

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
HIGHWAY DIVISION 10

## PROPOSAL

**DATE AND TIME OF BID OPENING:** Wednesday April 3, 2019 AT 2:00 P.M.

**CONTRACT ID:** DJ00335

**WBS ELEMENT NO.:** 17BP.10. R.130

**COUNTY:** Anson

**TIP NO.:** None

**MILES:** 0.100

**LOCATION:** Replace Bridge #80 Over N. Fork Jones Creek on SR 1120 (Dickie Little Road)

**TYPE OF WORK:** Grading, Paving, Drainage, & Structure

**AVAILABILITY DATE:** May 20, 2019

**COMPLETION DATE:** April 28, 2020

**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.

**THIS IS A STRUCTURE PROJECT.**

**BID BONDS ARE REQUIRED.**

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NAME OF BIDDER

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ADDRESS OF BIDDER

**PROPOSAL FOR THE CONSTRUCTION OF  
CONTRACT No. DJ00335 IN ANSON COUNTY, NORTH CAROLINA**

**Date April 3, 2019**

**DEPARTMENT OF TRANSPORTATION,  
RALEIGH, NORTH CAROLINA**

The Bidder has carefully examined the location of the proposed work to be known as Contract No. **DJ00335**; has carefully examined the plans and specifications, which are acknowledged to be part of the proposal, the special provisions, the proposal, the form of contract, and the forms of contract payment bond and contract performance bond; and thoroughly understands the stipulations, requirements and provisions. The undersigned bidder agrees to be bound upon his execution of the bid and subsequent award to him by the Department of Transportation in accordance with this proposal to provide the necessary contract payment bond and contract performance bond within fourteen days after the written notice of award is received by him. The undersigned Bidder further agrees to provide all necessary machinery, tools, labor, and other means of construction; and to do all the work and to furnish all materials, except as otherwise noted, necessary to perform and complete the said contract in accordance with *the 2018 Standard Specifications for Roads and Structures* by the dates(s) specified in the Project Special Provisions and in accordance with the requirements of the Engineer, and at the unit or lump sum prices, as the case may be, for the various items given on the sheets contained herein.

The Bidder shall provide and furnish all the materials, machinery, implements, appliances and tools, and perform the work and required labor to construct and complete State Highway Contract No. **DJ00335** in **ANSON COUNTY**, for the unit or lump sum prices, as the case may be, bid by the Bidder in his bid and according to the proposal, plans, and specifications prepared by said Department, which proposal, plans, and specifications show the details covering this project, and hereby become a part of this contract.

The published volume entitled *North Carolina Department of Transportation, Raleigh, Standard Specifications for Roads and Structures, January 2018* with all amendments and supplements thereto, is by reference incorporated into and made a part of this contract; that, except as herein modified, all the construction and work included in this contract is to be done in accordance with the specifications contained in said volume, and amendments and supplements thereto, under the direction of the Engineer.

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

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

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

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

## **INSTRUCTIONS TO BIDDERS**

**PLEASE READ ALL INSTRUCTIONS CAREFULLY  
BEFORE PREPARING AND SUBMITTING YOUR BID.**

**All bids shall be prepared and submitted in accordance with the following requirements. Failure to comply with any requirement may cause the bid to be considered irregular and may be grounds for rejection of the bid.**

For preparing and submitting the bid electronically, refer to Article 102-8(B) of the *2018 Standard Specifications*.

Bidders that bid electronically on Raleigh Central-Let projects will need a separate Digital Signature from the approved electronic bidding provider for Division Contracts.

### **ELECTRONIC ON-LINE BID:**

1. Download entire proposal from Connect NCDOT website. Download the electronic submittal file from the approved electronic bidding provider website.
2. Prepare and submit the electronic submittal file using the approved electronic bidding provider software.
3. Electronic bidding software necessary for electronic bid preparation may be downloaded from the Connect NCDOT website at: <https://connect.ncdot.gov/letting/Pages/EBS-Information.aspx> or from the approved electronic bidding provider website.

# TABLE OF CONTENTS

|  |    |
|--|----|
| PROJECT SPECIAL PROVISIONS (GENERAL).....  | 6  |
| CONTRACT TIME AND LIQUIDATED DAMAGES:.....   | 6  |
| INTERMEDIATE CONTRACT TIME NUMBER 1 AND LIQUIDATED DAMAGES: .....                      | 6  |
| DIVISION CONTRACT PREQUALIFICATION: .....  | 7  |
| BOND REQUIREMENTS: .....   | 7  |
| PROSECUTION OF WORK:.....  | 7  |
| PERMANENT VEGETATION ESTABLISHMENT: .....  | 8  |
| POSTED WEIGHT LIMITS: .....  | 8  |
| NO MAJOR CONTRACT ITEMS:.....  | 8  |
| NO SPECIALTY ITEMS: .....  | 9  |
| FUEL PRICE ADJUSTMENT:.....  | 9  |
| SUBSURFACE INFORMATION:.....   | 9  |
| EXTENSION OF CONTRACT TIME:.....   | 9  |
| CLAIMS FOR ADDITIONAL COMPENSATION:.....   | 10 |
| NOTIFICATION OF OPERATIONS: .....  | 10 |
| NIGHT OPERATIONS: .....  | 10 |
| DRIVEWAYS AND PRIVATE PROPERTY:.....   | 10 |
| MINORITY BUSINESS ENTERPRISE AND WOMEN BUSINESS ENTERPRISE (DIVISIONS): .....          | 10 |
| UTILITY CONFLICTS:.....  | 25 |
| ELECTRONIC BIDDING:.....   | 25 |
| TWELVE MONTH GUARANTEE:.....   | 26 |
| OUTSOURCING OUTSIDE THE USA: .....   | 26 |
| EROSION AND SEDIMENT CONTROL/STORMWATER CERTIFICATION:.....                            | 27 |
| PROCEDURE FOR MONITORING BORROW PIT DISCHARGE: .....                                   | 32 |
| PROJECT SPECIAL PROVISIONS (ROADWAY) .....   | 34 |
| SCOPE OF WORK:.....  | 34 |
| GRADING: .....   | 34 |
| BRIDGE APPROACH FILLS:.....  | 35 |
| PRICE ADJUSTMENT - ASPHALT BINDER FOR PLANT MIX: .....                                 | 37 |
| FINAL SURFACE TESTING NOT REQUIRED: .....  | 38 |
| ASPHALT CONCRETE PLANT MIX PAVEMENTS: .....  | 38 |
| GUARDRAIL END UNITS, TYPE - TL-3:.....   | 41 |
| GUARDRAIL ANCHOR UNITS AND TEMPORARY GUARDRAIL ANCHOR UNITS: .....                     | 42 |
| THERMOPLASTIC PAVEMENT MARKING MATERIAL – COLOR TESTING: .....                         | 44 |
| EXTRUDED THERMOPLASTIC PAVEMENT MARKING THICKNESS: .....                               | 45 |
| STABILIZATION REQUIREMENTS.....  | 45 |
| SEEDING AND MULCHING (EAST):.....  | 46 |
| TEMPORARY SEEDING:.....  | 47 |
| FERTILIZER TOPDRESSING: .....  | 47 |
| SUPPLEMENTAL SEEDING: .....  | 47 |
| MOWING: .....  | 48 |
| NATIVE GRASS SEEDING AND MULCHING (WEST) .....   | 48 |
| MINIMIZE REMOVAL OF VEGETATION: .....  | 49 |
| RESPONSE FOR EROSION CONTROL:.....   | 49 |
| TEMPORARY ROCK SILT CHECK TYPE A WITH EXCELSIOR MATTING AND POLYACRYLAMIDE (PAM):..... | 50 |
| COIR FIBER MAT:.....   | 51 |
| SAFETY FENCE AND JURISDICTIONAL FLAGGING: .....  | 53 |
| HIGH QUALITY WATERS: .....   | 55 |
| IMPERVIOUS DIKE: .....   | 56 |
| REFORESTATION: .....   | 56 |
| PERMANENT SOIL REINFORCEMENT MAT: .....  | 57 |
| CONCRETE WASHOUT STRUCTURE: .....  | 58 |
| STOCKPILE AREAS:.....  | 61 |

|   |     |
|---|-----|
| TRAFFIC CONTROL: .....  | 61  |
| PROJECT SPECIAL PROVISIONS (STRUCTURES).....                              | 62  |
| TEMPORARY PIPE FOR CULVERT CONSTRUCTION:.....                             | 62  |
| FALSEWORK AND FORMWORK (4-5-12) .....                                     | 62  |
| CRANE SAFETY (8-15-05).....   | 68  |
| SUBMITTAL OF WORKING DRAWINGS (6-28-17).....                              | 69  |
| GROUT FOR STRUCTURES (9-30-11) .....                                      | 75  |
| ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES ..... | 76  |
| STANDARD SPECIAL PROVISIONS .....   | 79  |
| PERMIT.....   | 79  |
| AVAILABILITY OF FUNDS – TERMINATION OF CONTRACTS:.....                    | 79  |
| NCDOT GENERAL SEED SPECIFICATION FOR SEED QUALITY: .....                  | 80  |
| ERRATA .....  | 83  |
| PLANT AND PEST QUARANTINES: .....   | 83  |
| MINIMUM WAGES: .....  | 84  |
| TITLE VI AND NONDISCRIMINATION:.....                                      | 85  |
| ON-THE-JOB TRAINING:.....   | 93  |
| STRUCTURE SUBSURFACE INVESTIGATION.....                                   | 96  |
| ITEMIZED PROPOSAL SHEET.....  | 105 |

## PROJECT SPECIAL PROVISIONS (GENERAL)

All work and materials shall be in accordance with the provisions of the General Guidelines of this contract, the Project Special Provisions, the North Carolina Department of Transportation *2018 Standard Specifications for Roads and Structure*, the North Carolina Department of Transportation *2018 Roadway Standards Drawings*, the current edition of the *Manual on Uniform Traffic Control Devices (MUTCD)*.

The Contractor shall keep himself/herself fully informed of all Federal, State and local laws, ordinances, and regulations, and shall comply with the provisions of Section 107 of the *Standard Specifications*.

### CONTRACT TIME AND LIQUIDATED DAMAGES:

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

108

SP1 G07 A

The date of availability for this contract is **May 20, 2019**, except that work in jurisdictional waters and wetlands shall not begin until a meeting between the DOT, Regulatory Agencies, and the Contractor is held as stipulated in the permits contained elsewhere in this proposal. This delay in availability has been considered in determining the contract time for this project.

The completion date for this contract is **April 28, 2020**.

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

The liquidated damages for this contract are **Five Hundred Dollars (\$500.00)** per calendar day. These liquidated damages will not be cumulative with any liquidated damages which may become chargeable under Intermediate Contract Time Number 1.

**NOTE: The Contractor will be required to give the Resident Engineer a minimum of fourteen (14) days' notice before closing the roadway at the bridge site.**

### INTERMEDIATE CONTRACT TIME NUMBER 1 AND LIQUIDATED DAMAGES:

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

108

SP1 G13 A

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

The date of availability for this intermediate contract time is **May 20, 2019**.

The completion date for this intermediate contract time is **October 31, 2019**.

The liquidated damages for this intermediate contract time are **One Thousand Dollars (\$1,000.00)** per calendar day.

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

**DIVISION CONTRACT PREQUALIFICATION:**

(07-01-14)(12-1-16)

SPD 01-410

Any firm that wishes to bid as a prime contractor shall be prequalified with NCDOT as a Bidder or PO Prime Contractor prior to submitting a bid. Information regarding prequalification can be found at: <https://connect.ncdot.gov/business/Prequal/Pages/default.aspx>.

Prior to performing the work, the prime contractor and/or subcontractor(s) shall be prequalified in the work code(s) which are identified as work items in the prime contractor's construction progress schedule that they will complete themselves. Any contractor identified as working outside their expertise may be considered in default of contract.

**BOND REQUIREMENTS:**

(06-01-16)

102-8, 102-10

SPD 01-420A

A Bid Bond is required in accordance with Article 102-10 of the *2018 Standard Specifications for Roads and Structures*.

Contract Payment and Performance Bonds are required in accordance with Article 103-7 of the *2018 Standard Specifications for Roads and Structures*.

**PROSECUTION OF WORK:**

(7-1-95) (Rev. 8-21-12)

108

SP1 G15R

The Contractor will be required to prosecute the work in a continuous and uninterrupted manner from the time he begins the work until completion and final acceptance of the project. The Contractor will not be permitted to suspend his operations except for reasons beyond his control or except where the Engineer has authorized a suspension of the Contractor's operations in writing.

In the event that the Contractor's operations are suspended in violation of the above provisions, the sum of **Five Hundred Dollars (\$500.00)** will be charged to the contractor for each and every calendar day that such suspension takes place. The said amount is hereby agreed upon as liquidated damages due to extra engineering and maintenance costs and due to increased public hazard resulting from a suspension of the work. Liquidated damages chargeable due to suspension of the work will be additional to any liquidated damages that may become chargeable due to failure to complete the work on time.

**PERMANENT VEGETATION ESTABLISHMENT:**

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

104

SP1 G16

Establish a permanent stand of the vegetation mixture shown in the contract. During the period between initial vegetation planting and final project acceptance, perform all work necessary to establish permanent vegetation on all erodible areas within the project limits, as well as, in borrow and waste pits. This work shall include erosion control device maintenance and installation, repair seeding and mulching, supplemental seeding and mulching, mowing, and fertilizer topdressing, as directed. All work shall be performed in accordance with the applicable section of the *2018 Standard Specifications*. All work required for initial vegetation planting shall be performed as a part of the work necessary for the completion and acceptance of the Intermediate Contract Time (ICT). Between the time of ICT and Final Project acceptance, or otherwise referred to as the vegetation establishment period, the Department will be responsible for preparing the required National Pollutant Discharge Elimination System (NPDES) inspection records.

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

Payment for *Response for Erosion Control, Seeding and Mulching, Repair Seeding, Supplemental Seeding, Mowing, Fertilizer Topdressing, Silt Excavation, and Stone for Erosion Control* will be made at contract unit prices for the affected items. Work required that is not represented by contract line items will be paid in accordance with Articles 104-7 or 104-3 of the *2018 Standard Specifications*. No additional compensation will be made for maintenance and removal of temporary erosion control items.

**POSTED WEIGHT LIMITS:**

(7-1-95) (Rev.9-15-15)

105

SP1 G24R

The Contractor's attention is directed to Article 105-15 of the *2018 Standard Specifications* and to the fact that various Primary and Secondary Roads and bridges may be posted with weight limits less than the legal limit. Do not exceed the posted weight limits in transporting materials and/or equipment to the projects. Make a thorough examination of all projects and haul routes and be prepared to discuss them at the Preconstruction Conference.

**NO MAJOR CONTRACT ITEMS:**

(2-19-02) (Rev. 8-21-07)

104

SP1 G31

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



**NO SPECIALTY ITEMS:**

(7-1-95)

108-6

SP1 G34

None of the items included in this contract will be specialty items (see Article 108-6 of the *2018 Standard Specifications*).

**FUEL PRICE ADJUSTMENT:**

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

109-8

SP1 G43

Revise the *2018 Standard Specifications* as follows:

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

The base index price for DIESEL #2 FUEL is \$ **2.0946** per gallon. Where any of the following are included as pay items in the contract, they will be eligible for fuel price adjustment.

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

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

**SUBSURFACE INFORMATION:**

(7-1-95)

450

SP1 G112 C

Subsurface information is available on the structure portion of this project only.

**EXTENSION OF CONTRACT TIME:**

Failure on the part of the Contractor to furnish bonds or certifications, or to satisfy preliminary requirements necessary to issue the purchase order will not constitute grounds for extension of the contract time. If the Contractor has fulfilled all preliminary requirements for the issuance of a purchase order, and the purchase order authorization is not available by the date of availability, the

Contractor shall be granted an extension equal to the number of calendar days the purchase order authorization is delayed after the date of availability.

**CLAIMS FOR ADDITIONAL COMPENSATION:**

The Contractor's attention is directed to the fact that Article 104-5 of the *2018 Standard Specifications* pertaining to revised contract unit prices will not apply to this contract. The Contractor will not be entitled to an adjustment in contract unit price for any item that may underrun or overrun the estimated contract quantities.

**NOTIFICATION OF OPERATIONS:**

The Contractor shall notify the Engineer 48 hours in advance of beginning work on this project. The Contractor shall give the Engineer sufficient notice of all operations for any sampling, inspection or acceptance testing required.

**NIGHT OPERATIONS:**

Verification of any city or county permits, required for night work, shall be provided to the Engineer if the contractor wants to work at night. Also, before the contractor begins his operations during night hours, he shall submit in writing, a full and complete plan for traffic control and construction lighting which shall be approved by the engineer prior to construction.

All traffic control devices used outside of closure areas shall meet the requirements for night use as set forth in the North Carolina Department of Transportation Standard Specifications for Roads and Structures, North Carolina Department of Transportation Roadway Standard Drawings, and the current Manual of Uniform Traffic Control Devices (MUTCD).

**DRIVEWAYS AND PRIVATE PROPERTY:**

The Contractor shall maintain access to driveways for all residents, businesses, and property owners throughout the life of the project.

The Contractor shall not perform work for private citizens or agencies in conjunction with this project or within the project limits of this contract. Any driveway paved by a Contractor which ties into an NCDOT system road being paved by the Contractor must be paved either prior to the road paving project or after its completion.

**MINORITY BUSINESS ENTERPRISE AND WOMEN BUSINESS ENTERPRISE (DIVISIONS):**

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

102-15(J)

SP1 G67

**Description**

The purpose of this Special Provision is to carry out the North Carolina Department of Transportation's policy of ensuring nondiscrimination in the award and administration of contracts financed in whole or in part with State funds.

**Definitions**

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

*Combined MBE/WBE Goal:* A portion of the total contract, expressed as a percentage that is to be performed by committed MBE/WBE subcontractors.

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

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

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

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

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

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

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

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

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

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

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

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

### **Forms and Websites Referenced in this Provision**

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

*DBE-IS Subcontractor Payment Information* - Form for reporting the payments made to all MBE/WBE firms working on the project. This form is for paper bid projects only.  
<https://connect.ncdot.gov/business/Turnpike/Documents/Form%20DBE-IS%20Subcontractor%20Payment%20Information.pdf>

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

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

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

*Letter of Intent* - Form signed by the Contractor and the MBE/WBE subcontractor, manufacturer or regular dealer that affirms that a portion of said contract is going to be performed by the signed MBE/WBE for the estimated amount (based on quantities and unit prices) listed at the time of bid.  
<http://connect.ncdot.gov/letting/LetCentral/Letter%20of%20Intent%20to%20Perform%20as%20a%20Subcontractor.pdf>

*Listing of MBE and WBE Subcontractors Form* - Form for entering MBE/WBE subcontractors on a project that will meet the Combined MBE/WBE goal. This form is for paper bids only.  
[http://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/09%20MBE-WBE%20Subcontractors%20\(State\).docx](http://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/09%20MBE-WBE%20Subcontractors%20(State).docx)

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

**Combined MBE/WBE Goal**

The Combined MBE/WBE Goal for this project is **7.0 %**

The Combined Goal was established utilizing the following anticipated participation for Minority Business Enterprises and Women Business Enterprises:

(A) Minority Business Enterprises **1.0 %**

- (1) *If the anticipated MBE participation is more than zero*, the Contractor shall exercise all necessary and reasonable steps to ensure that MBEs participate in at least the percent of the contract as set forth above.
- (2) *If the anticipated MBE participation is zero*, the Contractor shall make an effort to recruit and use MBEs during the performance of the contract. Any MBE participation obtained shall be reported to the Department.

(B) Women Business Enterprises **6.0 %**

- (1) *If the anticipated WBE participation is more than zero*, the Contractor shall exercise all necessary and reasonable steps to ensure that WBEs participate in at least the percent of the contract as set forth above.
- (2) *If the anticipated WBE participation is zero*, the Contractor shall make an effort to recruit and use WBEs during the performance of the contract. Any WBE participation obtained shall be reported to the Department.

The Bidder is required to submit only participation to meet the Combined MBE/WBE Goal. The Combined Goal may be met by submitting all MBE participation, all WBE participation, or a combination of MBE and WBE participation.

**Directory of Transportation Firms (Directory)**

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

<https://www.ebs.nc.gov/VendorDirectory/default.html>

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

**Listing of MBE/WBE Subcontractors**

At the time of bid, bidders shall submit all MBE and WBE participation that they anticipate to use during the life of the contract. Only those identified to meet the Combined MBE/WBE goal will be considered committed, even though the listing shall include both committed MBE/WBE subcontractors and additional MBE/WBE subcontractors. Any additional MBE/WBE subcontractor participation above the goal will follow the banking guidelines found elsewhere in this provision. All other additional MBE/WBE subcontractor participation submitted at the time of bid will be used toward the Department's overall race-neutral goals. Only those firms

with current MBE and WBE certification at the time of bid opening will be acceptable for listing in the bidder's submittal of MBE and WBE participation. The Contractor shall indicate the following required information:

(A) Electronic Bids

Bidders shall submit a listing of MBE and WBE participation in the appropriate section of the electronic submittal file.

- (1) Submit the names and addresses of MBE and WBE firms identified to participate in the contract. If the bidder uses the updated listing of MBE and WBE firms shown in the electronic submittal file, the bidder may use the dropdown menu to access the name and address of the firms.
- (2) Submit the contract line numbers of work to be performed by each MBE and WBE firm. When no figures or firms are entered, the bidder will be considered to have no MBE or WBE participation.
- (3) The bidder shall be responsible for ensuring that the MBE and WBE are certified at the time of bid by checking the Directory of Transportation Firms. If the firm is not certified at the time of the bid-letting, that MBE's or WBE's participation will not count towards achieving the Combined MBE/WBE goal.

(B) Paper Bids

- (1) *If the Combined MBE/ WBE goal is more than zero,*
  - (a) Bidders, at the time the bid proposal is submitted, shall submit a listing of MBE/WBE participation, including the names and addresses on *Listing of MBE and WBE Subcontractors* contained elsewhere in the contract documents in order for the bid to be considered responsive. Bidders shall indicate the total dollar value of the MBE and WBE participation for the contract.
  - (b) If bidders have no MBE or WBE participation, they shall indicate this on the *Listing of MBE and WBE Subcontractors* by entering the word "None" or the number "0." This form shall be completed in its entirety. **Blank forms will not be deemed to represent zero participation.** Bids submitted that do not have MBE and WBE participation indicated on the appropriate form will not be read publicly during the opening of bids. The Department will not consider these bids for award and the proposal will be rejected.
  - (c) The bidder shall be responsible for ensuring that the MBE/WBE is certified at the time of bid by checking the Directory of Transportation Firms. If the firm is not certified at the time of the bid-letting, that MBE's or WBE's participation will not count towards achieving the Combined MBE/WBE goal.

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

### **MBE or WBE Prime Contractor**

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

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

### **Written Documentation – Letter of Intent**

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

The documentation shall be received in the office of the Engineer no later than 2:00 p.m. of the fifth calendar day following opening of bids, unless the fifth day falls on Saturday, Sunday or an official state holiday. In that situation, it is due in the office of the Engineer no later than 10:00 a.m. on the next official state business day.

