



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

January 4, 2005

Addendum No. 1

RE: Contract ID: C201406
WBS # 36971
Union County
Bridge No. 33 Over Twelve
Mile Creek on NC-16.

January 11, 2005 Letting

To Whom It May Concern:

Reference is made to the proposal form furnished to you on the above-mentioned project.

The following revisions have been made to the proposal form:

On Page No. 1, the project special provision entitled "Contract Time and Liquidated Damages" has been revised. Also beginning on Page No. 1 and continuing on Page No. 1-A the project special provision entitled "Intermediate Contract Time No. 1 and Liquidated Damages" has been added. Please void Page No. 1 in your proposal and staple the revised Page No. 1 and New Page No. 1-A thereto.

On Page No. 33, a change was made in the first paragraph of section "C. Construction Sequence Plan." Please void Page No. 33 in your proposal and staple the revised Page No. 33 thereto.

On Page No. 34, a change was made in the 12th and 13th paragraphs. Please void Page no. 34 in your proposal and staple the revised Page no. 34 thereto.

The Table of Contents has been revised to reflect the above mentioned changes. Please void the Table of Contents in your proposal and staple the revised Table of Contents thereto.

Sincerely,

A handwritten signature in black ink, appearing to read "R. A. Garris".

R. A. Garris, PE
Contract Officer

Page No. 2 (C201406)
Union County

RAG/jag/pa
Attachments

cc: Mr. W. S. Varnedoe, PE
Mr. S. D. DeWitt, PE
Mr. E. C. Powell, PE
Mr. B. G. Payne, PE
Ms. D. M. Barbour, PE
Mr. Art McMillan, PE
Mr. J. V. Barbour, PE
Mr. John Emerson, PE (Attn: Mr. Mike Summers)
Mr. Mark Staley (2)
Mr. Aydren Flowers
Mr. R. E. Davenport, Jr., PE
Ms. Marsha Byrd
Ms. Taylor Mishoe
Project File (2)

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Signature Sheet (Bid Acceptance by Department)

PROJECT SPECIAL PROVISIONS

General

7-1-95

SP1G01

CONTRACT TIME AND LIQUIDATED DAMAGES:

07-20-99

The date of availability for this contract is January 18, 2005, 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.

The completion date for this contract is May 6, 2005.

When observation periods are required by the special provisions, they are not a part of the work to be completed by the completion date and/or intermediate contract times stated in the contract. Should an observation period extend beyond the final completion date, the acceptable completion of the observation period shall be a part of the work covered by the performance and payment bonds.

The liquidated damages for this contract are Two Hundred Dollars (\$200.00) per calendar day.
SP1G04

INTERMEDIATE CONTRACT TIME NUMBER 1 AND LIQUIDATED DAMAGES:

07-20-99

The date of availability for this intermediate contract time is January 18, 2005.

The completion date for this intermediate contract time is April 17, 2005.

It is mutually agreed that time is of the essence in completing Phase I, Step 4 and opening the bridge to traffic. It is further mutually agreed a delay in completing this work will result in damage due to increased engineering and inspection costs to the Department of Transportation, great hardship to the general public, public inconvenience, obstruction of traffic, interference with business and increased cost of maintaining traffic.

By reason of the necessity of expeditious completion of the work of completing Phase I, Step 4 of the Traffic Control Plans and placing and maintaining traffic on same, it is mutually agreed the Contractor shall receive an incentive payment of Three Thousand and Six Hundred Dollars (\$3,600.00) per calendar day for each day prior to April 17, 2005 that this work is completed. Incentive payment shall be limited to a maximum of One Hundred Thousand Dollars (\$100,000.00). No incentive payment shall be allowed for any calendar day after April 17, 2005 that this work remains incomplete. This April 17, 2005 date shall be utilized in determining incentive payments and it shall not be revised for any reason whatsoever. Incentive payment determined to be due the Contractor, shall be paid by the Department within forty-five (45) calendar days after completion of all of the work. No incentive payment shall be allowed if the contract is terminated under the provisions of Article 108.13.

Disincentive of Three Thousand and Six Hundred Dollars (\$3,600.00) per calendar day shall be assessed the Contractor for each day beyond the intermediate completion date the work is not completed.

The Engineer shall withhold the disincentive as they accrue from the amount of monies due on work performed in the contract. The withholding of the disincentives shall be in addition to the normal percentage retained as noted in Article 109-4 of the Standard Specifications.

