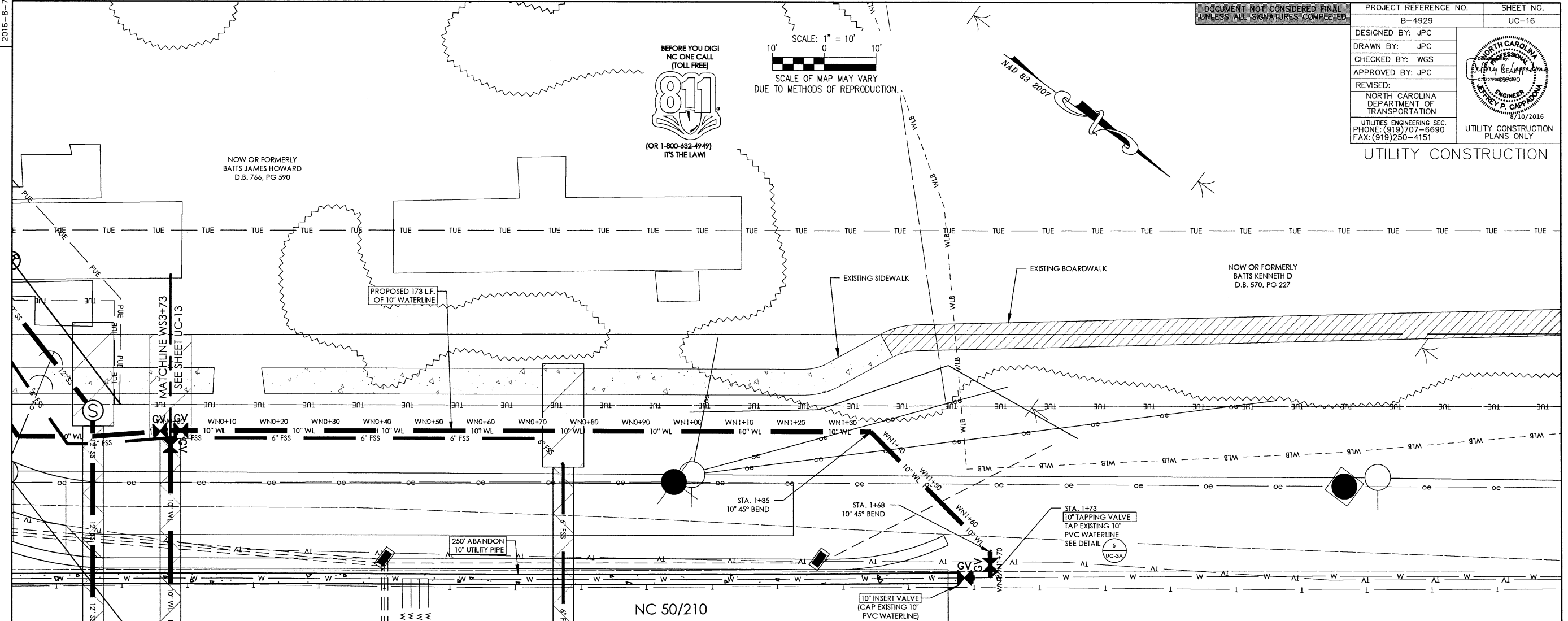
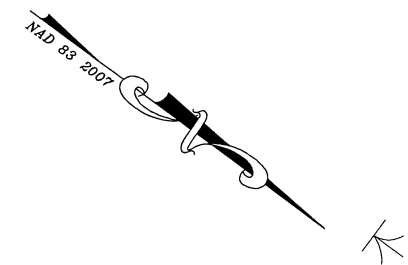
DESIGNED BY: JPC
 DRAWN BY: JPC
 CHECKED BY: WGS
 APPROVED BY: JPC
 REVISED:
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 UTILITIES ENGINEERING SEC.
 PHONE: (919) 707-6690
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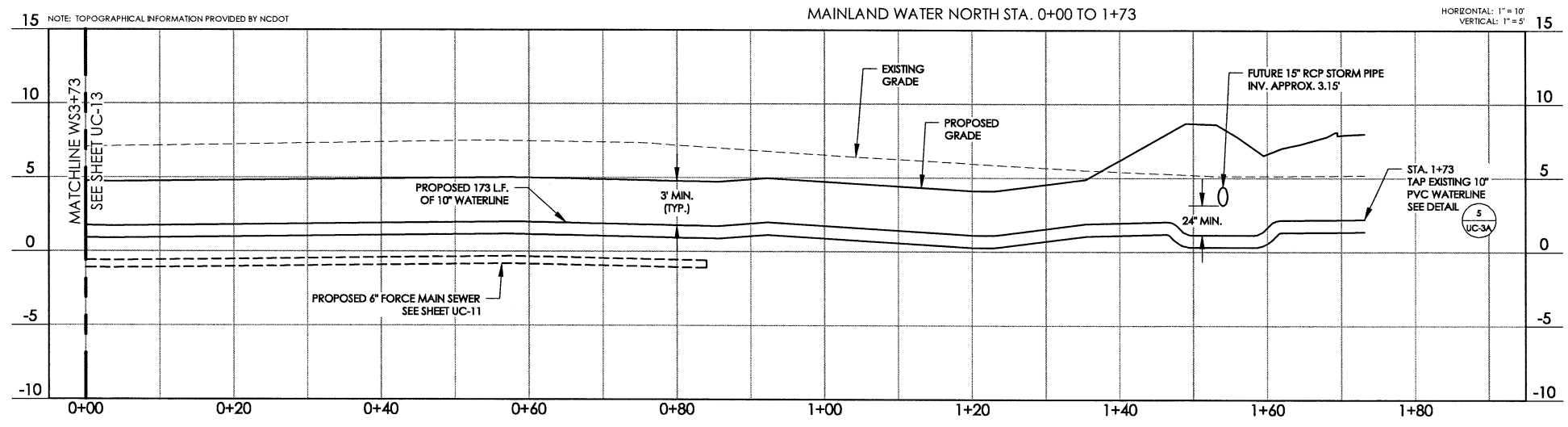
UTILITY CONSTRUCTION