If the bidder fails to submit the Letter of Intent from each committed MBE and WBE to be used toward the Combined MBE/WBE goal, or if the form is incomplete (i.e. both signatures are not present), the MBE/WBE participation will not count toward meeting the Combined MBE/WBE goal. If the lack of this participation drops the commitment below the Combined MBE/WBE goal, the Contractor shall submit evidence of good faith efforts for the goal not met, completed in its entirety, to the Engineer no later than 2:00 p.m. of the eighth calendar day following opening of bids, unless the eighth day falls on Saturday, Sunday or an official state holiday. In that situation, it is due in the office of the Engineer no later than 10:00 a.m. on the next official state business day.

### **Banking MBE/WBE Credit**

If the committed MBE/WBE participation submitted exceeds the algebraic sum of the Combined MBE/WBE goal by \$1,000 or more, the excess will be placed on deposit by the Department for future use by the bidder. Separate accounts will be maintained for MBE and WBE participation and these may accumulate for a period not to exceed 24 months.

When the apparent lowest responsive bidder fails to submit sufficient participation by MBE and WBE firms to meet the advertised goal, as part of the good faith effort, the Department will

consider allowing the bidder to withdraw funds to meet the Combined MBE/WBE goal as long as there are adequate funds available from the bidder's MBE and WBE bank accounts.

### **Submission of Good Faith Effort**

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

One complete set and 6 copies of this information shall be received in the office of the Engineer no later than 2:00 p.m. of the fifth calendar day following opening of bids, unless the fifth day falls on Saturday, Sunday or an official state holiday. In that situation, it is due in the office of the Engineer no later than 10:00 a.m. on the next official state business day.

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

### **Consideration of Good Faith Effort for Projects with a Combined MBE/WBE Goal More Than Zero**

Adequate good faith efforts mean that the bidder took all necessary and reasonable steps to achieve the goal which, by their scope, intensity, and appropriateness, could reasonably be expected to obtain sufficient MBE/WBE participation. Adequate good faith efforts also mean that the bidder actively and aggressively sought MBE/WBE participation. Mere *pro forma* efforts are not considered good faith efforts.

The Department will consider the quality, quantity, and intensity of the different kinds of efforts a bidder has made. Listed below are examples of the types of actions a bidder will take in making a good faith effort to meet the goals and are not intended to be exclusive or exhaustive, nor is it intended to be a mandatory checklist.

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



- (B) Selecting portions of the work to be performed by MBEs/WBEs in order to increase the likelihood that the Combined MBE/WBE goal will be achieved.
- (1) Where appropriate, break out contract work items into economically feasible units to facilitate MBE/WBE participation, even when the prime contractor might otherwise prefer to perform these work items with its own forces.
  - (2) Negotiate with subcontractors to assume part of the responsibility to meet the advertised goal when the work to be sublet includes potential for MBE/WBE participation (2<sup>nd</sup> and 3<sup>rd</sup> tier subcontractors).
- (C) Providing interested certified MBEs/WBEs that are also prequalified subcontractors with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.
- (D) (1) Negotiating in good faith with interested MBEs/WBEs. It is the bidder's responsibility to make a portion of the work available to MBE/WBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available MBE/WBE subcontractors and suppliers, so as to facilitate MBE/WBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of MBEs/WBEs that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for MBEs/WBEs to perform the work.
- (2) A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including MBE/WBE subcontractors, and would take a firm's price and capabilities as well as the advertised goal into consideration. However, the fact that there may be some additional costs involved in finding and using MBEs/WBEs is not in itself sufficient reason for a bidder's failure to meet the advertised goal, as long as such costs are reasonable. Also, the ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidding contractors are not, however, required to accept higher quotes from MBEs/WBEs if the price difference is excessive or unreasonable.
- (E) Not rejecting MBEs/WBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The bidder's standing within its industry, membership in specific groups, organizations, or associates and political or social affiliations (for example, union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the bidder's efforts to meet the project goal.
- (F) Making efforts to assist interested MBEs/WBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or bidder.
- (G) Making efforts to assist interested MBEs/WBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.
- (H) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; Federal, State, and local minority/women business

assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of MBEs/WBEs. Contact within 7 days from the bid opening the Business Opportunity and Work Force Development Unit at [BOWD@ncdot.gov](mailto:BOWD@ncdot.gov) to give notification of the bidder's inability to get MBE or WBE quotes.

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

In addition, the Department may take into account the following:

- (1) Whether the bidder's documentation reflects a clear and realistic plan for achieving the Combined MBE/WBE goal.
- (2) The bidders' past performance in meeting the contract goal.
- (3) The performance of other bidders in meeting the advertised goal. For example, when the apparent successful bidder fails to meet the goal, but others meet it, you may reasonably raise the question of whether, with additional reasonable efforts the apparent successful bidder could have met the goal. If the apparent successful bidder fails to meet the advertised goal, but meets or exceeds the average MBE and WBE participation obtained by other bidders, the Department may view this, in conjunction with other factors, as evidence of the apparent successful bidder having made a good faith effort.

If the Department does not award the contract to the apparent lowest responsive bidder, the Department reserves the right to award the contract to the next lowest responsive bidder that can satisfy to the Department that the Combined MBE/WBE goal can be met or that an adequate good faith effort has been made to meet the advertised goal.

### **Non-Good Faith Appeal**

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

### **Counting MBE/WBE Participation Toward Meeting the Combined MBE/WBE Goal**

- (A) Participation

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

## (B) Joint Checks

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

## (C) Subcontracts (Non-Trucking)

A MBE/WBE may enter into subcontracts. Work that a MBE subcontracts to another MBE firm may be counted toward the anticipated MBE participation. The same holds for work that a WBE subcontracts to another WBE firm. Work that a MBE/WBE subcontracts to a non-MBE/WBE firm does not count toward the contract goal requirement. It should be noted that every effort shall be made by MBE and WBE contractors to subcontract to the same certification (i.e., MBEs to MBEs and WBEs to WBEs), in order to fulfill the MBE or WBE participation breakdown. This, however, may not always be possible due to the limitation of firms in the area. If the MBE or WBE firm shows a good faith effort has been made to reach out to similarly certified firms and there is no interest or availability, and they can get assistance from other certified firms, the Engineer will not hold the prime responsible for meeting the individual MBE or WBE breakdown. If a MBE or WBE contractor or subcontractor subcontracts a significantly greater portion of the work of the contract than would be expected on the basis of standard industry practices, it shall be presumed that the MBE or WBE is not performing a commercially useful function.

## (D) Joint Venture

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

## (E) Suppliers

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

## (F) Manufacturers and Regular Dealers

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

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

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

### **Commercially Useful Function**

#### **(A) MBE/WBE Utilization**

The Contractor may count toward its contract goal requirement only expenditures to MBEs and WBEs that perform a commercially useful function in the work of a contract. A MBE/WBE performs a commercially useful function when it is responsible for execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. To perform a commercially useful function, the MBE/WBE shall also be responsible with respect to materials and supplies used on the contract, for negotiating price, determining quality and quantity, ordering the material and installing (where applicable) and paying for the material itself. To determine whether a MBE/WBE is performing a commercially useful function, the Department will evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the contract is commensurate with the work it is actually performing and the MBE/WBE credit claimed for its performance of the work, and any other relevant factors. If it is determined that a MBE or WBE is not performing a Commercially Useful Function, the contractor may present evidence to rebut this presumption to the Department.

#### **(B) MBE/WBE Utilization in Trucking**

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

- (1) The MBE/WBE shall be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract, and there shall not be a contrived arrangement for the purpose of meeting the Combined MBE/WBE goal.
- (2) The MBE/WBE shall itself own and operate at least one fully licensed, insured, and operational truck used on the contract.
- (3) The MBE/WBE receives credit for the total value of the transportation services it provides on the contract using trucks it owns, insures, and operates using drivers it employs.
- (4) The MBE may subcontract the work to another MBE firm, including an owner-operator who is certified as a MBE. The same holds true that a WBE may subcontract the work to another WBE firm, including an owner-operator who is certified as a WBE. When this occurs, the MBE or WBE who subcontracts work

receives credit for the total value of the transportation services the subcontracted MBE or WBE provides on the contract. It should be noted that every effort shall be made by MBE and WBE contractors to subcontract to the same certification (i.e., MBEs to MBEs and WBEs to WBEs), in order to fulfill the participation breakdown. This, however, may not always be possible due to the limitation of firms in the area. If the MBE or WBE firm shows a good faith effort has been made to reach out to similarly certified transportation service providers and there is no interest or availability, and they can get assistance from other certified providers, the Engineer will not hold the prime responsible for meeting the individual MBE or WBE participation breakdown.

- (5) The MBE/WBE may also subcontract the work to a non-MBE/WBE firm, including from an owner-operator. The MBE/WBE who subcontracts the work to a non-MBE/WBE is entitled to credit for the total value of transportation services provided by the non-MBE/WBE subcontractor not to exceed the value of transportation services provided by MBE/WBE-owned trucks on the contract. Additional participation by non-MBE/WBE subcontractors receives credit only for the fee or commission it receives as a result of the subcontract arrangement. The value of services performed under subcontract agreements between the MBE/WBE and the Contractor will not count towards the MBE/WBE contract requirement.
- (6) A MBE/WBE may lease truck(s) from an established equipment leasing business open to the general public. The lease must indicate that the MBE/WBE has exclusive use of and control over the truck. This requirement does not preclude the leased truck from working for others during the term of the lease with the consent of the MBE/WBE, so long as the lease gives the MBE/WBE absolute priority for use of the leased truck. This type of lease may count toward the MBE/WBE's credit as long as the driver is under the MBE/WBE's payroll.
- (7) Subcontracted/leased trucks shall display clearly on the dashboard the name of the MBE/WBE that they are subcontracted/leased to and their own company name if it is not identified on the truck itself. Magnetic door signs are not permitted.

### **MBE/WBE Replacement**

When a Contractor has relied on a commitment to a MBE or WBE subcontractor (or an approved substitute MBE or WBE subcontractor) to meet all or part of a contract goal requirement, the contractor shall not terminate the MBE/WBE subcontractor for convenience. This includes, but is not limited to, instances in which the Contractor seeks to perform the work of the terminated subcontractor with another MBE/WBE subcontractor, a non-MBE/WBE subcontractor, or with the Contractor's own forces or those of an affiliate.

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

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

- (a) The listed MBE/WBE subcontractor fails or refuses to execute a written contract;
- (b) The listed MBE/WBE subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards. Provided, however, that good cause does not exist if the failure or refusal of the MBE/WBE subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the prime contractor;
- (c) The listed MBE/WBE subcontractor fails or refuses to meet the prime contractor's reasonable, nondiscriminatory bond requirements;
- (d) The listed MBE/WBE subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;
- (e) The listed MBE/WBE subcontractor is ineligible to work on public works projects because of suspension and debarment proceedings pursuant to 2 CFR Parts 180, 215 and 1,200 or applicable state law;
- (f) The listed MBE/WBE subcontractor is not a responsible contractor;
- (g) The listed MBE/WBE voluntarily withdraws from the project and provides written notice of withdrawal;
- (h) The listed MBE/WBE is ineligible to receive MBE/WBE credit for the type of work required;
- (i) A MBE/WBE owner dies or becomes disabled with the result that the listed MBE/WBE contractor is unable to complete its work on the contract;
- (j) Other documented good cause that compels the termination of the MBE/WBE subcontractor. Provided, that good cause does not exist if the prime contractor seeks to terminate a MBE/WBE it relied upon to obtain the contract so that the prime contractor can self-perform the work for which the MBE/WBE contractor was engaged or so that the prime contractor can substitute another MBE/WBE or non-MBE/WBE contractor after contract award.

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

(A) Performance Related Replacement

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

If a replacement MBE/WBE is not found that can perform at least the same amount of work as the terminated MBE/WBE, the Contractor shall submit a good faith effort documenting the steps taken. Such documentation shall include, but not be limited to, the following:

- (1) Copies of written notification to MBE/WBEs that their interest is solicited in contracting the work defaulted by the previous MBE/WBE or in subcontracting other items of work in the contract.

- (2) Efforts to negotiate with MBE/WBEs for specific subbids including, at a minimum:
    - (a) The names, addresses, and telephone numbers of MBE/WBEs who were contacted.
    - (b) A description of the information provided to MBE/WBEs regarding the plans and specifications for portions of the work to be performed.
  - (3) A list of reasons why MBE/WBE quotes were not accepted.
  - (4) Efforts made to assist the MBE/WBEs contacted, if needed, in obtaining bonding or insurance required by the Contractor.
- (B) Decertification Replacement
- (1) When a committed MBE/WBE is decertified by the Department after the SAF (*Subcontract Approval Form*) has been received by the Department, the Department will not require the Contractor to solicit replacement MBE/WBE participation equal to the remaining work to be performed by the decertified firm. The participation equal to the remaining work performed by the decertified firm will count toward the contract goal requirement.
  - (2) When a committed MBE/WBE is decertified prior to the Department receiving the SAF (*Subcontract Approval Form*) for the named MBE/WBE firm, the Contractor shall take all necessary and reasonable steps to replace the MBE/WBE subcontractor with another MBE/WBE subcontractor to perform at least the same amount of work to meet the Combined MBE/WBE goal requirement. If a MBE/WBE firm is not found to do the same amount of work, a good faith effort must be submitted to NCDOT (see A herein for required documentation).

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

### **Changes in the Work**

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

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

When the Engineer makes changes that result in an alteration of plans or details of construction, and a portion or all of the work had been expected to be performed by a committed MBE/WBE,

the Contractor shall seek participation by MBEs/WBEs unless otherwise approved by the Engineer.

When the Contractor requests changes in the work that result in the reduction or elimination of work that the Contractor committed to be performed by a MBE/WBE, the Contractor shall seek additional participation by MBEs/WBEs equal to the reduced MBE/WBE participation caused by the changes.

### **Reports and Documentation**

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

When using transportation services to meet the contract commitment, the Contractor shall submit a proposed trucking plan in addition to the SAF. The plan shall be submitted prior to beginning construction on the project. The plan shall include the names of all trucking firms proposed for use, their certification type(s), the number of trucks owned by the firm, as well as the individual truck identification numbers, and the line item(s) being performed.

Within 30 calendar days of entering into an agreement with a MBE/WBE for materials, supplies or services, not otherwise documented by the SAF as specified above, the Contractor shall furnish the Engineer a copy of the agreement. The documentation shall also indicate the percentage (60% or 100%) of expenditures claimed for MBE/WBE credit.

### **Reporting Minority and Women Business Enterprise Participation**

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

- (A) Withholding of money due in the next partial pay estimate; or
- (B) Removal of an approved contractor from the prequalified bidders' list or the removal of other entities from the approved subcontractors list.

While each contractor (prime, subcontractor, 2nd tier subcontractor) is responsible for accurate accounting of payments to MBEs/WBEs, it shall be the prime contractor's responsibility to report all monthly and final payment information in the correct reporting manner.

Failure on the part of the Contractor to submit the required information in the time frame specified may result in the disqualification of that contractor and any affiliate companies from further bidding until the required information is submitted.

Failure on the part of any subcontractor to submit the required information in the time frame specified may result in the disqualification of that contractor and any affiliate companies from being approved for further work on future projects until the required information is submitted.



Contractors reporting transportation services provided by non-MBE/WBE lessees shall evaluate the value of services provided during the month of the reporting period only.

At any time, the Engineer can request written verification of subcontractor payments. The Contractor shall report the accounting of payments through the Department's DBE Payment Tracking System.

### **Failure to Meet Contract Requirements**

Failure to meet contract requirements in accordance with Subarticle 102-15(J) of the *2018 Standard Specifications* may be cause to disqualify the Contractor.

### **UTILITY CONFLICTS:**

It shall be the responsibility of the Contractor to contact all affected utility owners and determine the precise locations of all utilities prior to beginning construction. Utility owners shall be contacted a minimum of 48 hours prior to the commencement of operations. Special care shall be used in working around or near existing utilities, protecting them when necessary to provide uninterrupted service. In the event that any utility service is interrupted, the Contractor shall notify the utility owner immediately and shall cooperate with the owner, or his representative, in the restoration of service in the shortest time possible. Existing fire hydrants shall be kept accessible to fire departments at all times.

The Contractor shall adhere to all applicable regulations and follow accepted safety procedures when working in the vicinity of utilities in order to insure the safety of construction personnel and the public. Utilities damaged by the Contractor due to his negligence will be repaired at the Contractor's expense.

### **ELECTRONIC BIDDING:**

(2-19-19)

101, 102, 103

SP1 G140

Revise the *2018 Standard Specifications* as follows:

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

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

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

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

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

**TWELVE MONTH GUARANTEE:**

(7-15-03)

108

SP1 G145

- (A) The Contractor shall guarantee materials and workmanship against latent and patent defects arising from faulty materials, faulty workmanship or negligence for a period of twelve months following the date of final acceptance of the work for maintenance and shall replace such defective materials and workmanship without cost to the Department. The Contractor will not be responsible for damage due to faulty design, normal wear and tear, for negligence on the part of the Department, and/or for use in excess of the design.
- (B) Where items of equipment or material carry a manufacturer's guarantee for any period in excess of twelve months, then the manufacturer's guarantee shall apply for that particular piece of equipment or material. The Department's first remedy shall be through the manufacturer although the Contractor is responsible for invoking the warranted repair work with the manufacturer. The Contractor's responsibility shall be limited to the term of the manufacturer's guarantee. NCDOT would be afforded the same warranty as provided by the Manufacturer.

This guarantee provision shall be invoked only for major components of work in which the Contractor would be wholly responsible for under the terms of the contract. Examples would include pavement structures, bridge components, and sign structures. This provision will not be used as a mechanism to force the Contractor to return to the project to make repairs or perform additional work that the Department would normally compensate the Contractor for. In addition, routine maintenance activities (i.e. mowing grass, debris removal, ruts in earth shoulders,) are not parts of this guarantee.

Appropriate provisions of the payment and/or performance bonds shall cover this guarantee for the project.

To ensure uniform application statewide the Division Engineer will forward details regarding the circumstances surrounding any proposed guarantee repairs to the Chief Engineer for review and approval prior to the work being performed.

**OUTSOURCING OUTSIDE THE USA:**

(9-21-04) (Rev. 5-16-06)

SP1 G150

All work on consultant contracts, services contracts, and construction contracts shall be performed in the United States of America. No work shall be outsourced outside of the United States of America.

*Outsourcing* for the purpose of this provision is defined as the practice of subcontracting labor, work, services, staffing, or personnel to entities located outside of the United States.

The North Carolina Secretary of Transportation shall approve exceptions to this provision in writing.

**EROSION AND SEDIMENT CONTROL/STORMWATER CERTIFICATION:**

(1-16-07) (Rev 11-22-16)

105-16, 225-2, 16

SP1 G180

**General**

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

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

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

**Roles and Responsibilities**

- (A) *Certified Erosion and Sediment Control/Stormwater Supervisor* - The Certified Supervisor shall be Level II and responsible for ensuring the erosion and sediment control/stormwater plan is adequately implemented and maintained on the project and for conducting the quality control program. The Certified Supervisor shall be on the project within 24 hours notice from initial exposure of an erodible surface to the project's final acceptance. Perform the following duties:
  - (1) *Manage Operations* - Coordinate and schedule the work of subcontractors so that erosion and sediment control/stormwater measures are fully executed for each operation and in a timely manner over the duration of the contract.
    - (a) Oversee the work of subcontractors so that appropriate erosion and sediment control/stormwater preventive measures are conformed to at each stage of the work.
    - (b) Prepare the required National Pollutant Discharge Elimination System (NPDES) Inspection Record and submit to the Engineer.
    - (c) Attend all weekly or monthly construction meetings to discuss the findings of the NPDES inspection and other related issues.

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

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

The Contractor may request to use the same person as the Level II Supervisor and Level II Foreman. This person shall be onsite whenever construction activities as described above are taking place. This request shall be approved by the Engineer prior to work beginning.

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

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

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

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

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

### **Preconstruction Meeting**

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

### **Ethical Responsibility**

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

### **Revocation or Suspension of Certification**

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

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

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

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

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

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

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

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

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

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

### **Measurement and Payment**

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

**PROCEDURE FOR MONITORING BORROW PIT DISCHARGE:**

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

105-16, 230, 801

SPI G181

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

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

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

During the Environmental Assessment required by Article 230-4 of the *2018 Standard Specifications*, the Contractor shall define the point at which the discharge enters into the State's surface waters and the appropriate sampling locations. Sampling locations shall include points upstream and downstream from the point at which the discharge enters these waters. Upstream sampling location shall be located so that it is not influenced by backwater conditions and represents natural background conditions. Downstream sampling location shall be located at the point where complete mixing of the discharge and receiving water has occurred.

The discharge shall be closely monitored when water from the dewatering activities is introduced into jurisdictional wetlands. Any time visible sedimentation (deposition of sediment) on the wetland surface is observed, the dewatering activity will be suspended until turbidity levels in the stilling basin can be reduced to a level where sediment deposition does not occur. Staining of wetland surfaces from suspended

clay particles, occurring after evaporation or infiltration, does not constitute sedimentation. No activities shall occur in wetlands that adversely affect the functioning of a wetland. Visible sedimentation will be considered an indication of possible adverse impacts on wetland use.

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



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

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

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

**PROJECT SPECIAL PROVISIONS (ROADWAY)****SCOPE OF WORK:**

This contract is for the replacement of Bridge #80 Over North Fork Jones Creek on SR #1120 (Dickie Little Road). The Contractor shall furnish all labor and materials for the project in accordance with the 2018 Standard Specifications and/or Special Provisions herein.

**GRADING:**

The Contractor is to grade this project to the typical sections and details shown. **Grading shall be comprehensive grading as defined in Section 226 of the Standard Specifications**, and shall include excavation for paved shoulder construction, cutting and removal of paved driveways which intersect the roadway, reshaping, grading and compacting roadway shoulders and ditches, pavement removal, removal of existing concrete curb & gutter, sidewalk and concrete driveways. Contractor will restore all driveways to original or better condition. Any borrow will be incidental to comprehensive grading but undercut will be measured and paid for as **Undercut Excavation (CY)**, see **226-1** of the Specifications. It shall be the Contractor's responsibility to dispose of any waste material or to furnish any borrow material needed. No material may be wasted or removed from the project unless approved by the Engineer.

The Contractor shall shape, compact, and grade the ditches and shoulders to the lines, grades, and typical sections established by the plans or as directed by the Engineer. Roadway ditches shall be cleaned, reshaped and maintained until final acceptance of the project. The Contractor shall grade the roadway ditches so that the continuous drainage at driveway at driveway pipes shall be maintained. However, it shall not be the Contractor's responsibility to remove existing internal obstructions from driveway pipes.

The Contractor shall excavate only that portion of shoulder area to which Asphalt Concrete Base Course can be placed during the same day's operations. No open excavation adjacent to the roadway is permitted after working hours. The excavated area shall be uniformly graded, well compacted, and free of debris and loose material. Areas which the Contractor excavates but is unable to place Asphalt Concrete Base Course for shall be backfilled and made safe at the end of the work day. The contractor shall provide "weep" cuts at intervals to prevent water retention between the pavement and excavation windrow in the event of rain.

The Contractor shall remove any portion of paved driveways which are in conflict with the shoulder widening. A straight uniform edge shall be established for removal of the pavement by sawing or cutting the pavement prior to removal. Driveways which equal or exceed the pavement design of the shoulder widening and have a compatible surface grade may be left in place at the discretion of the Engineer.

The Contractor shall extend the excavation around the radii of intersecting streets to form a uniform transition. In sections which do not begin or end at an intersection, the Contractor shall excavate and pave a minimum 50 foot transition taper at the beginning and end of the widened section. Access shall be maintained to all driveways within the project limits at all times. The Contractor shall restore all unpaved driveways to conditions acceptable to the Department of Transportation. Stone shall be placed in unpaved driveways as directed by the Engineer or his representative. Payment for stone for driveways shall be made under the item "Incidental Stone Base."

Paved driveways or driveway pipes damaged by the Contractor's equipment or operations shall be replaced, repaired or otherwise restored to original condition and state of repair by the Contractor within 15 calendar days of notification by the Engineer. The contractor is advised to make a detailed investigation of the original state of such features prior to commencing operations.

**Grading will be as specified under section 226-3 of the Standard Specifications.**

**Reinforced Bridge Approach Fill is not included in Comprehensive Grading.**

**BRIDGE APPROACH FILLS:**

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

422

SP4 R02A

**Description**

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

Define bridge approach fill types as follows:

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

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

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

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

**Materials**

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

| <b>Item</b>                   | <b>Section</b> |
|-------------------------------|----------------|
| Geotextiles, Type 1           | 1056           |
| Portland Cement Concrete      | 1000           |
| Select Materials              | 1016           |
| Subsurface Drainage Materials | 1044           |

Provide Type 1 geotextile for separation geotextiles and Class B concrete for outlet pads. Use Class V or Class VI select material for standard and modified approach fills. For an approach fill

behind a bridge end bent with an MSE abutment wall, backfill the reinforced approach fill with the same aggregate type approved for the reinforced zone in the accepted MSE wall submittal. For MSE wall aggregate, reinforcement and connector materials, see the *Mechanically Stabilized Earth Retaining Walls* provision. Provide PVC pipes, fittings and outlet pipes for subsurface drainage materials. For PVC drain pipes, use pipes with perforations that meet AASHTO M 278.

### **Construction Methods**

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

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

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

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

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

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

**Measurement and Payment**

*Type II Modified Approach Fill, Station 15+08.00 -L-* will be paid at the contract lump sum price. The lump sum price for each approach fill will be full compensation for providing labor, tools, equipment and approach fill materials, excavating, backfilling, hauling and removing excavated materials, installing geotextiles and drains, compacting backfill and supplying select material, aggregate, separation geotextiles, drain pipes, pipe sleeves, outlet pipes and pads and any incidentals necessary to construct approach fills behind bridge end bents.

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

Payment will be made under:

**Pay Item**

**Pay Unit**

Type II Modified Approach Fill, Station 15+08.00 -L-

Lump Sum

**PRICE ADJUSTMENT - ASPHALT BINDER FOR PLANT MIX:**

(11-21-00)

SP6 R25

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

The base price index for asphalt binder for plant mix is **\$480.45** per ton.

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

**FINAL SURFACE TESTING NOT REQUIRED:**

(5-18-04) (Rev. 2-16-16)

610

SP6 R45

Final surface testing is not required on this project in accordance with Section 610-13, *Final Surface Testing and Acceptance*.

**ASPHALT CONCRETE PLANT MIX PAVEMENTS:**

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

610, 1012

SP6 R65

Revise the 2018 *Standard Specifications* as follows:

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

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

Revise the 2018 *Standard Specifications* as follows:

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

| <b>Binder Grade</b> | <b>JMF Temperature</b> |
|---------------------|------------------------|
| PG 58-28; PG 64-22  | 250 - 290°F            |
| PG 76-22            | 300 - 325°F            |

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

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

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

| <b>TABLE 610-3<br/>MIX DESIGN CRITERIA</b> |   |                              |                   |      |                        |                       |           |                  |                |
|--|---|------------------------------|-------------------|------|------------------------|-----------------------|-----------|------------------|----------------|
| Mix Type                                   | Design ESALs millions <sup>A</sup>            | Binder PG Grade <sup>B</sup> | Compaction Levels |      | Max. Rut Depth (mm)    | Volumetric Properties |           |                  |                |
|  |   |                              | Gmm @             |      |                        | VMA<br>% Min.         | VTM<br>%  | VFA<br>Min.-Max. | %Gmm<br>@ Nini |
|  |   |                              | Nini              | Ndes |                        |                       |           |                  |                |
| S4.75A                                     | < 1   | 64 - 22                      | 6                 | 50   | 11.5                   | 16.0                  | 4.0 - 6.0 | 65 - 80          | ≤ 91.5         |
| S9.5B                                      | 0 - 3   | 64 - 22                      | 6                 | 50   | 9.5                    | 16.0                  | 3.0 - 5.0 | 70 - 80          | ≤ 91.5         |
| S9.5C                                      | 3 - 30  | 64 - 22                      | 7                 | 65   | 6.5                    | 15.5                  | 3.0 - 5.0 | 65 - 78          | ≤ 90.5         |
| S9.5D                                      | > 30  | 76 - 22                      | 8                 | 100  | 4.5                    | 15.5                  | 3.0 - 5.0 | 65 - 78          | ≤ 90.0         |
| I19.0C                                     | ALL   | 64 - 22                      | 7                 | 65   | -                      | 13.5                  | 3.0 - 5.0 | 65 - 78          | ≤ 90.5         |
| B25.0C                                     | ALL   | 64 - 22                      | 7                 | 65   | -                      | 12.5                  | 3.0 - 5.0 | 65 - 78          | ≤ 90.5         |
| <b>Design Parameter</b>                    |   |                              |                   |      | <b>Design Criteria</b> |                       |           |                  |                |
| All Mix Types                              | Dust to Binder Ratio ( $P_{0.075} / P_{be}$ ) |                              |                   |      | 0.6 - 1.4 <sup>C</sup> |                       |           |                  |                |
|  | Tensile Strength Ratio (TSR) <sup>D</sup>     |                              |                   |      | 85% Min. <sup>E</sup>  |                       |           |                  |                |

**A.** Based on 20 year design traffic.

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

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

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

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

**Page 6-19, Table 610-5, BINDER GRADE REQUIREMENTS (BASED ON RBR%),** replace with the following:

| <b>TABLE 610-5<br/>BINDER GRADE REQUIREMENTS (BASED ON RBR%)</b> |                       |                       |            |
|--|-----------------------|-----------------------|------------|
| Mix Type   | %RBR ≤ 20%            | 21% ≤ %RBR ≤ 30%      | %RBR > 30% |
| S4.75A,<br>S9.5B, S9.5C,<br>I19.0C, B25.0C                       | PG 64-22              | PG 64-22 <sup>A</sup> | PG 58-28   |
| S9.5D, OGFC  | PG 76-22 <sup>B</sup> | n/a                   | n/a        |

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

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

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

| <b>Asphalt Concrete Mix Type</b> | <b>Minimum Surface and Air Temperature</b> |
|----------------------------------|--|
| B25.0C                           | 35°F                                       |
| I19.0C                           | 35°F                                       |
| S4.75A, S9.5B, S9.5C             | 40°F <sup>A</sup>                          |
| S9.5D                            | 50°F                                       |

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

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

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

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

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

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

| <b>Mix Type</b>              | <b>Minimum % G<sub>mm</sub><br/>(Maximum Specific Gravity)</b> |
|------------------------------|--|
| S4.75A                       | 85.0 <sup>A</sup>  |
| S9.5B                        | 90.0   |
| S9.5C, S9.5D, I19.0C, B25.0C | 92.0   |

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

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

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

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

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

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



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

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

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

| <b>Pay Item</b>                                   | <b>Pay Unit</b> |
|---|-----------------|
| Asphalt Concrete Base Course, Type B25.0C         | Ton             |
| Asphalt Concrete Intermediate Course, Type I19.0C | Ton             |
| Asphalt Concrete Surface Course, Type S4.75A      | Ton             |
| Asphalt Concrete Surface Course, Type S9.5B       | Ton             |
| Asphalt Concrete Surface Course, Type S9.5C       | Ton             |
| Asphalt Concrete Surface Course, Type S9.5D       | Ton             |

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

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

**A.** Requirements apply to the design aggregate blend.

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

### **GUARDRAIL END UNITS, TYPE - TL-3:**

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

862

SP8 R65

#### **Description**

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

**Materials**

Furnish guardrail end units listed on the NCDOT [Approved Products List](https://apps.dot.state.nc.us/vendor/approvedproducts/) at <https://apps.dot.state.nc.us/vendor/approvedproducts/> or approved equal.

Prior to installation the Contractor shall submit to the Engineer:

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

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

**Construction Methods**

Guardrail end delineation is required on all approach and trailing end sections for both temporary and permanent installations. Guardrail end delineation consists of yellow reflective sheeting applied to the entire end section of the guardrail in accordance with Article 1088-3 of the *2018 Standard Specifications* and is incidental to the cost of the guardrail end unit.

**Measurement and Payment**

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

Payment will be made under:

| <b>Pay Item</b>                | <b>Pay Unit</b> |
|--------------------------------|-----------------|
| Guardrail End Units, Type TL-3 | Each            |

**GUARDRAIL ANCHOR UNITS AND TEMPORARY GUARDRAIL ANCHOR UNITS:**

(1-16-2018)

862

SP8 R70

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

Revise the *2018 Standard Specifications* as follows:

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

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

Payment will be made under:

**Pay Item**

Guardrail Anchor Units, Type III

**Pay Unit**

Each

**THERMOPLASTIC PAVEMENT MARKING MATERIAL – COLOR TESTING:**

DocuSigned by:  
*Matthew V. Springer*  
BC90F8E8B584403...  
1/3/2019

**THERMOPLASTIC PAVEMENT MARKING MATERIAL – COLOR TESTING:**

(03-19-19)

Revise the *2018 Standard Specifications* as follows:

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

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

**EXTRUDED THERMOPLASTIC PAVEMENT MARKING THICKNESS:**

DocuSigned by:  
 Matthew V. Springer  
 BC00F8E88684403...  
 1/3/2019

**EXTRUDED THERMOPLASTIC PAVEMENT MARKING THICKNESS:**

(03-19-19)

Revise the *2018 Standard Specifications* as follows:

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

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

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

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

**STABILIZATION REQUIREMENTS**

(3-11-2016)

Stabilization for this project shall comply with the time frame guidelines as specified by the NCG-010000 general construction permit effective August 1, 2016 issued by the North Carolina Department of Environmental Quality Division of Water Resources. Temporary or permanent ground cover stabilization shall occur within 7 calendar days from the last land-disturbing activity, with the following exceptions in which temporary or permanent ground cover shall be provided in 14 calendar days from the last land-disturbing activity:

- Slopes between 2:1 and 3:1, with a slope length of 10 ft. or less
- Slopes 3:1 or flatter, with a slope of length of 50 ft. or less
- Slopes 4:1 or flatter

The stabilization timeframe for High Quality Water (HQW) Zones shall be 7 calendar days with no exceptions for slope grades or lengths. High Quality Water Zones (HQW) Zones are defined by North Carolina Administrative Code 15A NCAC 04A.0105 (25). Temporary and permanent

ground cover stabilization shall be achieved in accordance with the provisions in this contract and as directed.

**SEEDING AND MULCHING (EAST):**

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined. All rates are in pounds per acre.

All Roadway Areas

| <b>March 1 - August 31</b> |                       | <b>September 1 - February 28</b> |                         |
|----------------------------|-----------------------|----------------------------------|-------------------------|
| 50#                        | Tall Fescue           | 50#                              | Tall Fescue             |
| 10#                        | Centipede             | 10#                              | Centipede               |
| 25#                        | Bermudagrass (hulled) | 35#                              | Bermudagrass (unhulled) |
| 500#                       | Fertilizer            | 500#                             | Fertilizer              |
| 4000#                      | Limestone             | 4000#                            | Limestone               |

Waste and Borrow Locations

| <b>March 1 – August 31</b> |                       | <b>September 1 - February 28</b> |                         |
|----------------------------|-----------------------|----------------------------------|-------------------------|
| 75#                        | Tall Fescue           | 75#                              | Tall Fescue             |
| 25#                        | Bermudagrass (hulled) | 35#                              | Bermudagrass (unhulled) |
| 500#                       | Fertilizer            | 500#                             | Fertilizer              |
| 4000#                      | Limestone             | 4000#                            | Limestone               |

Note: 50# of Bahiagrass may be substituted for either Centipede or Bermudagrass only upon Engineer's request.

Approved Tall Fescue Cultivars

|                            |                 |                 |                    |
|----------------------------|-----------------|-----------------|--------------------|
| 06 Dust                    | Escalade        | Justice         | Serengeti          |
| 2 <sup>nd</sup> Millennium | Essential       | Kalahari        | Shelby             |
| 3 <sup>rd</sup> Millennium | Evergreen 2     | Kitty Hawk 2000 | Sheridan           |
| Apache III                 | Falcon IV       | Legitimate      | Signia             |
| Avenger                    | Falcon NG       | Lexington       | Silver Hawk        |
| Barlexas                   | Falcon V        | LSD             | Sliverstar         |
| Barlexas II                | Faith           | Magellan        | Shenandoah Elite   |
| Bar Fa                     | Fat Cat         | Matador         | Sidewinder         |
| Barrera                    | Festnova        | Millennium SRP  | Skyline            |
| Barrington                 | Fidelity        | Monet           | Solara             |
| Barrobusto                 | Finelawn Elite  | Mustang 4       | Southern Choice II |
| Barvado                    | Finelawn Xpress | Ninja 2         | Speedway           |
| Biltmore                   | Finesse II      | Ol' Glory       | Spyder LS          |
| Bingo                      | Firebird        | Olympic Gold    | Sunset Gold        |
| Bizem                      | Firecracker LS  | Padre           | Taccoa             |
| Blackwatch                 | Firenza         | Patagonia       | Tanzania           |
| Blade Runner II            | Five Point      | Pedigree        | Trio               |
| Bonsai                     | Focus           | Picasso         | Tahoe II           |
| Braveheart                 | Forte           | Piedmont        | Talladega          |

|              |                |                |              |
|--------------|----------------|----------------|--------------|
| Bravo        | Garrison       | Plantation     | Tarheel      |
| Bullseye     | Gazelle II     | Proseeds 5301  | Terrano      |
| Cannavaro    | Gold Medallion | Prospect       | Titan ltd    |
| Catalyst     | Grande 3       | Pure Gold      | Titanium LS  |
| Cayenne      | Greenbrooks    | Quest          | Tracer       |
| Cessane Rz   | Greenkeeper    | Raptor II      | Traverse SRP |
| Chipper      | Gremlin        | Rebel Exeda    | Tulsa Time   |
| Cochise IV   | Greystone      | Rebel Sentry   | Turbo        |
| Constitution | Guardian 21    | Rebel IV       | Turbo RZ     |
| Corgi        | Guardian 41    | Regiment II    | Tuxedo RZ    |
| Corona       | Hemi           | Regenerate     | Ultimate     |
| Coyote       | Honky Tonk     | Rendition      | Venture      |
| Darlington   | Hot Rod        | Rhambler 2 SRP | Umbrella     |
| Davinci      | Hunter         | Rembrandt      | Van Gogh     |
| Desire       | Inferno        | Reunion        | Watchdog     |
| Dominion     | Innovator      | Riverside      | Wolfpack II  |
| Dynamic      | Integrity      | RNP            | Xtremegreen  |
| Dynasty      | Jaguar 3       | Rocket         |              |
| Endeavor     | Jamboree       | Scorpion       |              |

On cut and fill slopes 2:1 or steeper Centipede shall be applied at the rate of 5 pounds per acre and add 20# of Sericea Lespedeza from January 1 - December 31.

Fertilizer shall be 10-20-20 analysis. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis and as directed.

#### **TEMPORARY SEEDING:**

Fertilizer shall be the same analysis as specified for *Seeding and Mulching* and applied at the rate of 400 pounds and seeded at the rate of 50 pounds per acre. Sweet Sudan Grass, German Millet or Browntop Millet shall be used in summer months and Rye Grain during the remainder of the year. The Engineer will determine the exact dates for using each kind of seed.

#### **FERTILIZER TOPDRESSING:**

Fertilizer used for topdressing on all roadway areas except slopes 2:1 and steeper shall be 10-20-20 grade and shall be applied at the rate of 500 pounds per acre. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 10-20-20 analysis and as directed.

Fertilizer used for topdressing on slopes 2:1 and steeper and waste and borrow areas shall be 16-8-8 grade and shall be applied at the rate of 500 pounds per acre. A different analysis of fertilizer may be used provided the 2-1-1 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 16-8-8 analysis and as directed.

#### **SUPPLEMENTAL SEEDING:**

The kinds of seed and proportions shall be the same as specified for *Seeding and Mulching*, with the exception that no centipede seed will be used in the seed mix for supplemental seeding. The

rate of application for supplemental seeding may vary from 25# to 75# per acre. The actual rate per acre will be determined prior to the time of topdressing and the Contractor will be notified in writing of the rate per acre, total quantity needed, and areas on which to apply the supplemental seed. Minimum tillage equipment, consisting of a sod seeder shall be used for incorporating seed into the soil as to prevent disturbance of existing vegetation. A clodbuster (ball and chain) may be used where degree of slope prevents the use of a sod seeder.

### **MOWING:**

The minimum mowing height on this project shall be 4 inches.

### **NATIVE GRASS SEEDING AND MULCHING (WEST)**

Native Grass Seeding and Mulching shall be performed on the disturbed areas of wetlands and riparian areas, and adjacent to Stream Relocation and/or trout stream construction within a 50 foot zone on both sides of the stream or depression, measured from top of stream bank or center of depression. The stream bank of the stream relocation shall be seeded by a method that does not alter the typical cross section of the stream bank. Native Grass Seeding and Mulching shall also be performed in the permanent soil reinforcement mat section of preformed scour holes, and in other areas as directed.

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined. All rates are in pounds per acre.

| <b>August 1 - June 1</b> |                     | <b>May 1 – September 1</b> |                           |
|--------------------------|---------------------|----------------------------|---------------------------|
| 18#                      | Creeping Red Fescue | 18#                        | Creeping Red Fescue       |
| 8#                       | Big Bluestem        | 8#                         | Big Bluestem              |
| 6#                       | Indiangrass         | 6#                         | Indiangrass               |
| 4#                       | Switchgrass         | 4#                         | Switchgrass               |
| 35#                      | Rye Grain           | 25#                        | German or Browntop Millet |
| 500#                     | Fertilizer          | 500#                       | Fertilizer                |
| 4000#                    | Limestone           | 4000#                      | Limestone                 |

Approved Creeping Red Fescue Cultivars:

Aberdeen                      Boreal                      Epic                      Cindy Lou

Fertilizer shall be 10-20-20 analysis. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis and as directed.

Native Grass Seeding and Mulching shall be performed in accordance with Section 1660 of the *Standard Specifications* and vegetative cover sufficient to restrain erosion shall be installed immediately following grade establishment.

### **Measurement and Payment**

Native Grass *Seeding and Mulching* will be measured and paid for in accordance with Article 1660-8 of the *Standard Specifications*.



**MINIMIZE REMOVAL OF VEGETATION:**

The Contractor shall minimize removal of vegetation within project limits to the maximum extent practicable. Vegetation along stream banks and adjacent to other jurisdictional resources outside the construction limits shall only be removed upon approval of Engineer. No additional payment will be made for this minimization work.

**RESPONSE FOR EROSION CONTROL:****Description**

Furnish the labor, materials, tools and equipment necessary to move personnel, equipment, and supplies to the project necessary for the pursuit of any or all of the following work as shown herein, by an approved subcontractor.

| <b>Section</b> | <b>Erosion Control Item</b>      | <b>Unit</b> |
|----------------|----------------------------------|-------------|
| 1605           | Temporary Silt Fence             | LF          |
| 1606           | Special Sediment Control Fence   | LF/TON      |
| 1615           | Temporary Mulching               | ACR         |
| 1620           | Seed - Temporary Seeding         | LB          |
| 1620           | Fertilizer - Temporary Seeding   | TN          |
| 1631           | Matting for Erosion Control      | SY          |
| SP             | Coir Fiber Mat                   | SY          |
| 1640           | Coir Fiber Baffles               | LF          |
| SP             | Permanent Soil Reinforcement Mat | SY          |
| 1660           | Seeding and Mulching             | ACR         |
| 1661           | Seed - Repair Seeding            | LB          |
| 1661           | Fertilizer - Repair Seeding      | TON         |
| 1662           | Seed - Supplemental Seeding      | LB          |
| 1665           | Fertilizer Topdressing           | TON         |
| SP             | Safety/Highly Visible Fencing    | LF          |
| SP             | Response for Erosion Control     | EA          |

**Construction Methods**

Provide an approved subcontractor who performs an erosion control action as described in the NPDES Inspection Form SPPP30. Each erosion control action may include one or more of the above work items.

**Measurement and Payment**

*Response for Erosion Control* will be measured and paid for by counting the actual number of times the subcontractor moves onto the project, including borrow and waste sites, and satisfactorily completes an erosion control action described in Form 1675. The provisions of Article 104-5 of the *Standard Specifications* will not apply to this item of work.

Payment will be made under:

| <b>Pay Item</b>              | <b>Pay Unit</b> |
|------------------------------|-----------------|
| Response for Erosion Control | Each            |

**TEMPORARY ROCK SILT CHECK TYPE A WITH EXCELSIOR MATTING AND POLYACRYLAMIDE (PAM):**

**Description**

Temporary Rock Silt Checks Type A with Excelsior Matting and Polyacrylamide (PAM) are devices utilized in temporary and permanent ditches to reduce runoff velocity and incorporate PAM into the construction runoff to increase settling of sediment particles and reduce turbidity of runoff. Temporary Rock Silt Checks Type A with Excelsior Matting and PAM are to be placed at locations shown on the plans or as directed. Installation shall follow the detail provided in the plans and as directed. Work includes furnishing materials, installation of Temporary Rock Silt Checks Type A, matting installation, PAM application, and removing Temporary Rock Silt Checks Type A with Excelsior Matting and PAM.

**Materials**

Structural stone shall be class B stone that meets the requirements of Section 1042 of the *Standard Specifications* for Stone for Erosion Control, Class B.

Sediment control stone shall be #5 or #57 stone, which meets the requirements of Section 1005 of the *Standard Specifications* for these stone sizes.

Matting shall meet the requirements of Excelsior Matting in Subarticle 1060-8(B) of the *Standard Specifications*, or shall meet specifications provided elsewhere in this contract.

Polyacrylamide (PAM) shall be applied in powder form and shall be anionic or neutrally charged. Soil samples shall be obtained in areas where the Temporary Rock Silt Checks Type A with Excelsior Matting and PAM will be placed, and from offsite material used to construct the roadway, and analyzed for the appropriate PAM flocculant to be utilized with each Temporary Rock Silt Check Type A. The PAM product used shall be listed on the North Carolina Department of Environment and Natural Resources (NCDENR) Division of Water Quality (DWQ) web site as an approved PAM product for use in North Carolina.

**Construction Methods**

Temporary Rock Silt Checks Type A shall be installed in accordance with Subarticle 1633-3(A) of the *Standard Specifications*, Roadway Standard Drawing No. 1633.01 and the detail provided in the plans.

Installation of matting shall be in accordance with the detail provided in the plans, and anchored by placing Class B stone on top of the matting at the upper and lower ends.

Apply PAM at a rate of 4 ounces over the center portion of the Temporary Rock Silt Checks Type A and matting where the water is going to flow over. PAM applications shall be done during construction activities and after every rainfall event that is equal to or exceeds 0.50 in.

The Contractor shall maintain the Temporary Rock Silt Checks Type A with Excelsior Matting and PAM until the project is accepted or until the Temporary Rock Silt Checks Type A with Excelsior Matting and PAM are removed, and shall remove and dispose of silt accumulations at the Temporary Rock Silt Checks Type A with Excelsior Matting and PAM when so directed in accordance with the requirements of Section 1630 of the *Standard Specifications*.