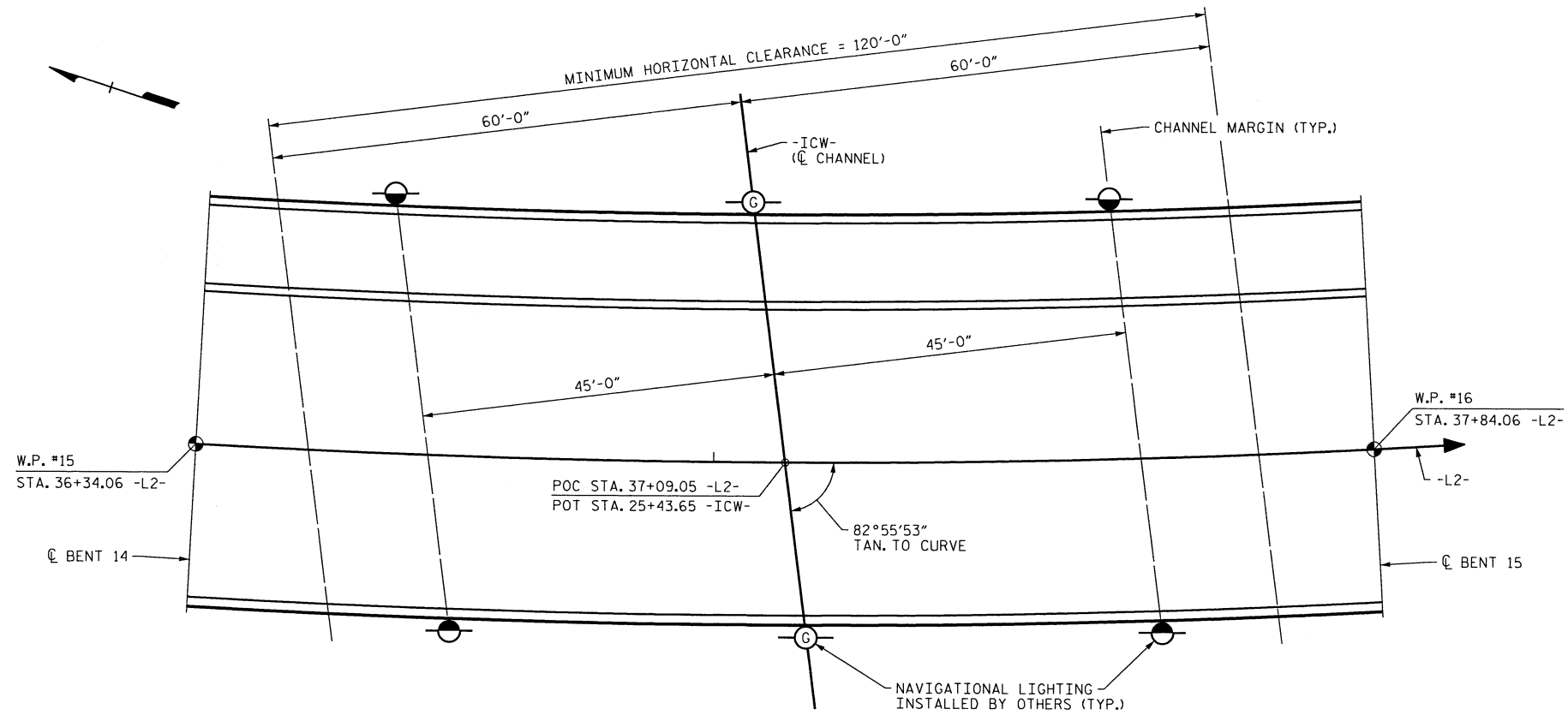
SCALE: 1" = 10'
 SCALE OF MAP MAY VARY DUE TO METHODS OF REPRODUCTION.