### **Measurement and Payment**

*Temporary Rock Silt Checks Type A* will be measured and paid for in accordance with Article 1633-5 of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

Matting will be measured and paid for in accordance with Article 1631-4 of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

*Polyacrylamide(PAM)* will be measured and paid for by the actual weight in pounds of PAM applied to the Temporary Rock Silt Checks Type A. Such price and payment will be full compensation for all work covered by this section, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to apply the *Polyacrylamide(PAM)*.

Payment will be made under:

| <b>Pay Item</b>     | <b>Pay Unit</b> |
|---------------------|-----------------|
| Polyacrylamide(PAM) | Pound           |

### **COIR FIBER MAT:**

#### **Description**

Furnish material, install and maintain coir fiber mat in locations shown on the plans or in locations as directed. Work includes providing all materials, excavating and backfilling, and placing and securing coir fiber mat with stakes, steel reinforcement bars or staples as directed.

#### **Materials**

| <b>Item</b>    | <b>Section</b> |
|----------------|----------------|
| Coir Fiber Mat | 1060-14        |

Anchors: Stakes, reinforcement bars, or staples shall be used as anchors.

Wooden Stakes:

Provide hardwood stakes 12"- 24" long with a 2" x 2" nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving through the coir fiber mat and down into the underlying soil. The other end of the stake needs to have a 1"- 2" long head at the top with a 1"- 2" notch following to catch and secure the coir fiber mat.

#### Steel Reinforcement Bars:

Provide uncoated #10 steel reinforcement bars 24" nominal length. The bars shall have a 4" diameter bend at one end with a 4" straight section at the tip to catch and secure the coir fiber mat.

#### Staples:

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

### Construction Methods

Place the coir fiber mat immediately upon final grading. Provide a smooth soil surface free from stones, clods, or debris that will prevent the contact of the mat with the soil. Unroll the mat and apply without stretching such that it will lie smoothly but loosely on the soil surface.

For stream relocation applications, take care to preserve the required line, grade, and cross section of the area covered. Bury the top slope end of each piece of mat in a narrow trench at least 6 in. deep and tamp firmly. Where one roll of matting ends and a second roll begins, overlap the end of the upper roll over the buried end of the second roll so there is a 6 in. overlap. Construct check trenches at least 12 in. deep every 50 ft. longitudinally along the edges of the mat or as directed. Fold over and bury mat to the full depth of the trench, close and tamp firmly. Overlap mat at least 6 in. where 2 or more widths of mat are installed side by side.

Place anchors across the mat at the ends approximately 1 ft. apart. Place anchors along the outer edges and down the center of the mat 3 ft. apart.

Adjustments in the trenching or anchoring requirements to fit individual site conditions may be required.

### Measurement and Payment

*Coir Fiber Mat* will be measured and paid for as the actual number of square yards measured along the surface of the ground over which coir fiber mat is installed and accepted.

No measurement will be made for anchor items.

Payment will be made under:

#### Pay Item

Coir Fiber Mat

#### Pay Unit

Square Yard

**SAFETY FENCE AND JURISDICTIONAL FLAGGING:****Description**

*Safety Fence* shall consist of furnishing materials, installing and maintaining polyethylene or polypropylene fence along the outside riparian buffer, wetland, or water boundary, or other boundaries located within the construction corridor to mark the areas that have been approved to infringe within the buffer, wetland, endangered vegetation, culturally sensitive areas or water. The fence shall be installed prior to any land disturbing activities.

Interior boundaries for jurisdictional areas noted above shall be delineated by stakes and highly visible flagging.

Jurisdictional boundaries at staging areas, waste sites, or borrow pits, whether considered outside or interior boundaries shall be delineated by stakes and highly visible flagging.

**Materials****(A) Safety Fencing**

Polyethylene or polypropylene fence shall be a highly visible preconstructed safety fence approved by the Engineer. The fence material shall have an ultraviolet coating.

Either wood posts or steel posts may be used. Wood posts shall be hardwood with a wedge or pencil tip at one end, and shall be at least 5 ft. in length with a minimum nominal 2" x 2" cross section. Steel posts shall be at least 5 ft. in length, and have a minimum weight of 0.85 lb/ft of length.

**(B) Boundary Flagging**

Wooden stakes shall be 4 feet in length with a minimum nominal 3/4" x 1-3/4" cross section. The flagging shall be at least 1" in width. The flagging material shall be vinyl and shall be orange in color and highly visible.

**Construction Methods**

No additional clearing and grubbing is anticipated for the installation of this fence. The fence shall be erected to conform to the general contour of the ground.

**(A) Safety Fencing**

Posts shall be set at a maximum spacing of 10 ft., maintained in a vertical position and hand set or set with a post driver. Posts shall be installed a minimum of 2 ft. into the ground. If hand set, all backfill material shall be thoroughly tamped. Wood posts may be sharpened to a dull point if power driven. Posts damaged by power driving shall be removed and replaced prior to final acceptance. The tops of all wood posts shall be cut at a 30-degree angle. The wood posts may, at the option of the Contractor, be cut at this angle either before or after the posts are erected.

The fence geotextile shall be attached to the wood posts with one 2" galvanized wire staple across each cable or to the steel posts with wire or other acceptable means.

Place construction stakes to establish the location of the safety fence in accordance with Article 105-9 or Article 801-1 of the *Standard Specifications*. No direct pay will be made for the staking of the safety fence. All stakeouts for safety fence shall be considered incidental to the work being paid for as "Construction Surveying", except that where there is no pay item for construction surveying, all safety fence stakeout will be performed by state forces.

The Contractor shall be required to maintain the safety fence in a satisfactory condition for the duration of the project as determined by the Engineer.

(B) Boundary Flagging

Boundary flagging delineation of interior boundaries shall consist of wooden stakes on 25 feet maximum intervals with highly visible orange flagging attached. Stakes shall be installed a minimum of 6" into the ground. Interior boundaries may be staked on a tangent that runs parallel to buffer but must not encroach on the buffer at any location. Interior boundaries of hand clearing shall be identified with a different colored flagging to distinguish it from mechanized clearing.

Boundary flagging delineation of interior boundaries will be placed in accordance with Article 105-9 or Article 801-1 of the *Standard Specifications*. No direct pay will be made for delineation of the interior boundaries. This delineation will be considered incidental to the work being paid for as *Construction Surveying*, except that where there is no pay item or construction surveying the cost of boundary flagging delineation shall be included in the unit prices bid for the various items in the contract. Installation for delineation of all jurisdictional boundaries at staging areas, waste sites, or borrow pits shall consist of wooden stakes on 25 feet maximum intervals with highly visible orange flagging attached. Stakes shall be installed a minimum of 6" into the ground. Additional flagging may be placed on overhanging vegetation to enhance visibility but does not substitute for installation of stakes.

Installation of boundary flagging for delineation of all jurisdictional boundaries at staging areas, waste sites, or borrow pits shall be performed in accordance with Subarticle 230-4(B)(5) or Subarticle 802-2(F) of the *Standard Specifications*. No direct pay will be made for this delineation, as the cost of same shall be included in the unit prices bid for the various items in the contract.

The Contractor shall be required to maintain alternative stakes and highly visible flagging in a satisfactory condition for the duration of the project as determined by the Engineer.

**Measurement and Payment**

*Safety Fence* will be measured and paid as the actual number of linear feet of polyethylene or polypropylene fence installed in place and accepted. Such payment will be full compensation including but not limited to furnishing and installing fence geotextile with necessary posts and post bracing, staples, tie wires, tools, equipment and incidentals necessary to complete this work.

Payment will be made under:

**Pay Item**  
Safety Fence

**Pay Unit**  
Linear Foot

**HIGH QUALITY WATERS:****Description**

The \_\_\_(H Q W)\_\_\_\_\_ has been identified as high quality waters. This designation requires special procedures to be used for clearing and grubbing, temporary stream crossings, and grading operations within the High Quality Water Zone and as designated by the Engineer. The High Quality Water Zones are identified on the plans as Environmentally Sensitive Areas. This also requires special procedures to be used for seeding and mulching and staged seeding.

The High Quality Water Zone/Environmentally Sensitive Area shall be defined as a 50-foot buffer zone on both sides of the stream measured from top of streambank.

**Construction Methods****(A) Clearing and Grubbing**

In areas identified as High Quality Water Zones/Environmentally Sensitive Areas, the Contractor may perform clearing operations, but not grubbing operations until immediately prior to beginning grading operations as described in Article 200-1 of the *Standard Specifications*. Only clearing operations (not grubbing) shall be allowed in this buffer zone until immediately prior to beginning grading operations. Erosion control devices shall be installed immediately following the clearing operation.

**(B) Grading**

Once grading operations begin in identified High Quality Water Zones/ Environmentally Sensitive Areas, work shall progress in a continuous manner until complete. All construction within these areas shall progress in a continuous manner such that each phase is complete and areas are permanently stabilized prior to beginning of next phase. Failure on the part of the Contractor to complete any phase of construction in a continuous manner in High Quality Water Zones/ Environmentally Sensitive Areas will be just cause for the Engineer to direct the suspension of work in accordance with Article 108-7 of the *Standard Specifications*.

**(C) Temporary Stream Crossings**

Any crossing of streams within the limits of this project shall be accomplished in accordance with the requirements of Subarticle 107-12 of the *Standard Specifications*.

**(D) Seeding and Mulching**

Seeding and mulching shall be performed in accordance with Section 1660 of the *Standard Specifications* and vegetative cover sufficient to restrain erosion shall be installed immediately following grade establishment.

Seeding and mulching shall be performed on the areas disturbed by construction immediately following final grade establishment. No appreciable time shall lapse into the contract time without stabilization of slopes, ditches and other areas within the High Quality Water Zones/Environmentally Sensitive Areas.

**(E) Stage Seeding**

The work covered by this section shall consist of the establishment of a vegetative cover on cut and fill slopes as grading progresses. Seeding and mulching shall be done in stages on cut and fill slopes that are greater than 20 feet in height measured along the slope, or greater than 2 acres in area. Each stage shall not exceed the limits stated above.

Additional payments will not be made for the requirements of this section, as the cost for this work shall be included in the contract unit prices for the work involved.

**IMPERVIOUS DIKE:****Description**

This work consists of furnishing, installing, maintaining, and removing an *Impervious Dike* for the purpose of diverting normal stream flow around the construction site. The Contractor shall construct an impervious dike in such a manner approved by the Engineer. The impervious dike shall not permit seepage of water into the construction site or contribute to siltation of the stream. The impervious dike shall be constructed of an acceptable material in the locations noted on the plans or as directed.

**Materials**

Acceptable materials shall include but not be limited to sheet piles, sandbags, and/or the placement of an acceptable size stone lined with polypropylene or other impervious geotextile. Earth material shall not be used to construct an impervious dike when it is in direct contact with the stream unless vegetation can be established before contact with the stream takes place.

**Measurement and Payment**

*Impervious Dike* will be measured and paid as the actual number of linear feet of impervious dike(s) constructed, measured in place from end to end of each separate installation that has been completed and accepted. Such price and payment will be full compensation for all work including but not limited to furnishing materials, construction, maintenance, and removal of the impervious dike.

Payment will be made under:

**Pay Item**

Impervious Dike

**Pay Unit**

Linear Foot

**REFORESTATION:****Description**

*Reforestation* will be planted within interchanges and along the outside borders of the road, and in other areas as directed. *Reforestation* is not shown on the plan sheets. See the Reforestation Detail Sheet.



All non-maintained riparian buffers impacted by the placement of temporary fill or clearing activities shall be restored to the preconstruction contours and revegetated with native woody species.

The entire *Reforestation* operation shall comply with the requirements of Section 1670 of the *Standard Specifications*.

### **Materials**

*Reforestation* shall be bare root seedlings 12"-18" tall.

### **Construction Methods**

*Reforestation* shall be planted as soon as practical following permanent *Seeding and Mulching*. The seedlings shall be planted in a 16-foot wide swath adjacent to mowing pattern line, or as directed.

Root dip: The roots of reforestation seedlings shall be coated with a slurry of water, and either a fine clay (kaolin) or a superabsorbent that is designated as a bare root dip. The type, mixture ratio, method of application, and the time of application shall be submitted to the Engineer for approval.

With the approval of the Engineer, seedlings may be coated before delivery to the job or at the time of planting, but at no time shall the roots of the seedlings be allowed to dry out. The roots shall be moistened immediately prior to planting.

Seasonal Limitations: *Reforestation* shall be planted from November 15 through March 15.

### **Measurement and Payment**

*Reforestation* will be measured and paid for in accordance with Article 1670-17 of the *Standard Specifications*.

### **PERMANENT SOIL REINFORCEMENT MAT:**

#### **Description**

This work consists of furnishing and placing *Permanent Soil Reinforcement Mat*, of the type specified, over previously prepared areas as directed.

#### **Materials**

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

| <b>Property</b>   | <b>Test Method</b> | <b>Value</b> | <b>Unit</b> |
|-------------------|--------------------|--------------|-------------|
| Light Penetration | ASTM D6567         | 9            | %           |
| Thickness         | ASTM D6525         | 0.40         | in          |

|  |                        |       |                    |
|--|------------------------|-------|--------------------|
| Mass Per Unit Area                           | ASTM D6566             | 0.55  | lb/sy              |
| Tensile Strength                             | ASTM D6818             | 385   | lb/ft              |
| Elongation (Maximum)                         | ASTM D6818             | 49    | %                  |
| Resiliency                                   | ASTM D1777             | >70   | %                  |
| UV Stability *                               | ASTM D4355             | ≥80   | %                  |
| Porosity (Permanent Net)                     | ECTC Guidelines        | ≥85   | %                  |
| Maximum Permissible Shear Stress (Vegetated) | Performance Bench Test | ≥8.0  | lb/ft <sup>2</sup> |
| Maximum Allowable Velocity (Vegetated)       | Performance Bench Test | ≥16.0 | ft/s               |

\*ASTM D1682 Tensile Strength and % strength retention of material after 1000 hours of exposure.

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

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

### Construction Methods

Matting shall be installed in accordance with Subarticle 1631-3(B) of the *Standard Specifications*.

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

### Measurement and Payment

*Permanent Soil Reinforcement Mat* will be measured and paid for as the actual number of square yards measured along the surface of the ground over which Permanent Soil Reinforcement Mat is installed and accepted. Overlaps will not be included in the measurement, and will be considered as incidental to the work. Such payment shall be full compensation for furnishing and installing the mat, including overlaps, and for all required maintenance.

Payment will be made under:

#### Pay Item

Permanent Soil Reinforcement Mat

#### Pay Unit

Square Yard

### CONCRETE WASHOUT STRUCTURE:

(01-03-19)

#### Description

Concrete washout structures are enclosures above or below grade to contain concrete waste water and associated concrete mix from washing out ready-mix trucks, drums, pumps, or other equipment. Concrete washouts must collect and retain all the concrete washout water and solids,

so that this material does not migrate to surface waters or into the ground water. These enclosures are not intended for concrete waste not associated with wash out operations.

The concrete washout structure may include constructed devices above or below ground and or commercially available devices designed specifically to capture concrete wash water.

## Materials

| Item                 | Section |
|----------------------|---------|
| Temporary Silt Fence | 1605    |

*Safety Fence* shall meet the specifications as provided elsewhere in this contract.

Geomembrane basin liner shall meet the following minimum physical properties for low permeability; it shall consist of a polypropylene or polyethylene 10 mil thick geomembrane. If the minimum setback dimensions can be achieved the liner is not required. (5 feet above groundwater, 50 feet from top of bank of perennial stream, other surface water body, or wetland.)

## Construction Methods

Build an enclosed earthen berm or excavate to form an enclosure in accordance with the details and as directed.

Install temporary silt fence around the perimeter of the enclosure in accordance with the details and as directed if structure is not located in an area where existing erosion and sedimentation control devices are capable to containing any loss of sediment.

Post a sign with the words “Concrete Washout” in close proximity of the concrete washout area, so it is clearly visible to site personnel. Install safety fence as directed for visibility to construction traffic.

The construction details for the above grade and below grade concrete washout structures can be found on the following web page link:

<https://connect.ncdot.gov/resources/roadside/SoilWaterDocuments/ConcreteWashoutStructureDetail.pdf>

[Alternate details for accommodating concrete washout may be submitted for review and approval.](#)

[The alternate details shall include the method used to retain and dispose of the concrete waste water within the project limits and in accordance with the minimum setback requirements.](#) (5 feet above groundwater, 50 feet from top of bank of perennial stream, other surface water body, or wetland.)

## Maintenance and Removal

Maintain the concrete washout structure(s) to provide adequate holding capacity plus a minimum freeboard of 12 inches. Remove and dispose of hardened concrete and return the structure to a functional condition after reaching 75% capacity.

Inspect concrete washout structures for damage and maintain for effectiveness.

Remove the concrete washout structures and sign upon project completion. Grade the earth material to match the existing contours and permanently seed and mulch area.

### **Measurement and Payment**

*Concrete Washout Structure* will be paid for per each enclosure installed in accordance with the details. If alternate details are approved then those details will also be paid for per each approved and installed device.

*Temporary Silt Fence* will be measured and paid for in accordance with Article 1605-5 of the *Standard Specifications*.

No measurement will be made for other items or for over excavation or stockpiling.

Payment will be made under:

| <b>Pay Item</b>            | <b>Pay Unit</b> |
|----------------------------|-----------------|
| Concrete Washout Structure | Each            |

**STOCKPILE AREAS:**

The Contractor shall install and maintain erosion control devices sufficient to contain sediment around any erodible material stockpile areas as directed.

**TRAFFIC CONTROL:**

Contractor will be paid for all traffic control items that have been included in the contract. No direct payment will be made for providing other traffic control as required herein, as the cost of same will be considered incidental to the work being paid for under those various traffic control items that have been included. Where the Contractor maintains traffic as required herein but no specific pay items have been included in the contract, all associated costs will be considered incidental to the work being paid for under the various items in the contract.

**PROJECT SPECIAL PROVISIONS (STRUCTURES)**

**TEMPORARY PIPE FOR CULVERT CONSTRUCTION:**

**Description**

This work consists of furnishing, installing, maintaining and removing any and all temporary pipe used on this project in conjunction with the culvert construction.

**Construction Methods**

The Contractor shall install temporary pipe in locations shown on the plans in such a manner approved by the Engineer. The temporary pipe shall provide a passageway for the stream through the work-site. The minimum size requirements will be as stated on the erosion control plans.

**Measurement and Payment**

*24" Temporary Pipe* will be measured and paid for at the contract unit price per linear foot of temporary pipe approved by the Engineer and measured in place from end to end. Such price and payment will be full compensation for all work covered by this section including but not limited to furnishing all materials required for installation, construction, maintenance, and removal of temporary pipe.

Payment will be made under:

| <b>Pay Item</b>    | <b>Pay Unit</b> |
|--------------------|-----------------|
| 24" Temporary Pipe | Linear Foot     |

**FALSEWORK AND FORMWORK..... (4-5-12)**

**DESCRIPTION**

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

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

Design and construct safe and adequate temporary works that will support all loads imposed and provide the necessary rigidity to achieve the lines and grades shown on the plans in the final structure.

## 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.

## DESIGN REQUIREMENTS

### A. Working Drawings

Provide working drawings for items as specified in the contract, or as required by the Engineer, with design calculations and supporting data in sufficient detail to permit a structural and safety review of the proposed design of the temporary work.

On the drawings, show all information necessary to allow the design of any component to be checked independently as determined by the Engineer.

When concrete placement is involved, include data such as the drawings of proposed sequence, rate of placement, direction of placement, and location of all construction joints. Submit the number of copies as called for by the contract.

When required, have the drawings and calculations prepared under the guidance of, and sealed by, a North Carolina Registered Professional Engineer who is knowledgeable in temporary works design.

If requested by the Engineer, submit with the working drawings manufacturer's catalog data listing the weight of all construction equipment that will be supported on the temporary work. Show anticipated total settlements and/or deflections of falsework and forms on the working drawings. Include falsework footing settlements, joint take-up, and deflection of beams or girders.

As an option for the Contractor, overhang falsework hangers may be uniformly spaced, at a maximum of 36 inches, provided the following conditions are met:

| Member Type (PCG) | Member Depth, (inches) | Max. Overhang Width, (inches) | Max. Slab Edge Thickness, (inches) | Max. Screed Wheel Weight, (lbs.) | Bracket Min. Vertical Leg Extension, (inches) |
|-------------------|------------------------|-------------------------------|------------------------------------|----------------------------------|---|
| II                | 36                     | 39                            | 14                                 | 2000                             | 26  |
| III               | 45                     | 42                            | 14                                 | 2000                             | 35  |
| IV                | 54                     | 45                            | 14                                 | 2000                             | 44  |
| MBT               | 63                     | 51                            | 12                                 | 2000                             | 50  |

|     |    |    |    |      |    |
|-----|----|----|----|------|----|
| MBT | 72 | 55 | 12 | 1700 | 48 |
|-----|----|----|----|------|----|

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

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

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

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

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

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

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

When staged construction of the bridge deck is required, detail falsework and forms for screed and fluid concrete loads to be independent of any previous deck pour components when the mid-span girder deflection due to deck weight is greater than 3/4".

Note on the working drawings any anchorages, connectors, inserts, steel sleeves or other such devices used as part of the falsework or formwork that remains in the permanent structure. If the plan notes indicate that the structure contains the necessary corrosion protection required for a Corrosive Site, epoxy coat, galvanize or metalize these devices. Electroplating will not be allowed. Any coating required by the Engineer will be considered incidental to the various pay items requiring temporary works.

Design falsework and formwork requiring submittals in accordance with the 1995 AASHTO *Guide Design Specifications for Bridge Temporary Works* except as noted herein.

#### 1. Wind Loads



Table 2.2 of Article 2.2.5.1 is modified to include wind velocities up to 110 mph. In addition, Table 2.2A is included to provide the maximum wind speeds by county in North Carolina.

**Table 2.2 - Wind Pressure Values**

| Height Zone<br>feet above ground | Pressure, lb/ft <sup>2</sup> for Indicated Wind Velocity, mph |    |    |     |     |
|----------------------------------|---|----|----|-----|-----|
|                                  | 70  | 80 | 90 | 100 | 110 |
| 0 to 30                          | 15  | 20 | 25 | 30  | 35  |
| 30 to 50                         | 20  | 25 | 30 | 35  | 40  |
| 50 to 100                        | 25  | 30 | 35 | 40  | 45  |
| over 100                         | 30  | 35 | 40 | 45  | 50  |

## 2. Time of Removal

The following requirements replace those of Article 3.4.8.2.

Do not remove forms until the concrete has attained strengths required in Article 420-16 of the Standard Specifications and these Special Provisions.

Do not remove forms until the concrete has sufficient strength to prevent damage to the surface.

**Table 2.2A - Steady State Maximum Wind Speeds by Counties in North Carolina**

| COUNTY     | 25 YR<br>(mph) | COUNTY      | 25 YR<br>(mph) | COUNTY       | 25 YR<br>(mph) |
|------------|----------------|-------------|----------------|--------------|----------------|
| Alamance   | 70             | Franklin    | 70             | Pamlico      | 100            |
| Alexander  | 70             | Gaston      | 70             | Pasquotank   | 100            |
| Alleghany  | 70             | Gates       | 90             | Pender       | 100            |
| Anson      | 70             | Graham      | 80             | Perquimans   | 100            |
| Ashe       | 70             | Granville   | 70             | Person       | 70             |
| Avery      | 70             | Greene      | 80             | Pitt         | 90             |
| Beaufort   | 100            | Guilford    | 70             | Polk         | 80             |
| Bertie     | 90             | Halifax     | 80             | Randolph     | 70             |
| Bladen     | 90             | Harnett     | 70             | Richmond     | 70             |
| Brunswick  | 100            | Haywood     | 80             | Robeson      | 80             |
| Buncombe   | 80             | Henderson   | 80             | Rockingham   | 70             |
| Burke      | 70             | Hertford    | 90             | Rowan        | 70             |
| Cabarrus   | 70             | Hoke        | 70             | Rutherford   | 70             |
| Caldwell   | 70             | Hyde        | 110            | Sampson      | 90             |
| Camden     | 100            | Iredell     | 70             | Scotland     | 70             |
| Carteret   | 110            | Jackson     | 80             | Stanley      | 70             |
| Caswell    | 70             | Johnston    | 80             | Stokes       | 70             |
| Catawba    | 70             | Jones       | 100            | Surry        | 70             |
| Cherokee   | 80             | Lee         | 70             | Swain        | 80             |
| Chatham    | 70             | Lenoir      | 90             | Transylvania | 80             |
| Chowan     | 90             | Lincoln     | 70             | Tyrell       | 100            |
| Clay       | 80             | Macon       | 80             | Union        | 70             |
| Cleveland  | 70             | Madison     | 80             | Vance        | 70             |
| Columbus   | 90             | Martin      | 90             | Wake         | 70             |
| Craven     | 100            | McDowell    | 70             | Warren       | 70             |
| Cumberland | 80             | Mecklenburg | 70             | Washington   | 100            |
| Currituck  | 100            | Mitchell    | 70             | Watauga      | 70             |
| Dare       | 110            | Montgomery  | 70             | Wayne        | 80             |
| Davidson   | 70             | Moore       | 70             | Wilkes       | 70             |
| Davie      | 70             | Nash        | 80             | Wilson       | 80             |
| Duplin     | 90             | New Hanover | 100            | Yadkin       | 70             |
| Durham     | 70             | Northampton | 80             | Yancey       | 70             |
| Edgecombe  | 80             | Onslow      | 100            |              |                |
| Forsyth    | 70             | Orange      | 70             |              |                |

**B. Review and Approval**

The Engineer is responsible for the review and approval of temporary works' drawings.

Submit the working drawings sufficiently in advance of proposed use to allow for their review, revision (if needed), and approval without delay to the work.

The time period for review of the working drawings does not begin until complete drawings and design calculations, when required, are received by the Engineer.

Do not start construction of any temporary work for which working drawings are required until the drawings have been approved. Such approval does not relieve the Contractor of the responsibility for the accuracy and adequacy of the working drawings.

## **CONSTRUCTION REQUIREMENTS**

All requirements of Section 420 of the Standard Specifications apply.

Construct temporary works in conformance with the approved working drawings. Ensure that the quality of materials and workmanship employed is consistent with that assumed in the design of the temporary works. Do not weld falsework members to any portion of the permanent structure unless approved. Show any welding to the permanent structure on the approved construction drawings.

Provide tell-tales attached to the forms and extending to the ground, or other means, for accurate measurement of falsework settlement. Make sure that the anticipated compressive settlement and/or deflection of falsework does not exceed 1 inch. For cast-in-place concrete structures, make sure that the calculated deflection of falsework flexural members does not exceed 1/240 of their span regardless of whether or not the deflection is compensated by camber strips.

### **A. Maintenance and Inspection**

Inspect and maintain the temporary work in an acceptable condition throughout the period of its use. Certify that the manufactured devices have been maintained in a condition to allow them to safely carry their rated loads. Clearly mark each piece so that its capacity can be readily determined at the job site.

Perform an in-depth inspection of an applicable portion(s) of the temporary works, in the presence of the Engineer, not more than 24 hours prior to the beginning of each concrete placement. Inspect other temporary works at least once a month to ensure that they are functioning properly. Have a North Carolina Registered Professional Engineer inspect the cofferdams, shoring, sheathing, support of excavation structures, and support systems for load tests prior to loading.

### **B. Foundations**

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

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

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

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

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

## **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.

## **METHOD OF MEASUREMENT**

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

## **BASIS OF PAYMENT**

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

## **CRANE SAFETY (8-15-05)**

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

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

## **CRANE SAFETY SUBMITTAL LIST**

**Competent Person:** Provide the name and qualifications of the “Competent Person” responsible for crane safety and lifting operations. The named competent person will have the responsibility and authority to stop any work activity due to safety concerns.

**Riggers:** Provide the qualifications and experience of the persons responsible for rigging operations. Qualifications and experience should include, but not be limited to, weight calculations, center of gravity determinations, selection and inspection of sling and rigging equipment, and safe rigging practices.

**Crane Inspections:** Inspection records for all cranes shall be current and readily accessible for review upon request.

**Certifications:** 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.

## **SUBMITTAL OF WORKING DRAWINGS (6-28-17)**

### **GENERAL**

Submit working drawings in accordance with Article 105-2 of the *Standard Specifications* and this provision. For this provision, “submittals” refers to only those listed in this provision. The list of submittals contained herein does not represent a list of required submittals for the project. Submittals are only necessary for those items as required by the contract. Make submittals that are not specifically noted in this provision directly to the Engineer. Either the Structures Management Unit or the Geotechnical Engineering Unit or both units will jointly review submittals.

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

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

### **ADDRESSES AND CONTACTS**

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

Via US mail:

Mr. B. C. Hanks, P. E.  
State Structures Engineer  
North Carolina Department  
of Transportation  
Structures Management Unit  
1581 Mail Service Center  
Raleigh, NC 27699-1581

Attention: Mr. J. L. Bolden, P. E.

Via other delivery service:

Mr. B. C. Hanks, P. E.  
State Structures Engineer  
North Carolina Department  
of Transportation  
Structures Management Unit  
1000 Birch Ridge Drive  
Raleigh, NC 27610

Attention: Mr. J. L. Bolden, P. E.

Submittals may also be made via email.

Send submittals to:

[jlbolden@ncdot.gov](mailto:jlbolden@ncdot.gov) (James Bolden)

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

[eomile@ncdot.gov](mailto:eomile@ncdot.gov) (Emmanuel Omile)

[mrorie@ncdot.gov](mailto:mrorie@ncdot.gov) (Madonna Rorie)

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

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

Via US mail:

Mr. Chris Kreider, P. E.  
Eastern Regional Geotechnical  
Manager  
North Carolina Department  
of Transportation  
Geotechnical Engineering Unit  
Eastern Regional Office  
1570 Mail Service Center  
Raleigh, NC 27699-1570

Via other delivery service:

Mr. Chris Kreider, P. E.  
Eastern Regional Geotechnical  
Manager  
North Carolina Department  
of Transportation  
Geotechnical Engineering Unit  
Eastern Regional Office  
3301 Jones Sausage Road, Suite 100  
Garner, NC 27529

Via Email: [EastGeotechnicalSubmittal@ncdot.gov](mailto:EastGeotechnicalSubmittal@ncdot.gov)

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

Via US mail or other delivery service:

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

Via Email: [WestGeotechnicalSubmittal@ncdot.gov](mailto:WestGeotechnicalSubmittal@ncdot.gov)

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

The status of the review of geotechnical-related submittals sent to the Geotechnical Engineering Unit can be viewed from the Unit's website, via the "Geotechnical Construction Submittals" link.

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

Primary Structures Contact: James Bolden (919) 707 – 6408  
(919) 250 – 4082 facsimile  
[jlbolden@ncdot.gov](mailto:jlbolden@ncdot.gov)

Secondary Structures Contacts: Emmanuel Omile (919) 707 – 6451  
Madonna Rorie (919) 707 – 6508

Eastern Regional Geotechnical Contact (Divisions 1-7):  
Chris Kreider (919) 662 – 4710  
[ckreider@ncdot.gov](mailto:ckreider@ncdot.gov)

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

## **SUBMITTAL COPIES**

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

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

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

### **STRUCTURE SUBMITTALS**

| <b>Submittal</b> | <b>Copies<br/>Required by<br/>Structures</b> | <b>Copies<br/>Required by<br/>Geotechnical</b> | <b>Contract Reference<br/>Requiring Submittal <sup>1</sup></b> |
|------------------|--|--|--|
|------------------|--|--|--|

|  | <b>Management<br/>Unit</b> | <b>Engineering<br/>Unit</b> |   |
|--|----------------------------|-----------------------------|---|
| Arch Culvert Falsework   | 5                          | 0                           | Plan Note, SN Sheet & “Falsework and Formwork”  |
| Box Culvert Falsework <sup>7</sup>   | 5                          | 0                           | Plan Note, SN Sheet & “Falsework and Formwork”  |
| Cofferdams   | 6                          | 2                           | Article 410-4   |
| Foam Joint Seals <sup>6</sup>  | 9                          | 0                           | “Foam Joint Seals”  |
| Expansion Joint Seals<br>(hold down plate type with base<br>angle)         | 9                          | 0                           | “Expansion Joint Seals”   |
| Expansion Joint Seals<br>(modular)   | 2, then 9                  | 0                           | “Modular Expansion Joint<br>Seals”  |
| Expansion Joint Seals<br>(strip seals)                                     | 9                          | 0                           | “Strip Seals”   |
| Falsework & Forms <sup>2</sup><br>(substructure)                           | 8                          | 0                           | Article 420-3 & “Falsework<br>and Formwork”   |
| Falsework & Forms<br>(superstructure)                                      | 8                          | 0                           | Article 420-3 & “Falsework<br>and Formwork”   |
| Girder Erection over Railroad  | 5                          | 0                           | Railroad Provisions   |
| Maintenance and Protection of<br>Traffic Beneath Proposed<br>Structure     | 8                          | 0                           | “Maintenance and<br>Protection of Traffic<br>Beneath Proposed Structure<br>at Station ____” |
| Metal Bridge Railing   | 8                          | 0                           | Plan Note   |
| Metal Stay-in-Place Forms  | 8                          | 0                           | Article 420-3   |
| Metalwork for Elastomeric<br>Bearings <sup>4,5</sup>                       | 7                          | 0                           | Article 1072-8  |
| Miscellaneous Metalwork <sup>4,5</sup>                                     | 7                          | 0                           | Article 1072-8  |
| Disc Bearings <sup>4</sup>   | 8                          | 0                           | “Disc Bearings”   |
| Overhead and Digital Message<br>Signs (DMS) (metalwork and<br>foundations) | 13                         | 0                           | Applicable Provisions   |
| Placement of Equipment on<br>Structures (cranes, etc.)                     | 7                          | 0                           | Article 420-20  |



|  |                           |   |  |
|--|---------------------------|---|--|
| 17BP.10. R.130   | 73                        |   | Anson  |
| Precast Concrete Box Culverts  | 2, then<br>1 reproducible | 0 | “Optional Precast Reinforced Concrete Box Culvert at Station ____”   |
| Prestressed Concrete Cored Slab<br>(detensioning sequences) <sup>3</sup>         | 6                         | 0 | Article 1078-11  |
| Prestressed Concrete Deck Panels   | 6 and<br>1 reproducible   | 0 | Article 420-3  |
| Prestressed Concrete Girder<br>(strand elongation and<br>detensioning sequences) | 6                         | 0 | Articles 1078-8 and 1078-11  |
| Removal of Existing Structure<br>over Railroad                                   | 5                         | 0 | Railroad Provisions  |
| Revised Bridge Deck Plans<br>(adaptation to prestressed deck<br>panels)          | 2, then<br>1 reproducible | 0 | Article 420-3  |
| Revised Bridge Deck Plans<br>(adaptation to modular<br>expansion joint seals)    | 2, then<br>1 reproducible | 0 | “Modular Expansion Joint Seals”  |
| Sound Barrier Wall (precast<br>items)  | 10                        | 0 | Article 1077-2 &<br>“Sound Barrier Wall”   |
| Sound Barrier Wall Steel<br>Fabrication Plans <sup>5</sup>                       | 7                         | 0 | Article 1072-8 &<br>“Sound Barrier Wall”   |
| Structural Steel <sup>4</sup>  | 2, then 7                 | 0 | Article 1072-8   |
| Temporary Detour Structures  | 10                        | 2 | Article 400-3 &<br>“Construction,<br>Maintenance and Removal<br>of Temporary Structure at<br>Station ____” |
| TFE Expansion Bearings <sup>4</sup>  | 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<br>Required by<br>Geotechnical<br>Engineering<br>Unit | Copies<br>Required by<br>Structures<br>Management<br>Unit | Contract Reference<br>Requiring Submittal <sup>1</sup>  |
|--|--|---|---|
| Drilled Pier Construction Plans <sup>2</sup>       | 1  | 0   | Subarticle 411-3(A)                                     |
| Crosshole Sonic Logging (CSL) Reports <sup>2</sup> | 1  | 0   | Subarticle 411-5(A)(2)                                  |
| Pile Driving Equipment Data Forms <sup>2,3</sup>   | 1  | 0   | Subarticle 450-3(D)(2)                                  |
| Pile Driving Analyzer (PDA) Reports <sup>2</sup>   | 1  | 0   | Subarticle 450-3(F)(3)                                  |
| Retaining Walls <sup>4</sup>                       | 1 drawings,<br>1 calculations                                | 2 drawings  | Applicable Provisions                                   |
| Temporary Shoring <sup>4</sup>                     | 1 drawings,<br>1 calculations                                | 2 drawings  | “Temporary Shoring” &<br>“Temporary Soil Nail<br>Walls” |

#### FOOTNOTES

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

**GROUT FOR STRUCTURES (9-30-11)****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.

**MATERIAL REQUIREMENTS**

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

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

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

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

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

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

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

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

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

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

**SAMPLING AND PLACEMENT**

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

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

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

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

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

**BASIS OF PAYMENT**

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

**ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION  
ACTIVITIES**

(12-30-15)

**INSPECTION FOR ASBESTOS CONTAINING MATERIAL**

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

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

- ACM was found  
 ACM was not found

### **REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIAL**

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

An Asbestos Removal Permit must be obtained from the Health Hazards Control Unit (HHCU) of the N.C. Department of Health & Human Services, Division of Public Health, if more than 35 cubic feet, 160 square feet, or 260 linear feet of regulated ACM (RACM) is to be removed from a structure and this work must be completed by a contractor prequalified by NCDOT to perform asbestos abatement. RACM is defined in 40 CFR, Part 61, Subpart M. Note: 40 CFR 763.85 (a)(4) vi)(D) defines ACM as surfacing, TSI and Miscellaneous which does not meet the NESHAP RACM.

### **DEMOLITION NOTIFICATION**

Even if no ACM is found (or if quantities are less than those required for a permit), a Demolition Notification (DHHS-3768) must be submitted to the HHCU. Notifications and Asbestos Permit applications require an original signature and must be submitted to the HHCU 10 working days prior to beginning demolition activities. The 10 working day period starts based on the post-marked date or date of hand delivery. Demolition that does not begin as originally notified requires submission of a separate revision form HHCU 3768-R to HHCU. Reference the North Carolina Administrative Code, Chapter 10A, Subchapter 41C, Article .0605 for directives on revision submissions.

#### Contact Information

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

### **SPECIAL CONSIDERATIONS**

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

For demolitions with no RACM, only the local environmental agencies must be notified. Contact information is as follows:

#### Buncombe County

WNC Regional Air Pollution Control Agency  
49 Mt. Carmel Road  
Asheville, NC 28806  
(828) 250-6777

Forsyth County  
Environmental Affairs Department  
537 N. Spruce Street  
Winston-Salem, NC 27101  
(336) 703-2440

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

#### **ADDITIONAL INFORMATION**

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

[www.epi.state.nc.us/epi/asbestos/ahmp.html](http://www.epi.state.nc.us/epi/asbestos/ahmp.html)

#### **BASIS OF PAYMENT**

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

## STANDARD SPECIAL PROVISIONS

### PERMIT

The Contractor's attention is directed to the following permits, which have been issued to the Department of Transportation by the authority granting the permit.

| <u>PERMIT</u>   | <u>AUTHORITY GRANTING THE PERMIT</u>                                 |
|---|--|
| Dredge and Fill and/or Work in Navigable Waters (404) | U. S. Army Corps of Engineers  |
| Water Quality (401)                                   | Division of Environmental Management, DEQ<br>State of North Carolina |

The Contractor shall comply with all applicable permit conditions during construction of this project. Those conditions marked by \* are the responsibility of the Department and the Contractor has no responsibility in accomplishing those conditions.

Agents of the permitting authority will periodically inspect the project for adherence to the permits.

The Contractor's attention is also directed to Articles 107-10 and 107-13 of the *2018 Standard Specifications* and the following:

Should the Contractor propose to utilize construction methods (such as temporary structures or fill in waters and/or wetlands for haul roads, work platforms, cofferdams, etc.) not specifically identified in the permit (individual, general, or nationwide) authorizing the project it shall be the Contractor's responsibility to coordinate with the Engineer to determine what, if any, additional permit action is required. The Contractor shall also be responsible for initiating the request for the authorization of such construction method by the permitting agency. The request shall be submitted through the Engineer. The Contractor shall not utilize the construction method until it is approved by the permitting agency. The request normally takes approximately 60 days to process; however, no extensions of time or additional compensation will be granted for delays resulting from the Contractor's request for approval of construction methods not specifically identified in the permit.

**Where construction moratoriums are contained in a permit condition which restricts the Contractor's activities to certain times of the year, those moratoriums will apply only to the portions of the work taking place in the restricted waters, wetlands or buffer zones, provided that activities outside those areas is done in such a manner as to not affect the restricted waters, wetlands or buffer zones.**

### AVAILABILITY OF FUNDS – TERMINATION OF CONTRACTS:

(5-20-08)

Z-2

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

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

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

#### **NCDOT GENERAL SEED SPECIFICATION FOR SEED QUALITY:**

(5-17-11)

Z-3

Seed shall be sampled and tested by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory. When said samples are collected, the vendor shall supply an independent laboratory report for each lot to be tested. Results from seed so sampled shall be final. Seed not meeting the specifications shall be rejected by the Department of Transportation and shall not be delivered to North Carolina Department of Transportation warehouses. If seed has been delivered it shall be available for pickup and replacement at the supplier's expense.

Any re-labeling required by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory, that would cause the label to reflect as otherwise specified herein shall be rejected by the North Carolina Department of Transportation.

Seed shall be free from seeds of the noxious weeds Johnsongrass, Balloonvine, Jimsonweed, Witchweed, Itchgrass, Serrated Tussock, Showy Crotalaria, Smooth Crotalaria, Sicklepod, Sandbur, Wild Onion, and Wild Garlic. Seed shall not be labeled with the above weed species on the seed analysis label. Tolerances as applied by the Association of Official Seed Analysts will NOT be allowed for the above noxious weeds except for Wild Onion and Wild Garlic.

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

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



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

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

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

#### FURTHER SPECIFICATIONS FOR EACH SEED GROUP ARE GIVEN BELOW:

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

Sericea Lespedeza  
Oats (seeds)

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

Tall Fescue (all approved varieties)  
Kobe Lespedeza  
Korean Lespedeza  
Weeping Lovegrass  
Carpetgrass

Bermudagrass  
Browntop Millet  
German Millet – Strain R  
Clover – Red/White/Crimson

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

Common or Sweet Sundangrass

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

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

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

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

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

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

**ERRATA**

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

Z-4

Revise the *2018 Standard Specifications* as follows:

**Division 6**

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

**Division 7**

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

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

**Division 10**

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

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

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

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

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

**Division 17**

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

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

Directional Drill (1)(1.25”) Linear Foot

**PLANT AND PEST QUARANTINES:**

**(Imported Fire Ant, Gypsy Moth, Witchweed, Emerald Ash Borer, And Other Noxious Weeds)**

(3-18-03) (Rev. 12-20-16)

Z-04a

**Within Quarantined Area**

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

### **Originating in a Quarantined County**

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

### **Contact**

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

### **Regulated Articles Include**

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

### **MINIMUM WAGES:**

(7-21-09)

Z-5

**FEDERAL:** The Fair Labor Standards Act provides that with certain exceptions every employer shall pay wages at the rate of not less than SEVEN DOLLARS AND TWENTY FIVE CENTS (\$7.25) per hour.

**STATE:** The North Carolina Minimum Wage Act provides that every employer shall pay to each of his employees, wages at a rate of not less than SEVEN DOLLARS AND TWENTY FIVE CENTS (\$7.25) per hour.

The minimum wage paid to all skilled labor employed on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS (\$7.25) per hour.

The minimum wage paid to all intermediate labor employed on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS (\$7.25) per hour.

The minimum wage paid to all unskilled labor on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS (\$7.25) per hour.

This determination of the intent of the application of this act to the contract on this project is the responsibility of the Contractor.

The Contractor shall have no claim against the Department of Transportation for any changes in the minimum wage laws, Federal or State. It is the responsibility of the Contractor to keep fully informed of all Federal and State Laws affecting his contract.

#### **TITLE VI AND NONDISCRIMINATION:**

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

Z-6

Revise the *2018 Standard Specifications* as follows:

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

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

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

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

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

##### **(a) Compliance with Regulations**

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

##### **(b) Nondiscrimination**

The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of

equipment. The contractor shall not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.

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

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

(d) Information and Reports

The contractor shall provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the FHWA to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor shall so certify to the Recipient or the FHWA, as appropriate, and shall set forth what efforts it has made to obtain the information.

(e) Sanctions for Noncompliance:

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

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

(f) Incorporation of Provisions

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

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

The North Carolina Department of Transportation (NCDOT) has assured the USDOT that, as a condition to receiving federal financial assistance, NCDOT will comply with Title VI of the Civil Rights Act of 1964 and all requirements imposed by Title 49 CFR part 21 and related nondiscrimination authorities to ensure that no person shall, on the ground of race, color, national origin, limited English proficiency, sex, age, or disability (including religion/creed or income-level, where applicable), be excluded from participation in, be

denied the benefits of, or be subjected to discrimination under any programs, activities, or services conducted or funded by NCDOT. Contractors and other organizations under contract or agreement with NCDOT must also comply with Title VI and related authorities, therefore:

- (a) During the performance of this contract or agreement, contractors (e.g., subcontractors, consultants, vendors, prime contractors) are responsible for complying with NCDOT's Title VI Program. Contractors are not required to prepare or submit Title VI Programs. To comply with this section, the prime contractor shall:
1. Post NCDOT's Notice of Nondiscrimination and the Contractor's own Equal Employment Opportunity (EEO) Policy in conspicuous locations accessible to all employees, applicants and subcontractors on the jobsite.
  2. Physically incorporate the required Title VI clauses into all subcontracts on federally-assisted and state-funded NCDOT projects, and ensure inclusion by subcontractors into all lower-tier subcontracts.
  3. Required Solicitation Language. The Contractor shall include the following notification in all solicitations for bids and requests for work or material, regardless of funding source:  
  
"The North Carolina Department of Transportation, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award. In accordance with other related nondiscrimination authorities, bidders and contractors will also not be discriminated against on the grounds of sex, age, disability, low-income level, creed/religion, or limited English proficiency in consideration for an award."
  4. Physically incorporate the FHWA-1273, in its entirety, into all subcontracts and subsequent lower tier subcontracts on Federal-aid highway construction contracts only.
  5. Provide language assistance services (i.e., written translation and oral interpretation), free of charge, to LEP employees and applicants. Contact NCDOT OCR for further assistance, if needed.
  6. For assistance with these Title VI requirements, contact the NCDOT Title VI Nondiscrimination Program at 1-800-522-0453.
- (b) Subrecipients (e.g. cities, counties, LGAs, planning organizations) may be required to prepare and submit a Title VI Plan to NCDOT, including Title VI Assurances and/or agreements. Subrecipients must also ensure compliance by their contractors and subrecipients with Title VI. (23 CFR 200.9(b)(7))
- (c) If reviewed or investigated by NCDOT, the contractor or subrecipient agrees to take affirmative action to correct any deficiencies found within a reasonable time period, not to exceed 90 calendar days, unless additional time is granted by NCDOT. (23 CFR 200.9(b)(15))
- (d) The Contractor is responsible for notifying subcontractors of NCDOT's External Discrimination Complaints Process.