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NOTES:
 THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION SHALL FURNISH AND INSTALL THE PERMANENT NAVIGATIONAL LIGHTING.
 PRIOR TO ANY WORK COMMENCING IN THE WATERWAY, TEMPORARY NAVIGATIONAL LIGHTING WILL BE REQUIRED BY THE COAST GUARD. ADDITIONAL LIGHTING OR OBSTRUCTION LIGHTING MAY ALSO BE REQUIRED. ALL TEMPORARY NAVIGATIONAL LIGHTING SHOULD BE COORDINATED WITH THE DISTRICT COMMANDER OF THE COAST GUARD.
 NO SEPARATE PAYMENT WILL BE MADE FOR THE COST FOR FURNISHING, INSTALLING, AND MAINTAINING THE TEMPORARY NAVIGATIONAL LIGHTING.



PLAN

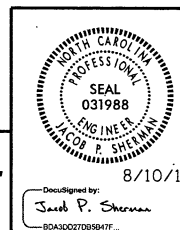
- ⊙ 360° GREEN NAVIGATIONAL LIGHT - CHANNEL CENTERLINE
- 180° RED NAVIGATIONAL LIGHT - CHANNEL MARGIN

PROJECT NO. B-4929
PENDER COUNTY
 STATION: 38+13.81 -L2-

8/10/2016 400_271_B4929_SML_SAP1.dgn

DESIGNED BY: J. DOUGHTY DATE: DEC 2015
 DRAWN BY: K. WHITE DATE: DEC 2015
 CHECKED BY: B. LOFLIN DATE: MAR 2016
 DESIGN ENGINEER OF RECORD: J. SHERMAN DATE: AUG 2016

PARSONS BRINCKERHOFF
 434 FAYETTEVILLE STREET
 SUITE 1500
 RALEIGH, NC 27601
 LICENSE NO. F-0165



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

NAVIGATIONAL LIGHTING LAYOUT

| REVISIONS | | | | | | SHEET NO. |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO. | BY: | DATE: | NO. | BY: | DATE: | TOTAL SHEETS |
| 1 | | | 3 | | | S-137 |
| 2 | | | 4 | | | 278 |

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