### 1. Applicability

Title VI and related laws protect participants and beneficiaries (e.g., members of the public and contractors) from discrimination by NCDOT employees, subrecipients and contractors, regardless of funding source.

### 2. Eligibility

Any person—or class of persons—who believes he/she has been subjected to discrimination based on race, color, national origin, Limited English Proficiency (LEP), sex, age, or disability (and religion in the context of employment, aviation, or transit) may file a written complaint. The law also prohibits intimidation or retaliation of any sort.

### 3. Time Limits and Filing Options

Complaints may be filed by the affected individual(s) or a representative and must be filed no later than 180 calendar days after the following:

- (i) The date of the alleged act of discrimination; or
- (ii) The date when the person(s) became aware of the alleged discrimination; or
- (iii) Where there has been a continuing course of conduct, the date on which that conduct was discontinued or the latest instance of the conduct.

Title VI and related discrimination complaints may be submitted to the following entities:

- North Carolina Department of Transportation, Office of Civil Rights, Title VI Program, 1511 Mail Service Center, Raleigh, NC 27699-1511; toll free 1-800-522-0453
- Federal Highway Administration, North Carolina Division Office, 310 New Bern Avenue, Suite 410, Raleigh, NC 27601, 919-747-7010
- US Department of Transportation, Departmental Office of Civil Rights, External Civil Rights Programs Division, 1200 New Jersey Avenue, SE, Washington, DC 20590; 202-366-4070

### 4. Format for Complaints

Complaints must be in writing and signed by the complainant(s) or a representative, and include the complainant's name, address, and telephone number. Complaints received by fax or e-mail will be acknowledged and processed. Allegations received by telephone will be reduced to writing and provided to the complainant for confirmation or revision before processing. Complaints will be accepted in other languages, including Braille.

### 5. Discrimination Complaint Form

Contact NCDOT Civil Rights to receive a full copy of the Discrimination Complaint Form and procedures.

### 6. Complaint Basis

Allegations must be based on issues involving race, color, national origin (LEP), sex, age, disability, or religion (in the context of employment, aviation or transit). "Basis" refers to the complainant's membership in a protected group category.



**TABLE 103-1  
COMPLAINT BASIS**

| <b>Protected Categories</b>   | <b>Definition</b>  | <b>Examples</b>  | <b>Applicable Nondiscrimination Authorities</b>  |
|---|--|--|--|
| Race and Ethnicity  | An individual belonging to one of the accepted racial groups; or the perception, based usually on physical characteristics that a person is a member of a racial group   | Black/African American, Hispanic/Latino, Asian, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, White | Title VI of the Civil Rights Act of 1964; 49 CFR Part 21; 23 CFR 200; 49 U.S.C. 5332(b); 49 U.S.C. 47123. ( <i>Executive Order 13166</i> )   |
| Color   | Color of skin, including shade of skin within a racial group   | Black, White, brown, yellow, etc.  |  |
| National Origin ( <i>Limited English Proficiency</i> )  | Place of birth. Citizenship is not a factor. ( <i>Discrimination based on language or a person's accent is also covered</i> )  | Mexican, Cuban, Vietnamese, Chinese  |  |
| Sex   | Gender. The sex of an individual.<br><i>Note: Sex under this program does not include sexual orientation.</i>  | Women and Men  | 1973 Federal-Aid Highway Act; 49 U.S.C. 5332(b); 49 U.S.C. 47123.  |
| Age   | Persons of any age   | 21-year-old person   | Age Discrimination Act of 1975 49 U.S.C. 5332(b); 49 U.S.C. 47123.   |
| Disability  | Physical or mental impairment, permanent or temporary, or perceived.   | Blind, alcoholic, para-amputee, epileptic, diabetic, arthritic   | Section 504 of the Rehabilitation Act of 1973; Americans with Disabilities Act of 1990   |
| Religion (in the context of employment) ( <i>Religion/ Creed in all aspects of any aviation or transit-related construction</i> ) | An individual belonging to a religious group; or the perception, based on distinguishable characteristics that a person is a member of a religious group. In practice, actions taken as a result of the moral and ethical beliefs as to what is right and wrong, which are sincerely held with the strength of traditional religious views. <i>Note: Does not have to be associated with a recognized religious group or church; if an individual sincerely holds to the belief, it is a protected religious practice.</i> | Muslim, Christian, Sikh, Hindu, etc.   | Title VII of the Civil Rights Act of 1964; 23 CFR 230; FHWA-1273 Required Contract Provisions. ( <i>49 U.S.C. 5332(b); 49 U.S.C. 47123</i> ) |

### (3) Pertinent Nondiscrimination Authorities

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

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

- (c) Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 et seq.), (prohibits discrimination on the basis of sex);
- (d) Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 et seq.), as amended, (prohibits discrimination on the basis of disability) and 49 CFR Part 27;
- (e) The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 et seq.), (prohibits discrimination on the basis of age);
- (f) Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
- (g) The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- (h) Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131-12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;
- (i) The Federal Aviation Administration's Nondiscrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- (j) Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures Nondiscrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;
- (k) Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of Limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- (l) Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).
- (m) Title VII of the Civil Rights Act of 1964 (42 U.S.C. § 2000e et seq., Pub. L. 88-352), (prohibits employment discrimination on the basis of race, color, religion, sex, or national origin).

#### (4) **Additional Title VI Assurances**

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

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

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

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

(HABENDUM CLAUSE)

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

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

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

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

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

1. The (grantee, lessee, permittee, etc. as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree [in the case of deeds and leases add "as a covenant running with the land"] that:
    - (i.) In the event facilities are constructed, maintained, or otherwise operated on the property described in this (deed, license, lease, permit, etc.) for a purpose for which a U.S. Department of Transportation activity, facility, or program is extended or for another purpose involving the provision of similar services or benefits, the (grantee, licensee, lessee, permittee, etc.) will maintain and operate such facilities and services in compliance with all requirements imposed by the Acts and Regulations (as may be amended) such that no person on the grounds of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities.
    2. With respect to licenses, leases, permits, etc., in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will have the right to terminate the (lease, license, permit, etc.) and to enter, re-enter, and repossess said lands and facilities thereon, and hold the same as if the (lease, license, permit, etc.) had never been made or issued. \*
    3. With respect to a deed, in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will have the right to enter or re-enter the lands and facilities thereon, and the above described lands and facilities will there upon revert to and vest in and become the absolute property of the NCDOT and its assigns. \*
- (\*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)
- (c) Clauses for Construction/Use/Access to Real Property Acquired Under the Activity, Facility or Program (1050.2A, Appendix D)

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

1. The (grantee, licensee, permittee, etc., as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree (in the case of deeds and leases add, "as a covenant running with the land") that (1) no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities, (2) that in the construction of any improvements on, over, or under such land, and the furnishing of services thereon, no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination, (3) that the (grantee, licensee, lessee, permittee, etc.) will use the premises in compliance with all other requirements imposed by or pursuant to the Acts and Regulations, as amended, set forth in this Assurance.

2. With respect to (licenses, leases, permits, etc.), in the event of breach of any of the above Non-discrimination covenants, the NCDOT will have the right to terminate the (license, permit, etc., as appropriate) and to enter or re-enter and repossess said land and the facilities thereon, and hold the same as if said (license, permit, etc., as appropriate) had never been made or issued. \*
3. With respect to deeds, in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will there upon revert to and vest in and become the absolute property of the NCDOT and its assigns. \*

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

### **ON-THE-JOB TRAINING:**

(10-16-07) (Rev. 4-21-15)

Z-10

#### **Description**

The North Carolina Department of Transportation will administer a custom version of the Federal On-the-Job Training (OJT) Program, commonly referred to as the Alternate OJT Program. All contractors (existing and newcomers) will be automatically placed in the Alternate Program. Standard OJT requirements typically associated with individual projects will no longer be applied at the project level. Instead, these requirements will be applicable on an annual basis for each contractor administered by the OJT Program Manager.

On the Job Training shall meet the requirements of 23 CFR 230.107 (b), 23 USC – Section 140, this provision and the On-the-Job Training Program Manual.

The Alternate OJT Program will allow a contractor to train employees on Federal, State and privately funded projects located in North Carolina. However, priority shall be given to training employees on NCDOT Federal-Aid funded projects.

#### **Minorities and Women**

Developing, training and upgrading of minorities and women toward journeyman level status is a primary objective of this special training provision. Accordingly, the Contractor shall make every effort to enroll minority and women as trainees to the extent that such persons are available within a reasonable area of recruitment. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

#### **Assigning Training Goals**

The Department, through the OJT Program Manager, will assign training goals for a calendar year based on the contractors' past three years' activity and the contractors' anticipated upcoming year's activity with the Department. At the beginning of each year, all contractors eligible will be contacted by the Department to determine the number of trainees that will be assigned for the upcoming calendar year. At that time the Contractor shall enter into an agreement with the Department to provide a self-imposed on-the-job training program for the calendar year. This agreement will include a specific number of annual training goals agreed to by both parties.

The number of training assignments may range from 1 to 15 per contractor per calendar year. The Contractor shall sign an agreement to fulfill their annual goal for the year.\

### **Training Classifications**

The Contractor shall provide on-the-job training aimed at developing full journeyman level workers in the construction craft/operator positions. Preference shall be given to providing training in the following skilled work classifications:

|                     |                                  |
|---------------------|----------------------------------|
| Equipment Operators | Office Engineers                 |
| Truck Drivers       | Estimators                       |
| Carpenters          | Iron / Reinforcing Steel Workers |
| Concrete Finishers  | Mechanics                        |
| Pipe Layers         | Welders                          |

The Department has established common training classifications and their respective training requirements that may be used by the contractors. However, the classifications established are not all-inclusive. Where the training is oriented toward construction applications, training will be allowed in lower-level management positions such as office engineers and estimators. Contractors shall submit new classifications for specific job functions that their employees are performing. The Department will review and recommend for acceptance to FHWA the new classifications proposed by contractors, if applicable. New classifications shall meet the following requirements:

Proposed training classifications are reasonable and realistic based on the job skill classification needs, and

The number of training hours specified in the training classification is consistent with common practices and provides enough time for the trainee to obtain journeyman level status.

The Contractor may allow trainees to be trained by a subcontractor provided that the Contractor retains primary responsibility for meeting the training and this provision is made applicable to the subcontract. However, only the Contractor will receive credit towards the annual goal for the trainee.

Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. The number of trainees shall be distributed among the work classifications on the basis of the contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment.

No employee shall be employed as a trainee in any classification in which they have successfully completed a training course leading to journeyman level status or in which they have been employed as a journeyman.

### **Records and Reports**

The Contractor shall maintain enrollment, monthly and completion reports documenting company compliance under these contract documents. These documents and any other information as requested shall be submitted to the OJT Program Manager.

Upon completion and graduation of the program, the Contractor shall provide each trainee with a certification Certificate showing the type and length of training satisfactorily completed.

### **Trainee Interviews**

All trainees enrolled in the program will receive an initial and Trainee/Post graduate interview conducted by the OJT program staff.

### **Trainee Wages**

Contractors shall compensate trainees on a graduating pay scale based upon a percentage of the prevailing minimum journeyman wages (Davis-Bacon Act). Minimum pay shall be as follows:

|            |   |
|------------|---|
| 60 percent | of the journeyman wage for the first half of the training period    |
| 75 percent | of the journeyman wage for the third quarter of the training period |
| 90 percent | of the journeyman wage for the last quarter of the training period  |

In no instance shall a trainee be paid less than the local minimum wage. The Contractor shall adhere to the minimum hourly wage rate that will satisfy both the NC Department of Labor (NCDOL) and the Department.

### **Achieving or Failing to Meet Training Goals**

The Contractor will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and who receives training for at least 50 percent of the specific program requirement. Trainees will be allowed to be transferred between projects if required by the Contractor's scheduled workload to meet training goals.

If a contractor fails to attain their training assignments for the calendar year, they may be taken off the NCDOT's Bidders List.

### **Measurement and Payment**

No compensation will be made for providing required training in accordance with these contract documents.

**STRUCTURE SUBSURFACE INVESTIGATION**

**REFERENCE: SF-030080**

**PROJECT: 17BP.10.R.130**

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|-------|-----------------------------|-----------|--------------|
| N.C.  | SF-030080                   | 1         | 8            |

**STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT**

**STRUCTURE  
SUBSURFACE INVESTIGATION**

COUNTY ANSON  
PROJECT DESCRIPTION BRIDGE NO. 80 ON SR 1120  
(DICKIE LITTLE RD.) OVER N. FORK OF JONES  
CREEK

**CONTENTS**

| <u>SHEET NO.</u> | <u>DESCRIPTION</u>   |
|------------------|----------------------|
| 1                | TITLE SHEET          |
| 2, 2A            | LEGEND (SOIL & ROCK) |
| 3                | SITE PLAN            |
| 4-7              | BORE LOG(S)          |
| 8                | SITE PHOTOGRAPH(S)   |

PERSONNEL  
J.K. STICKNEY  
C.L. SMITH

INVESTIGATED BY J.E. BEVERLY  
DRAWN BY T.T. WALKER, F&R, Inc.  
CHECKED BY J.E. BEVERLY  
SUBMITTED BY K.B. MILLER  
DATE OCTOBER 2018

**CAUTION NOTICE**

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THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

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  - BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

NORTH CAROLINA  
LICENSED  
SEAL  
2029  
KEVIN BENNETT MILLER  
GEOLOGIST  
Do not sign here.

*[Signature]*  
957A789AE 10/31/2018

SIGNATURE \_\_\_\_\_ DATE \_\_\_\_\_

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**



| <p>PROJECT REFERENCE NO. <b>SF-030080</b></p> <p>SHEET NO. <b>2</b></p>  |   |  |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
|--|---|--|---|--|--|--|---|-------------|---|---|---------------|------------------------------------|----------------|--|-------|-----------------|---------------|--------------|---|-------------------|------------|------------|--------|--------|--------------|--------------|--------|------------|-------|---------|--------|------------|----------|--------|-----|----------|----------|----------|--------|--|--|--|--|--|--|--|--|--|--|--|--|--|-----------|-----|-----|------|------|-----|-----|------|------|-----|-----|------|------|-----|-----|------|------|----------------------|--|--|--|--|--|--|--|--|--|--|--|--|----|--|--|--|--|--|--|--|--|--|--|--|--|----|--|--|--|--|--|--|--|--|--|--|--|--|-------------|--|--|--|--|--|--|--|--|--|--|--|--|-------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|-------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|------------------|----------------|-------------------|----------------|-------------------------|--------|--------|-------|-----------------------|--------|---------|--------|--------------------|---------|----------|------|----------------|-------|-------|--------|--------------------|---------------|-----------------------|------------------------|-------------------|------------------|-----------|-------------------|------------------|-----------------------------|------------------|----------------------------------|---------------|----------------|--|------------------------|--------------------------|--|--------------------------------|-------------------|--|----------------|-------------------|--|----------|-------------------|--|-----------------------|-----------------|--|------------------------------|------------------------|--|--------------------|----------------------|--|--------------|----------|--|
| <p><b>NORTH CAROLINA DEPARTMENT OF TRANSPORTATION</b><br/> <b>DIVISION OF HIGHWAYS</b><br/> <b>GEOTECHNICAL ENGINEERING UNIT</b><br/> <b>SUBSURFACE INVESTIGATION</b><br/> <b>SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS</b><br/> <b>(PAGE 1 OF 2)</b></p>  |   |  |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| <p><b>SOIL DESCRIPTION</b></p> <p>SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (ASTM D 1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</p> <p><b>SOIL LEGEND AND AASHTO CLASSIFICATION</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th rowspan="2">GENERAL CLASS.</th> <th colspan="4">GRANULAR MATERIALS (&lt; 3% PASSING #200)</th> <th colspan="4">SILT-CLAY MATERIALS (&gt; 35% PASSING #200)</th> <th colspan="3">ORGANIC MATERIALS</th> </tr> <tr> <th>A-1</th> <th>A-3</th> <th>A-2</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-4, A-5</th> <th>A-6, A-7</th> <th></th> <th></th> </tr> <tr> <td>GROUP CLASS.</td> <td>A-1-a</td> <td>A-1-b</td> <td>A-2-4</td> <td>A-2-5</td> <td>A-2-6</td> <td>A-2-7</td> <td>A-4</td> <td>A-5</td> <td>A-6</td> <td>A-7</td> <td>A-1, A-2</td> <td>A-4, A-5</td> <td>A-6, A-7</td> </tr> <tr> <td>SYMBOL</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>% PASSING</td> <td>#10</td> <td>#40</td> <td>#100</td> <td>#200</td> <td>#40</td> <td>#60</td> <td>#100</td> <td>#200</td> <td>#40</td> <td>#60</td> <td>#100</td> <td>#200</td> <td>#40</td> <td>#60</td> <td>#100</td> <td>#200</td> </tr> <tr> <td>MATERIAL PASSING #40</td> <td colspan="12"></td> </tr> <tr> <td>LL</td> <td colspan="12"></td> </tr> <tr> <td>PI</td> <td colspan="12"></td> </tr> <tr> <td>GROUP INDEX</td> <td colspan="12"></td> </tr> <tr> <td>USUAL TYPES OF HAUL MATERIALS</td> <td colspan="12"></td> </tr> <tr> <td>GEN. RATING AS SUBGRADE</td> <td colspan="12"></td> </tr> </table> | GENERAL CLASS.  | GRANULAR MATERIALS (< 3% PASSING #200)   |   |  |  | SILT-CLAY MATERIALS (> 35% PASSING #200)   |   |             |   | ORGANIC MATERIALS                             |               |                                    | A-1            | A-3  | A-2   | A-4             | A-5           | A-6          | A-7                                     | A-1, A-2          | A-4, A-5   | A-6, A-7   |        |        | GROUP CLASS. | A-1-a        | A-1-b  | A-2-4      | A-2-5 | A-2-6   | A-2-7  | A-4        | A-5      | A-6    | A-7 | A-1, A-2 | A-4, A-5 | A-6, A-7 | SYMBOL |  |  |  |  |  |  |  |  |  |  |  |  |  | % PASSING | #10 | #40 | #100 | #200 | #40 | #60 | #100 | #200 | #40 | #60 | #100 | #200 | #40 | #60 | #100 | #200 | MATERIAL PASSING #40 |  |  |  |  |  |  |  |  |  |  |  |  | LL |  |  |  |  |  |  |  |  |  |  |  |  | PI |  |  |  |  |  |  |  |  |  |  |  |  | GROUP INDEX |  |  |  |  |  |  |  |  |  |  |  |  | USUAL TYPES OF HAUL MATERIALS |  |  |  |  |  |  |  |  |  |  |  |  | GEN. RATING AS SUBGRADE |  |  |  |  |  |  |  |  |  |  |  |  | <p><b>GRADATION</b></p> <p>WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p> <p><b>ANGULARITY OF GRAINS</b></p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p> <p><b>MINERALOGICAL COMPOSITION</b></p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p><b>COMPRESSIBILITY</b></p> <p>SLIGHTLY COMPRESSIBLE LL &lt; 31<br/> MODERATELY COMPRESSIBLE LL + 31 - 50<br/> HIGHLY COMPRESSIBLE LL &gt; 50</p> <p><b>PERCENTAGE OF MATERIAL</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>&gt; 10%</td> <td>&gt; 20%</td> <td>HIGHLY</td> </tr> </table> <p><b>GROUND WATER</b></p> <p>▽ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING<br/> ▽ STATIC WATER LEVEL AFTER 24 HOURS<br/> ▽ PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA<br/> ○ SPRING OR SEEP</p> <p><b>MISCELLANEOUS SYMBOLS</b></p> <p> ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION<br/>  SOIL SYMBOL<br/>  ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT<br/>  INFERRERD SOIL BOUNDARY<br/>  INFERRERD ROCK LINE<br/>  ALLUVIAL SOIL BOUNDARY<br/>  DIP &amp; DIP DIRECTION OF ROCK STRUCTURES<br/>  SPT TEST BORING<br/>  CORE BORING<br/>  MONITORING WELL<br/>  PIEZOMETER INSTALLATION<br/>  SLOPE INDICATOR INSTALLATION<br/>  CONE PENETROMETER TEST<br/>  SOUNDING ROD<br/>  TEST BORING WITH CORE<br/>  SPT N-VALUE</p> <p><b>RECOMMENDATION SYMBOLS</b></p> <p> UNDERCUT<br/>  SHALLOW UNDERCUT<br/>  UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE<br/>  UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK<br/>  UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL</p> <p><b>ABBREVIATIONS</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>AR - AUGER REFUSAL</td> <td>MED. - MEDIUM</td> <td>VST - VANE SHEAR TEST</td> </tr> <tr> <td>BT - BORING TERMINATED</td> <td>MICA. - MICACEOUS</td> <td>WEA. - WEATHERED</td> </tr> <tr> <td>CL - CLAY</td> <td>MOD. - MODERATELY</td> <td>UW - UNIT WEIGHT</td> </tr> <tr> <td>CPT - CONE PENETRATION TEST</td> <td>NP - NON PLASTIC</td> <td>W<sub>d</sub> - DRY UNIT WEIGHT</td> </tr> <tr> <td>CSE. - COARSE</td> <td>ORG. - ORGANIC</td> <td></td> </tr> <tr> <td>DMT - DILATOMETER TEST</td> <td>PMT - PRESSUREMETER TEST</td> <td></td> </tr> <tr> <td>DPT - DYNAMIC PENETRATION TEST</td> <td>SAP. - SAPROLITIC</td> <td></td> </tr> <tr> <td>e - VOID RATIO</td> <td>SD. - SAND, SANDY</td> <td></td> </tr> <tr> <td>F - FINE</td> <td>SL. - SILT, SILTY</td> <td></td> </tr> <tr> <td>FOSS. - FOSSILIFEROUS</td> <td>SLL. - SLIGHTLY</td> <td></td> </tr> <tr> <td>FRAC. - FRACTURED, FRACTURES</td> <td>TRC. - TRICONE REFUSAL</td> <td></td> </tr> <tr> <td>FRAGS. - FRAGMENTS</td> <td>w - MOISTURE CONTENT</td> <td></td> </tr> <tr> <td>HL. - HIGHLY</td> <td>V - VERY</td> <td></td> </tr> </table> | ORGANIC MATERIAL | GRANULAR SOILS | SILT - CLAY SOILS | OTHER MATERIAL | TRACE OF ORGANIC MATTER | 2 - 3% | 3 - 5% | TRACE | LITTLE ORGANIC MATTER | 3 - 5% | 5 - 12% | LITTLE | MODERATELY ORGANIC | 5 - 10% | 12 - 20% | SOME | HIGHLY ORGANIC | > 10% | > 20% | HIGHLY | AR - AUGER REFUSAL | MED. - MEDIUM | VST - VANE SHEAR TEST | BT - BORING TERMINATED | MICA. - MICACEOUS | WEA. - WEATHERED | CL - CLAY | MOD. - MODERATELY | UW - UNIT WEIGHT | CPT - CONE PENETRATION TEST | NP - NON PLASTIC | W <sub>d</sub> - DRY UNIT WEIGHT | CSE. - COARSE | ORG. - ORGANIC |  | DMT - DILATOMETER TEST | PMT - PRESSUREMETER TEST |  | DPT - DYNAMIC PENETRATION TEST | SAP. - SAPROLITIC |  | e - VOID RATIO | SD. - SAND, SANDY |  | F - FINE | SL. - SILT, SILTY |  | FOSS. - FOSSILIFEROUS | SLL. - SLIGHTLY |  | FRAC. - FRACTURED, FRACTURES | TRC. - TRICONE REFUSAL |  | FRAGS. - FRAGMENTS | w - MOISTURE CONTENT |  | HL. - HIGHLY | V - VERY |  |
| GENERAL CLASS.   |   | GRANULAR MATERIALS (< 3% PASSING #200)   |   |  |  | SILT-CLAY MATERIALS (> 35% PASSING #200)   |   |             |   | ORGANIC MATERIALS                             |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
|  | A-1   | A-3  | A-2   | A-4  | A-5  | A-6  | A-7   | A-1, A-2    | A-4, A-5  | A-6, A-7                                      |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| GROUP CLASS.   | A-1-a   | A-1-b  | A-2-4   | A-2-5  | A-2-6  | A-2-7                                      | A-4   | A-5         | A-6   | A-7   | A-1, A-2      | A-4, A-5                           | A-6, A-7       |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| SYMBOL   |   |  |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| % PASSING  | #10   | #40  | #100  | #200   | #40  | #60  | #100  | #200        | #40   | #60   | #100          | #200                               | #40            | #60  | #100  | #200            |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| MATERIAL PASSING #40   |   |  |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| LL   |   |  |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| PI   |   |  |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| GROUP INDEX  |   |  |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| USUAL TYPES OF HAUL MATERIALS  |   |  |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| GEN. RATING AS SUBGRADE  |   |  |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| ORGANIC MATERIAL   | GRANULAR SOILS  | SILT - CLAY SOILS  | OTHER MATERIAL  |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| TRACE OF ORGANIC MATTER  | 2 - 3%  | 3 - 5%   | TRACE   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| LITTLE ORGANIC MATTER  | 3 - 5%  | 5 - 12%  | LITTLE  |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| MODERATELY ORGANIC   | 5 - 10%   | 12 - 20%   | SOME  |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| HIGHLY ORGANIC   | > 10%   | > 20%  | HIGHLY  |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| AR - AUGER REFUSAL   | MED. - MEDIUM   | VST - VANE SHEAR TEST  |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| BT - BORING TERMINATED   | MICA. - MICACEOUS   | WEA. - WEATHERED   |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| CL - CLAY  | MOD. - MODERATELY   | UW - UNIT WEIGHT   |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| CPT - CONE PENETRATION TEST  | NP - NON PLASTIC  | W <sub>d</sub> - DRY UNIT WEIGHT   |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| CSE. - COARSE  | ORG. - ORGANIC  |  |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| DMT - DILATOMETER TEST   | PMT - PRESSUREMETER TEST  |  |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| DPT - DYNAMIC PENETRATION TEST   | SAP. - SAPROLITIC   |  |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| e - VOID RATIO   | SD. - SAND, SANDY   |  |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| F - FINE   | SL. - SILT, SILTY   |  |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| FOSS. - FOSSILIFEROUS  | SLL. - SLIGHTLY   |  |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| FRAC. - FRACTURED, FRACTURES   | TRC. - TRICONE REFUSAL  |  |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| FRAGS. - FRAGMENTS   | w - MOISTURE CONTENT  |  |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| HL. - HIGHLY   | V - VERY  |  |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| <p><b>CONSISTENCY OR DENSITY</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>PRIMARY SOIL TYPE</th> <th>COMPACTNESS OR CONSISTENCY</th> <th>RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)</th> <th>RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT<sup>2</sup>)</th> </tr> <tr> <td rowspan="4">GENERALLY GRANULAR MATERIAL (NON-COHESIVE)</td> <td>VERY LOOSE</td> <td>&lt; 4</td> <td></td> </tr> <tr> <td>LOOSE</td> <td>4 TO 10</td> <td></td> </tr> <tr> <td>MEDIUM DENSE</td> <td>10 TO 30</td> <td>N/A</td> </tr> <tr> <td>DENSE</td> <td>30 TO 50</td> <td></td> </tr> <tr> <td rowspan="4">GENERALLY SILT-CLAY MATERIAL (COHESIVE)</td> <td>VERY SOFT</td> <td>&lt; 2</td> <td>&lt; 0.25</td> </tr> <tr> <td>SOFT</td> <td>2 TO 4</td> <td>0.25 TO 0.5</td> </tr> <tr> <td>MEDIUM STIFF</td> <td>4 TO 8</td> <td>0.5 TO 1.0</td> </tr> <tr> <td>STIFF</td> <td>8 TO 15</td> <td>1 TO 2</td> </tr> <tr> <td>VERY STIFF</td> <td>15 TO 30</td> <td>2 TO 4</td> <td></td> </tr> <tr> <td>HARD</td> <td>&gt; 30</td> <td>&gt; 4</td> <td></td> </tr> </table>   |   | PRIMARY SOIL TYPE  | COMPACTNESS OR CONSISTENCY  | RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)   | RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> ) | GENERALLY GRANULAR MATERIAL (NON-COHESIVE) | VERY LOOSE  | < 4         |   | LOOSE   | 4 TO 10       |                                    | MEDIUM DENSE   | 10 TO 30   | N/A   | DENSE           | 30 TO 50      |              | GENERALLY SILT-CLAY MATERIAL (COHESIVE) | VERY SOFT         | < 2        | < 0.25     | SOFT   | 2 TO 4 | 0.25 TO 0.5  | MEDIUM STIFF | 4 TO 8 | 0.5 TO 1.0 | STIFF | 8 TO 15 | 1 TO 2 | VERY STIFF | 15 TO 30 | 2 TO 4 |     | HARD     | > 30     | > 4      |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| PRIMARY SOIL TYPE  | COMPACTNESS OR CONSISTENCY  | RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)   | RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )  |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| GENERALLY GRANULAR MATERIAL (NON-COHESIVE)   | VERY LOOSE  | < 4  |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
|  | LOOSE   | 4 TO 10  |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
|  | MEDIUM DENSE  | 10 TO 30   | N/A   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
|  | DENSE   | 30 TO 50   |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| GENERALLY SILT-CLAY MATERIAL (COHESIVE)  | VERY SOFT   | < 2  | < 0.25  |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
|  | SOFT  | 2 TO 4   | 0.25 TO 0.5   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
|  | MEDIUM STIFF  | 4 TO 8   | 0.5 TO 1.0  |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
|  | STIFF   | 8 TO 15  | 1 TO 2  |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| VERY STIFF   | 15 TO 30  | 2 TO 4   |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| HARD   | > 30  | > 4  |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| <p><b>TEXTURE OR GRAIN SIZE</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>U.S. STD. SIEVE SIZE</th> <th>4</th> <th>10</th> <th>40</th> <th>60</th> <th>200</th> <th>270</th> </tr> <tr> <th>OPENING (MM)</th> <td>4.75</td> <td>2.00</td> <td>0.42</td> <td>0.25</td> <td>0.075</td> <td>0.053</td> </tr> </table> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>BOULDER (BLDR.)</th> <th>COBBLE (COB.)</th> <th>GRAVEL (GR.)</th> <th>COARSE SAND (CSE. SD.)</th> <th>FINE SAND (F SD.)</th> <th>SILT (SL.)</th> <th>CLAY (CL.)</th> </tr> <tr> <td>MM 305</td> <td>75</td> <td>2.0</td> <td>0.25</td> <td>0.05</td> <td>0.005</td> <td></td> </tr> <tr> <td>IN. 12</td> <td>3</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>  |   | U.S. STD. SIEVE SIZE   | 4   | 10   | 40   | 60   | 200   | 270         | OPENING (MM)  | 4.75  | 2.00          | 0.42                               | 0.25           | 0.075  | 0.053 | BOULDER (BLDR.) | COBBLE (COB.) | GRAVEL (GR.) | COARSE SAND (CSE. SD.)                  | FINE SAND (F SD.) | SILT (SL.) | CLAY (CL.) | MM 305 | 75     | 2.0          | 0.25         | 0.05   | 0.005      |       | IN. 12  | 3      |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| U.S. STD. SIEVE SIZE   | 4   | 10   | 40  | 60   | 200  | 270  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| OPENING (MM)   | 4.75  | 2.00   | 0.42  | 0.25   | 0.075  | 0.053                                      |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| BOULDER (BLDR.)  | COBBLE (COB.)   | GRAVEL (GR.)   | COARSE SAND (CSE. SD.)  | FINE SAND (F SD.)  | SILT (SL.)   | CLAY (CL.)                                 |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| MM 305   | 75  | 2.0  | 0.25  | 0.05   | 0.005  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| IN. 12   | 3   |  |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| <p><b>SOIL MOISTURE - CORRELATION OF TERMS</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</th> <th>FIELD MOISTURE DESCRIPTION</th> <th>GUIDE FOR FIELD MOISTURE DESCRIPTION</th> </tr> <tr> <td rowspan="2">LL - LIQUID LIMIT<br/>PL - PLASTIC LIMIT</td> <td>- SATURATED - (SAT.)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td>- WET - (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td rowspan="2">OM - OPTIMUM MOISTURE<br/>SL - SHRINKAGE LIMIT</td> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td>- DRY - (D)</td> <td>REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </table>  |   | SOIL MOISTURE SCALE (ATTERBERG LIMITS)   | FIELD MOISTURE DESCRIPTION  | GUIDE FOR FIELD MOISTURE DESCRIPTION   | LL - LIQUID LIMIT<br>PL - PLASTIC LIMIT                          | - SATURATED - (SAT.)                       | USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE | - WET - (W) | SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE | OM - OPTIMUM MOISTURE<br>SL - SHRINKAGE LIMIT | - MOIST - (M) | SOLID; AT OR NEAR OPTIMUM MOISTURE | - DRY - (D)    | REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| SOIL MOISTURE SCALE (ATTERBERG LIMITS)   | FIELD MOISTURE DESCRIPTION  | GUIDE FOR FIELD MOISTURE DESCRIPTION   |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| LL - LIQUID LIMIT<br>PL - PLASTIC LIMIT  | - SATURATED - (SAT.)  | USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE  |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
|  | - WET - (W)   | SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE  |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| OM - OPTIMUM MOISTURE<br>SL - SHRINKAGE LIMIT  | - MOIST - (M)   | SOLID; AT OR NEAR OPTIMUM MOISTURE   |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
|  | - DRY - (D)   | REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE   |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| <p><b>PLASTICITY</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>PLASTICITY INDEX (PI)</th> <th>DRY STRENGTH</th> </tr> <tr> <td>NON PLASTIC</td> <td>0-5</td> <td>VERY LOW</td> </tr> <tr> <td>SLIGHTLY PLASTIC</td> <td>6-15</td> <td>SLIGHT</td> </tr> <tr> <td>MODERATELY PLASTIC</td> <td>16-25</td> <td>MEDIUM</td> </tr> <tr> <td>HIGHLY PLASTIC</td> <td>26 OR MORE</td> <td>HIGH</td> </tr> </table>   |   | PLASTICITY INDEX (PI)  | DRY STRENGTH  | NON PLASTIC  | 0-5  | VERY LOW                                   | SLIGHTLY PLASTIC  | 6-15        | SLIGHT  | MODERATELY PLASTIC                            | 16-25         | MEDIUM                             | HIGHLY PLASTIC | 26 OR MORE   | HIGH  |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| PLASTICITY INDEX (PI)  | DRY STRENGTH  |  |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| NON PLASTIC  | 0-5   | VERY LOW   |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| SLIGHTLY PLASTIC   | 6-15  | SLIGHT   |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| MODERATELY PLASTIC   | 16-25   | MEDIUM   |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| HIGHLY PLASTIC   | 26 OR MORE  | HIGH   |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| <p><b>COLOR</b></p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>  |   |  |   |  |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
| <p><b>EQUIPMENT USED ON SUBJECT PROJECT</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td> <p>DRILL UNITS:</p> <input type="checkbox"/> CME-45C<br/> <input type="checkbox"/> CME-55<br/> <input type="checkbox"/> CME-55B<br/> <input type="checkbox"/> VANE SHEAR TEST<br/> <input type="checkbox"/> PORTABLE HOIST<br/> <input checked="" type="checkbox"/> CME-550X </td> <td> <p>ADVANCING TOOLS:</p> <input type="checkbox"/> CLAY BITS<br/> <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER<br/> <input checked="" type="checkbox"/> 8" HOLLOW AUGERS<br/> <input type="checkbox"/> HARD FACED FINGER BITS<br/> <input type="checkbox"/> TUNG-CARBIDE INSERTS<br/> <input checked="" type="checkbox"/> CASING <input checked="" type="checkbox"/> W/ ADVANCER<br/> <input type="checkbox"/> TRICONE * STEEL TEETH<br/> <input type="checkbox"/> TRICONE * TUNG-CARB.<br/> <input type="checkbox"/> CORE BIT </td> <td> <p>HAMMER TYPE:</p> <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL<br/> <p>CORE SIZE:</p> <input type="checkbox"/> -B <input type="checkbox"/> -H <input type="checkbox"/> -N<br/> <p>HAND TOOLS:</p> <input type="checkbox"/> POST HOLE DIGGER<br/> <input type="checkbox"/> HAND AUGER<br/> <input type="checkbox"/> SOUNDING ROD<br/> <input type="checkbox"/> VANE SHEAR TEST </td> </tr> </table>   |   | <p>DRILL UNITS:</p> <input type="checkbox"/> CME-45C<br><input type="checkbox"/> CME-55<br><input type="checkbox"/> CME-55B<br><input type="checkbox"/> VANE SHEAR TEST<br><input type="checkbox"/> PORTABLE HOIST<br><input checked="" type="checkbox"/> CME-550X   | <p>ADVANCING TOOLS:</p> <input type="checkbox"/> CLAY BITS<br><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER<br><input checked="" type="checkbox"/> 8" HOLLOW AUGERS<br><input type="checkbox"/> HARD FACED FINGER BITS<br><input type="checkbox"/> TUNG-CARBIDE INSERTS<br><input checked="" type="checkbox"/> CASING <input checked="" type="checkbox"/> W/ ADVANCER<br><input type="checkbox"/> TRICONE * STEEL TEETH<br><input type="checkbox"/> TRICONE * TUNG-CARB.<br><input type="checkbox"/> CORE BIT | <p>HAMMER TYPE:</p> <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL<br><p>CORE SIZE:</p> <input type="checkbox"/> -B <input type="checkbox"/> -H <input type="checkbox"/> -N<br><p>HAND TOOLS:</p> <input type="checkbox"/> POST HOLE DIGGER<br><input type="checkbox"/> HAND AUGER<br><input type="checkbox"/> SOUNDING ROD<br><input type="checkbox"/> VANE SHEAR TEST |  |  |   |             |   |   |               |                                    |                |  |       |                 |               |              |   |                   |            |            |        |        |              |              |        |            |       |         |        |            |          |        |     |          |          |          |        |  |  |  |  |  |  |  |  |  |  |  |  |  |           |     |     |      |      |     |     |      |      |     |     |      |      |     |     |      |      |                      |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |  |  |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |                         |  |  |  |  |  |  |  |  |  |  |  |  |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |       |       |        |                    |               |                       |                        |                   |                  |           |                   |                  |                             |                  |                                  |               |                |  |                        |                          |  |                                |                   |  |                |                   |  |          |                   |  |                       |                 |  |                              |                        |  |                    |                      |  |              |          |  |
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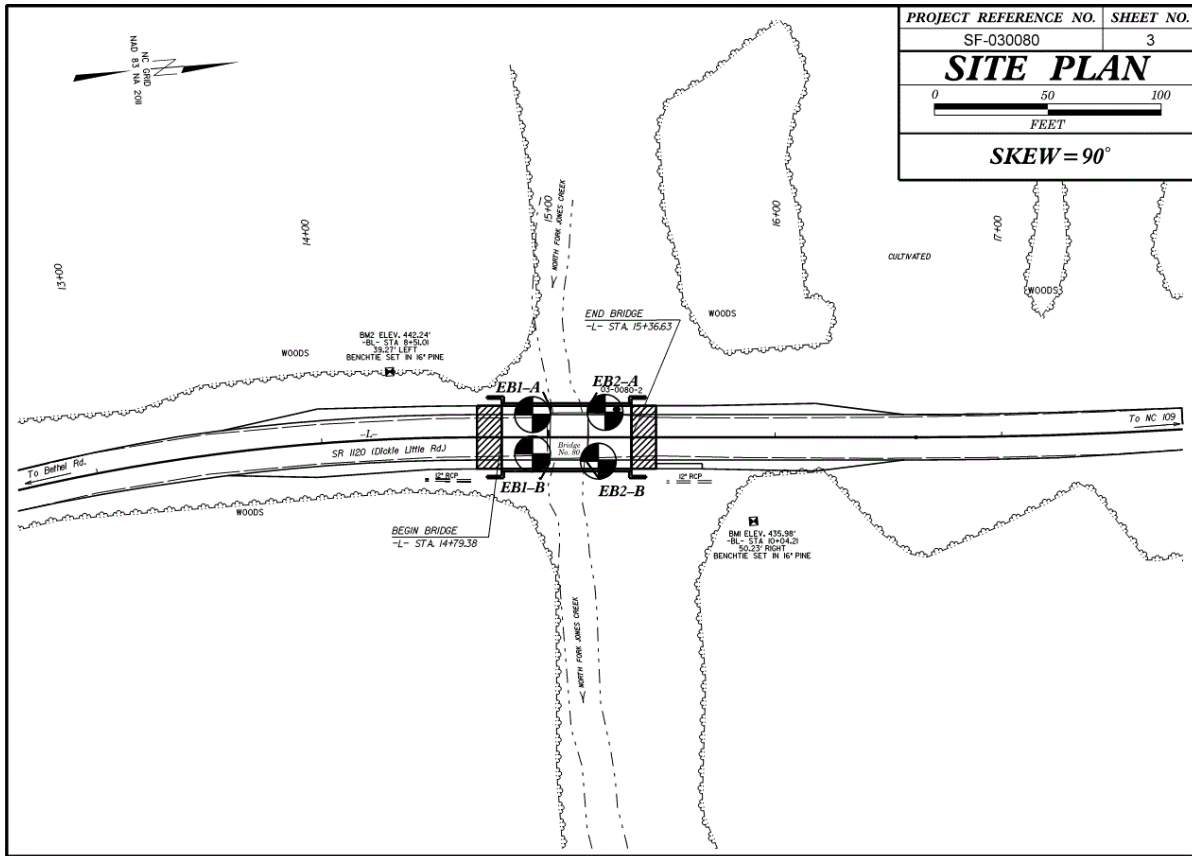
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**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT**

**SUBSURFACE INVESTIGATION**

**SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**  
(PAGE 2 OF 2)

| ROCK DESCRIPTION   |   | TERMS AND DEFINITIONS  |  |
|--|---|--|--|
| <p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 6.3 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p> |   | <p><b>ALLUVIUM (ALLOU)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.</p> <p><b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA.</p> <p><b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.</p> <p><b>ARGILLACEOUS</b> - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.</p> <p><b>ARTESIAN</b> - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.</p> <p><b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p> <p><b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p> <p><b>CORE RECOVERY (REC)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.</p> <p><b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p> <p><b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.</p> <p><b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p> <p><b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.</p> <p><b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.</p> <p><b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL.</p> <p><b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.</p> <p><b>FORMATION (FM)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.</p> <p><b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.</p> <p><b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.</p> <p><b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.</p> <p><b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.</p> <p><b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</p> <p><b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p> <p><b>ROCK QUALITY DESIGNATION (RQD)</b> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.</p> <p><b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.</p> <p><b>SILL</b> - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRODUCED ROCKS.</p> <p><b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.</p> <p><b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - NUMBER OF BLOWS IN OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 6.3 FOOT PER 60 BLOWS.</p> <p><b>STRATA CORE RECOVERY (SREC)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.</p> <p><b>STRATA ROCK QUALITY DESIGNATION (SRQD)</b> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.</p> <p><b>TOPSOIL (TS)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p> |  |
| <p><b>WEATHERED ROCK (WR)</b></p>  <p>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES &gt; 100 BLOWS PER FOOT IF TESTED.</p>   | <p><b>CRYSTALLINE ROCK (CR)</b></p>  <p>FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL, IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</p>  | <p><b>NON-CRYSTALLINE ROCK (NCR)</b></p>  <p>FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL, IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.</p>   | <p><b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b></p>  <p>COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p> |
| <b>WEATHERING</b>  |   |  |  |
| <p><b>FRESH</b></p> <p>ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p>   | <p><b>VERY SLIGHT (V SLI)</b></p> <p>ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.</p>  | <p><b>SLIGHT (SLI)</b></p> <p>ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.</p>  |  |
| <p><b>MODERATE (MOD)</b></p> <p>SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.</p>   | <p><b>MODERATELY SEVERE (MOD. SEV)</b></p> <p>ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i></p> | <p><b>SEVERE (SEV)</b></p> <p>ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES &gt; 100 BPF</i></p>  |  |
| <p><b>VERY SEVERE (V SEV)</b></p> <p>ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</i></p>   | <p><b>COMPLETE</b></p> <p>ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.</p>  |  |  |
| <b>ROCK HARDNESS</b>   |   |  |  |
| <p><b>VERY HARD</b></p> <p>CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p>   | <p><b>HARD</b></p> <p>CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p>   | <p><b>MODERATELY HARD</b></p> <p>CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.</p>   |  |
| <p><b>MEDIUM HARD</b></p> <p>CAN BE GROOVED OR GOUGED 0.25 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.</p>  | <p><b>SOFT</b></p> <p>CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.</p>   | <p><b>VERY SOFT</b></p> <p>CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.</p>  |  |
| <b>FRACTURE SPACING</b>  |   | <b>BEDDING</b>   |  |
| <p><b>TERM</b></p> <p>VERY WIDE</p> <p>WIDE</p> <p>MODERATELY CLOSE</p> <p>CLOSE</p> <p>VERY CLOSE</p>   | <p><b>SPACING</b></p> <p>MORE THAN 10 FEET</p> <p>3 TO 10 FEET</p> <p>1 TO 3 FEET</p> <p>0.16 TO 1 FOOT</p> <p>LESS THAN 0.16 FEET</p>  | <p><b>TERM</b></p> <p>VERY THICKLY BEDDED</p> <p>THICKLY BEDDED</p> <p>THINLY BEDDED</p> <p>VERY THINLY BEDDED</p> <p>THICKLY LAMINATED</p> <p>THINLY LAMINATED</p>  |  |
|  | <p><b>THICKNESS</b></p> <p>4 FEET</p> <p>1.5 - 4 FEET</p> <p>0.16 - 1.5 FEET</p> <p>0.03 - 0.16 FEET</p> <p>0.009 - 0.03 FEET</p> <p>&lt; 0.009 FEET</p>  |  |  |
| <b>INDURATION</b>  |   |  |  |
| <p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p>   |   |  |  |
| <p><b>FRIABLE</b></p> <p>RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</p>  | <p><b>MODERATELY INDURATED</b></p> <p>GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</p>   | <p><b>INDURATED</b></p> <p>GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</p>  |  |
| <p><b>EXTREMELY INDURATED</b></p> <p>SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>   |   |  |  |
| <p><b>BENCH MARK: BM-2= BL. STATION 8+51.00, 39' LT, N: 423944, E: 1661164, BENCHTIE SET IN 16" PINE</b></p> <p style="text-align: right;"><b>ELEVATION: 442.24 FEET</b></p>   |   | <p><b>NOTES:</b></p> <p>FIAD= FILLED IMMEDIATELY AFTER DRILLING</p>  |  |
|  |   | DATE: 8-15-14  |  |



### GEOTECHNICAL BORING REPORT BORE LOG

| WBS 17BP.10.R.130   |                 | TIP SF-030080       |            | COUNTY ANSON             |       | GEOLOGIST Stickney, J. K. |                 |    |    |     |           |     |                           |            |      |  |
|---|-----------------|---------------------|------------|--------------------------|-------|---------------------------|-----------------|----|----|-----|-----------|-----|---------------------------|------------|------|--|
| SITE DESCRIPTION Bridge No. 80 on SR 1120 (Dickie Little Rd.) over N. Fork of Jones Creek |                 |                     |            |                          |       |                           | GROUND WTR (ft) |    |    |     |           |     |                           |            |      |  |
| BORING NO. EB1-A  |                 | STATION 14+93       |            | OFFSET 10 ft LT          |       | ALIGNMENT -L-             | 0 HR. N/A       |    |    |     |           |     |                           |            |      |  |
| COLLAR ELEV. 437.4 ft   |                 | TOTAL DEPTH 30.0 ft |            | NORTHING 424,005         |       | EASTING 1,661,188         | 24 HR. FIAD     |    |    |     |           |     |                           |            |      |  |
| DRILL RIG/HAMMER EFF./DATE HFC0072 CME-550X 90% 05/23/2017                                |                 |                     |            | DRILL METHOD H.S. Augers |       | HAMMER TYPE Automatic     |                 |    |    |     |           |     |                           |            |      |  |
| DRILLER Smith, C. L.  |                 | START DATE 06/12/17 |            | COMP. DATE 06/12/17      |       | SURFACE WATER DEPTH N/A   |                 |    |    |     |           |     |                           |            |      |  |
| ELEV (ft)   | DRIVE ELEV (ft) | DEPTH (ft)          | BLOW COUNT |                          |       | BLOWS PER FOOT            |                 |    |    |     | SAMP. NO. | LOG | SOIL AND ROCK DESCRIPTION |            |      |  |
|   |                 |                     | 0.5ft      | 0.5ft                    | 0.5ft | 0                         | 25              | 50 | 75 | 100 |           |     | ELEV. (ft)                | DEPTH (ft) |      |  |
| 440   |                 |                     |            |                          |       |                           |                 |    |    |     |           |     |                           | 437.4      | 0.0  | GROUND SURFACE   |
| 435   |                 |                     |            |                          |       |                           |                 |    |    |     |           |     |                           | 434.4      | 3.0  | ROADWAY EMBANKMENT<br>RED, SILTY CLAY  |
| 430   | 433.2           | 4.2                 | 1          | 2                        | 3     |                           |                 |    |    |     |           |     |                           |            |      | ALLUVIAL<br>TAN, GRAY, SANDY SILTY CLAY  |
| 425   | 428.2           | 9.2                 | 26         | 14                       | 15    |                           |                 |    |    |     |           |     |                           | 429.1      | 8.3  | RESIDUAL<br>RED, PURPLE, GRAY, SILTY CLAY  |
| 420   | 423.2           | 14.2                | 15         | 19                       | 50    |                           |                 |    |    |     |           |     |                           | 425.5      | 11.9 | VERY SOFT FROM 11.9 TO 14.0  |
| 415   | 418.2           | 19.2                | 56         | 44/0.2                   |       |                           |                 |    |    |     |           |     |                           | 423.4      | 14.0 |  |
| 410   | 413.2           | 24.2                | 100/0.4    |                          |       |                           |                 |    |    |     |           |     |                           | 418.2      | 19.2 | WEATHERED ROCK<br>WEATHERED ROCK (TRIASSIC MUDSTONE)                             |
|   | 408.2           | 29.2                | 41         | 59/0.3                   |       |                           |                 |    |    |     |           |     |                           | 410.7      |      |  |
|   |                 |                     |            |                          |       |                           |                 |    |    |     |           |     |                           | 407.4      | 30.0 | Boring Terminated at Elevation 407.4 ft in<br>WEATHERED ROCK (TRIASSIC MUDSTONE) |

NCDOT BORE SINGLE SF030080\_GEO\_BRDG0080.GPJ NC\_DOT.GDT 10/17/18

### GEOTECHNICAL BORING REPORT BORE LOG

| WBS 17BP.10.R.130   |                 | TIP SF-030080       |            | COUNTY ANSON                       |        | GEOLOGIST Stickney, J. K. |                 |    |    |         |           |     |                           |            |  |      |
|---|-----------------|---------------------|------------|------------------------------------|--------|---------------------------|-----------------|----|----|---------|-----------|-----|---------------------------|------------|--|------|
| SITE DESCRIPTION Bridge No. 80 on SR 1120 (Dickie Little Rd.) over N. Fork of Jones Creek |                 |                     |            |                                    |        |                           | GROUND WTR (ft) |    |    |         |           |     |                           |            |  |      |
| BORING NO. EB1-B  |                 | STATION 14+93       |            | OFFSET 7 ft RT                     |        | ALIGNMENT -L-             | 0 HR. 8.8       |    |    |         |           |     |                           |            |  |      |
| COLLAR ELEV. 437.5 ft   |                 | TOTAL DEPTH 24.2 ft |            | NORTHING 424,003                   |        | EASTING 1,661,205         | 24 HR. FIAD     |    |    |         |           |     |                           |            |  |      |
| DRILL RIG/HAMMER EFF./DATE HFC0072 CME-550X 90% 05/23/2017                                |                 |                     |            | DRILL METHOD NW Casing w/ Advancer |        | HAMMER TYPE Automatic     |                 |    |    |         |           |     |                           |            |  |      |
| DRILLER Smith, C. L.  |                 | START DATE 06/12/17 |            | COMP. DATE 06/12/17                |        | SURFACE WATER DEPTH N/A   |                 |    |    |         |           |     |                           |            |  |      |
| ELEV (ft)   | DRIVE ELEV (ft) | DEPTH (ft)          | BLOW COUNT |                                    |        | BLOWS PER FOOT            |                 |    |    |         | SAMP. NO. | LOG | SOIL AND ROCK DESCRIPTION |            |  |      |
|   |                 |                     | 0.5ft      | 0.5ft                              | 0.5ft  | 0                         | 25              | 50 | 75 | 100     |           |     | ELEV. (ft)                | DEPTH (ft) |  |      |
| 440   |                 |                     |            |                                    |        |                           |                 |    |    |         |           |     |                           | 437.5      | GROUND SURFACE   | 0.0  |
|   |                 |                     |            |                                    |        |                           |                 |    |    |         |           |     |                           |            | <b>ROADWAY EMBANKMENT</b>  |      |
| 435   |                 |                     |            |                                    |        |                           |                 |    |    |         |           |     |                           | 434.5      | RED, SILTY CLAY  | 3.0  |
|   | 433.4           | 4.1                 |            | 2                                  | 2      | 3                         |                 |    |    |         |           |     |                           |            | <b>ALLUVIAL</b>  |      |
|   |                 |                     |            |                                    |        |                           |                 |    |    |         |           |     |                           | 431.5      | TAN, GRAY, SILTY SANDY CLAY  | 6.0  |
| 430   |                 |                     |            |                                    |        |                           |                 |    |    |         |           |     |                           |            | <b>RESIDUAL</b>  |      |
|   | 428.4           | 9.1                 |            | 75                                 | 25/0.1 |                           |                 |    |    | 100/0.6 |           |     |                           | 428.4      | RED, PURPLE, GRAY, SILTY CLAY  | 9.1  |
|   |                 |                     |            |                                    |        |                           |                 |    |    |         |           |     |                           |            | <b>WEATHERED ROCK</b>  |      |
| 425   |                 |                     |            |                                    |        |                           |                 |    |    |         |           |     |                           | 425.9      | WEATHERED ROCK (TRIASSIC MUDSTONE)   | 11.6 |
|   | 423.4           | 14.1                |            | 2                                  | 8      | 9                         |                 |    |    |         |           |     |                           |            | <b>RESIDUAL</b>  |      |
|   |                 |                     |            |                                    |        |                           |                 |    |    |         |           |     |                           | 421.8      | RED, PURPLE, GRAY, SILTY CLAY  | 15.7 |
| 420   |                 |                     |            |                                    |        |                           |                 |    |    |         |           |     |                           |            | <b>WEATHERED ROCK</b>  |      |
|   | 418.4           | 19.1                |            | 100/0.4                            |        |                           |                 |    |    | 100/0.4 |           |     |                           |            | WEATHERED ROCK (TRIASSIC MUDSTONE)   |      |
|   |                 |                     |            |                                    |        |                           |                 |    |    |         |           |     |                           |            |  |      |
| 415   |                 |                     |            |                                    |        |                           |                 |    |    |         |           |     |                           |            |  |      |
|   | 413.4           | 24.1                |            | 60/0.1                             |        |                           |                 |    |    | 60/0.1  |           |     |                           | 413.3      | Boring Terminated with Standard Penetration Test Refusal at Elevation 413.3 ft in NON-CRYSTALLINE ROCK (TRIASSIC MUDSTONE) |      |

NCDOT BORE SINGLE SF030080\_GEO\_BRDG0080.GPJ NC\_DOT.GDT 10/17/18



### GEOTECHNICAL BORING REPORT BORE LOG

| WBS 17BP.10.R.130   |                 | TIP SF-030080       |            | COUNTY ANSON             |       | GEOLOGIST Stickney, J. K. |                 |    |    |           |     |                           |            |            |  |  |   |
|---|-----------------|---------------------|------------|--------------------------|-------|---------------------------|-----------------|----|----|-----------|-----|---------------------------|------------|------------|--|--|---|
| SITE DESCRIPTION Bridge No. 80 on SR 1120 (Dickie Little Rd.) over N. Fork of Jones Creek |                 |                     |            |                          |       |                           | GROUND WTR (ft) |    |    |           |     |                           |            |            |  |  |   |
| BORING NO. EB2-B  |                 | STATION 15+22       |            | OFFSET 11 ft RT          |       | ALIGNMENT -L-             | 0 HR. 5.0 Caved |    |    |           |     |                           |            |            |  |  |   |
| COLLAR ELEV. 436.7 ft   |                 | TOTAL DEPTH 19.8 ft |            | NORTHING 424,032         |       | EASTING 1,661,211         | 24 HR. FIAD     |    |    |           |     |                           |            |            |  |  |   |
| DRILL RIG/HAMMER EFF./DATE HFC0072 CME-550X 90% 05/23/2017                                |                 |                     |            | DRILL METHOD H.S. Augers |       | HAMMER TYPE Automatic     |                 |    |    |           |     |                           |            |            |  |  |   |
| DRILLER Smith, C. L.  |                 | START DATE 06/12/17 |            | COMP. DATE 06/12/17      |       | SURFACE WATER DEPTH N/A   |                 |    |    |           |     |                           |            |            |  |  |   |
| ELEV (ft)   | DRIVE ELEV (ft) | DEPTH (ft)          | BLOW COUNT |                          |       | BLOWS PER FOOT            |                 |    |    | SAMP. NO. | LOG | SOIL AND ROCK DESCRIPTION |            |            |  |  |   |
|   |                 |                     | 0.5ft      | 0.5ft                    | 0.5ft | 0                         | 25              | 50 | 75 |           |     | 100                       | ELEV. (ft) | DEPTH (ft) |  |  |   |
| 440   |                 |                     |            |                          |       |                           |                 |    |    |           |     |                           |            |            |  |  |   |
|   |                 |                     |            |                          |       |                           |                 |    |    |           |     |                           |            | 436.7      |  |  | GROUND SURFACE  |
| 435   |                 |                     |            |                          |       |                           |                 |    |    |           |     |                           |            |            |  |  | ROADWAY EMBANKMENT  |
|   |                 |                     |            |                          |       |                           |                 |    |    |           |     |                           |            | 433.7      |  |  | RED, SILTY CLAY   |
|   |                 | 432.2               | 4.5        |                          |       |                           |                 |    |    |           |     |                           |            |            |  |  | ALLUVIAL  |
|   |                 |                     |            | 4                        | 3     | 2                         |                 |    |    |           |     |                           |            |            |  |  | TAN, YELLOW, SILTY SANDY CLAY   |
| 430   |                 |                     |            |                          |       |                           |                 |    |    |           |     |                           |            | 430.2      |  |  | RESIDUAL  |
|   |                 | 427.2               | 9.5        |                          |       |                           |                 |    |    |           |     |                           |            |            |  |  | RED, PURPLE, GRAY, SILTY CLAY   |
| 425   |                 |                     |            |                          |       |                           |                 |    |    |           |     |                           |            | 426.2      |  |  | WEATHERED ROCK  |
|   |                 | 422.2               | 14.5       |                          |       |                           |                 |    |    |           |     |                           |            |            |  |  | WEATHERED ROCK (TRIASSIC MUDSTONE)  |
| 420   |                 |                     |            |                          |       |                           |                 |    |    |           |     |                           |            |            |  |  |   |
|   |                 | 417.2               | 19.5       |                          |       |                           |                 |    |    |           |     |                           |            |            |  |  |   |
|   |                 |                     |            |                          |       |                           |                 |    |    |           |     |                           |            |            |  |  | Boring Terminated at Elevation 416.9 ft in WEATHERED ROCK (TRIASSIC MUDSTONE) |

NCDOT BORE SINGLE SF030080\_GEO\_BRDG0080.GPJ NC\_DOT.GDT 10/17/18

**Bridge No. 80 on SR 1120 (Dickie Little Rd.) over N. Fork of Jones Creek  
SITE PHOTOGRAPH**



View looking downstream.



County : Anson

| Line #               | Item Number  | Sec # | Description   | Quantity   | Unit Cost | Amount |
|----------------------|--------------|-------|---|------------|-----------|--------|
| <b>ROADWAY ITEMS</b> |              |       |   |            |           |        |
| 0001                 | 0000100000-N | 800   | MOBILIZATION  | Lump Sum   | L.S.      |        |
| 0002                 | 0000400000-N | 801   | CONSTRUCTION SURVEYING  | Lump Sum   | L.S.      |        |
| 0003                 | 0030000000-N | SP    | TYPE II MODIFIED APPROACH<br>FILL, STATION *****<br>(AT STATION 15+08.00 -L-) | Lump Sum   | L.S.      |        |
| 0004                 | 0063000000-N | SP    | GRADING   | Lump Sum   | L.S.      |        |
| 0005                 | 0134000000-E | 240   | DRAINAGE DITCH EXCAVATION   | 27<br>CY   |           |        |
| 0006                 | 0318000000-E | 300   | FOUNDATION CONDITIONING MATE-<br>RIAL, MINOR STRUCTURES                       | 5<br>TON   |           |        |
| 0007                 | 0320000000-E | 300   | FOUNDATION CONDITIONING GEO-<br>TEXTILE                                       | 10<br>SY   |           |        |
| 0008                 | 0335200000-E | 305   | 15" DRAINAGE PIPE   | 16<br>LF   |           |        |
| 0009                 | 0335850000-E | 305   | *** DRAINAGE PIPE ELBOWS<br>(15")   | 2<br>EA    |           |        |
| 0010                 | 1491000000-E | 610   | ASPHALT CONC BASE COURSE, TYPE<br>B25.0C                                      | 290<br>TON |           |        |
| 0011                 | 1503000000-E | 610   | ASPHALT CONC INTERMEDIATE<br>COURSE, TYPE I19.0C                              | 280<br>TON |           |        |
| 0012                 | 1523000000-E | 610   | ASPHALT CONC SURFACE COURSE,<br>TYPE S9.5C                                    | 240<br>TON |           |        |
| 0013                 | 1575000000-E | 620   | ASPHALT BINDER FOR PLANT MIX  | 45<br>TON  |           |        |
| 0014                 | 2286000000-N | 840   | MASONRY DRAINAGE STRUCTURES   | 1<br>EA    |           |        |
| 0015                 | 2367000000-N | 840   | FRAME WITH TWO GRATES, STD<br>840.29  | 1<br>EA    |           |        |
| 0016                 | 2556000000-E | 846   | SHOULDER BERM GUTTER  | 21<br>LF   |           |        |
| 0017                 | 3030000000-E | 862   | STEEL BEAM GUARDRAIL  | 50<br>LF   |           |        |
| 0018                 | 3150000000-N | 862   | ADDITIONAL GUARDRAIL POSTS  | 10<br>EA   |           |        |

County : Anson

| Line # | Item Number  | Sec # | Description  | Quantity    | Unit Cost | Amount |
|--------|--------------|-------|--|-------------|-----------|--------|
| 0019   | 3215000000-N | SP    | GUARDRAIL ANCHOR UNITS, TYPE III                   | 4<br>EA     |           |        |
| 0020   | 3287000000-N | SP    | GUARDRAIL END UNITS, TYPE TL-3                     | 4<br>EA     |           |        |
| 0021   | 3635000000-E | 876   | RIP RAP, CLASS II                                  | 400<br>TON  |           |        |
| 0022   | 3649000000-E | 876   | RIP RAP, CLASS B                                   | 5<br>TON    |           |        |
| 0023   | 3656000000-E | 876   | GEOTEXTILE FOR DRAINAGE                            | 255<br>SY   |           |        |
| 0024   | 4400000000-E | 1110  | WORK ZONE SIGNS (STATIONARY)                       | 387<br>SF   |           |        |
| 0025   | 4410000000-E | 1110  | WORK ZONE SIGNS (BARRICADE MOUNTED)                | 57<br>SF    |           |        |
| 0026   | 4445000000-E | 1145  | BARRICADES (TYPE III)                              | 100<br>LF   |           |        |
| 0027   | 4685000000-E | 1205  | THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS) | 2,128<br>LF |           |        |
| 0028   | 6000000000-E | 1605  | TEMPORARY SILT FENCE                               | 100<br>LF   |           |        |
| 0029   | 6006000000-E | 1610  | STONE FOR EROSION CONTROL, CLASS A                 | 10<br>TON   |           |        |
| 0030   | 6009000000-E | 1610  | STONE FOR EROSION CONTROL, CLASS B                 | 240<br>TON  |           |        |
| 0031   | 6012000000-E | 1610  | SEDIMENT CONTROL STONE                             | 100<br>TON  |           |        |
| 0032   | 6015000000-E | 1615  | TEMPORARY MULCHING                                 | 0.5<br>ACR  |           |        |
| 0033   | 6018000000-E | 1620  | SEED FOR TEMPORARY SEEDING                         | 100<br>LB   |           |        |
| 0034   | 6021000000-E | 1620  | FERTILIZER FOR TEMPORARY SEEDING                   | 0.5<br>TON  |           |        |
| 0035   | 6024000000-E | 1622  | TEMPORARY SLOPE DRAINS                             | 200<br>LF   |           |        |
| 0036   | 6029000000-E | SP    | SAFETY FENCE                                       | 200<br>LF   |           |        |
| 0037   | 6030000000-E | 1630  | SILT EXCAVATION                                    | 150<br>CY   |           |        |

County : Anson

| Line # | Item Number  | Sec # | Description                      | Quantity | Unit Cost | Amount |
|--------|--------------|-------|----------------------------------|----------|-----------|--------|
| 0038   | 6036000000-E | 1631  | MATTING FOR EROSION CONTROL      | 5,150    | SY        |        |
| 0039   | 6037000000-E | SP    | COIR FIBER MAT                   | 100      | SY        |        |
| 0040   | 6038000000-E | SP    | PERMANENT SOIL REINFORCEMENT MAT | 260      | SY        |        |
| 0041   | 6045000000-E | SP    | *** TEMPORARY PIPE (24")         | 31       | LF        |        |
| 0042   | 6070000000-N | 1639  | SPECIAL STILLING BASINS          | 2        | EA        |        |
| 0043   | 6071020000-E | SP    | POLYACRYLAMIDE (PAM)             | 45       | LB        |        |
| 0044   | 6084000000-E | 1660  | SEEDING & MULCHING               | 0.5      | ACR       |        |
| 0045   | 6087000000-E | 1660  | MOWING                           | 0.5      | ACR       |        |
| 0046   | 6111000000-E | SP    | IMPERVIOUS DIKE                  | 160      | LF        |        |
| 0047   | 6117000000-N | SP    | RESPONSE FOR EROSION CONTROL     | 13       | EA        |        |
| 0048   | 6117500000-N | SP    | CONCRETE WASHOUT STRUCTURE       | 2        | EA        |        |
| 0049   | 6123000000-E | 1670  | REFORESTATION                    | 0.1      | ACR       |        |

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**STRUCTURE ITEMS**


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|      |              |     |  |          |      |  |
|------|--------------|-----|--|----------|------|--|
| 0050 | 8035000000-N | 402 | REMOVAL OF EXISTING STRUCTURE AT STATION *****<br>(AT STATION 15+08.00 -L-)  | Lump Sum | L.S. |  |
| 0051 | 8065000000-N | SP  | ASBESTOS ASSESSMENT  | Lump Sum | L.S. |  |
| 0052 | 8121000000-N | 412 | UNCLASSIFIED STRUCTURE EXCAVATION AT STATION *****<br>(STATION 15+08.00 -L-) | Lump Sum | L.S. |  |
| 0053 | 8182000000-E | 420 | CLASS A CONCRETE (BRIDGE)  | 26       | CY   |  |

County : Anson

| Line # | Item Number  | Sec # | Description   | Quantity    | Unit Cost | Amount |
|--------|--------------|-------|---|-------------|-----------|--------|
| 0054   | 8210000000-N | 422   | BRIDGE APPROACH SLABS, STATION<br>*****<br>(STATION 15+08.00 -L-)   | Lump Sum    | L.S.      |        |
| 0055   | 8217000000-E | 425   | REINFORCING STEEL (BRIDGE)  | 3,930<br>LB |           |        |
| 0056   | 8328200000-E | 450   | PILE DRIVING EQUIPMENT SETUP<br>FOR *** STEEL PILES<br>(HP 12 X 53) | 10<br>EA    |           |        |
| 0057   | 8364000000-E | 450   | HP12X53 STEEL PILES   | 175<br>LF   |           |        |
| 0058   | 8391000000-N | 450   | STEEL PILE POINTS   | 10<br>EA    |           |        |
| 0059   | 8392500000-E | 450   | PREDRILLING FOR PILES   | 80<br>LF    |           |        |
| 0060   | 8505000000-E | 460   | VERTICAL CONCRETE BARRIER RAIL                                      | 110<br>LF   |           |        |
| 0061   | 8657000000-N | 430   | ELASTOMERIC BEARINGS  | Lump Sum    | L.S.      |        |
| 0062   | 8762000000-E | 430   | 3'-0" X 1'-9" PRESTRESSED CONC<br>CORED SLABS                       | 550<br>LF   |           |        |

1429/Mar11/Q16103.1/D297729770000/E62

Total Amount Of Bid For Entire Project :