SP1G04

DRILLED PIERS**(10-03-02)****1.0 General****A. Description**

The work in this special provision governs the construction of Drilled Piers, also known as "Drilled Shafts" and "Caissons". Drilled piers are a reinforced concrete section, cast-in-place against in situ, undisturbed material. Drilled piers are a straight shaft type and vertical. Construct drilled piers in accordance with the details and dimensions shown on the plans and the requirements of this special provision.

B. Work Experience

The Contractor/Subcontractor and the Contractor's/Subcontractor's superintendent performing the work described in this special provision is required to have installed drilled piers of both diameter and length similar to those shown on the plans and have a minimum of five years experience with underwater concrete placement prior to the bid date for this project. This work is performed under the supervision of the Contractor's/Subcontractor's superintendent, who is knowledgeable and experienced in the construction of drilled piers using casing and/or slurry. Use equipment that has the capacity to undertake the work and is sufficient to complete the work within the specified contract time. Furnish evidence of experience and expertise that the Contractor/Subcontractor meets the following requirements.

To verify the ability to construct drilled piers for this project, submit a list containing a description of at least two projects completed in the last five years on which those responsible for the drilled pier construction have installed drilled piers of similar size as shown in the plans and with similar excavation techniques anticipated for this project. Include on the list of projects the names and phone numbers of the project owner's representatives who can verify the Contractor/Subcontractor's participation on the project.

C. Construction Sequence Plan

Develop and submit a drilled pier construction sequence plan for all the drilled piers for review and acceptance **10** days prior to beginning construction of the drilled piers. Provide detailed project specific information in the drilled pier construction sequence plan including:

1. Work experience in accordance with Section 1.0, Item B.
2. List and size of proposed equipment including: cranes, kelly bars, drill rigs, vibratory hammers, augers, core barrels, cleanout buckets, airlifts and/or submersible pumps, tremies and/or concrete pumps, casing (diameters, thicknesses and lengths), desanding equipment (for slurry construction), etc.

PROJECT NO. MA10001B

3. Details of the sequence of drilled pier construction, including the order of drilled pier construction.
4. Details of pier excavation methods.
5. Details of proposed methods to clean the pier excavation bottom.
6. Details of reinforcement placement including support and method to center in the excavation.
7. Details of concrete placement including proposed operational procedures for the concrete tremie or pump; including initial placement, how the tremie or pump is raised during concrete placement and what type of discharge control is proposed to prevent concrete contamination when the tremie or pump is initially placed in the excavation.
8. Details of casing installation and temporary casing removal including order of telescoped casing removal.
9. Required submittals for concrete mix designs.
10. Details of the slurry to be used (if applicable), including: product information, manufacturers mixing instructions, slurry equipment information and how the Contractor proposes to use the slurry. Also, submit a written approval from the bentonite supplier that the water to be used is acceptable.
11. Details on the handling of drilling spoils and slurry overflow including environmental control procedures used to prevent the loss of concrete, slurry and spoils.
12. Details of how the level of slurry is maintained above the highest piezometric pressure head (if applicable).
13. Other information shown in the plans or requested by the Engineer.

The Engineer reviews the drilled pier construction sequence plan for conformance with the plans, specifications and special provisions. Within *5 working* ~~X~~ days of receiving the plan, the Engineer notifies the Contractor of any additional information required and/or changes that are necessary to satisfy the plans, specifications and special provisions. Submit changes for re-evaluation of any unsatisfactory part of the construction sequence plan that is rejected. The Engineer responds to the Contractor within *3 working* ~~X~~ days after receiving the proposed changes.

If any changes in procedure are made during the construction of the drilled piers, inform the Engineer in writing and await approval of the proposed modifications prior to the construction of the remaining drilled piers.

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

PROPOSAL

DATE AND TIME OF BID OPENING: **JANUARY 11, 2005 AT 2:00 PM**

CONTRACT ID C201406

WBS 36971

FEDERAL-AID NO. STATE FUNDED

COUNTY UNION

T.I.P. NO.

MILES 0.188

ROUTE NO. NC 16

LOCATION BRIDGE OVER TWELVE MILE CREEK ON NC-16.

TYPE OF WORK BRIDGE REPLACEMENT.

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 SPECIALITY 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.

BIDS WILL BE RECEIVED AS SHOWN BELOW:

THIS IS A STRUCTURE PROPOSAL

5% BID BOND OR BID DEPOSIT REQUIRED

PROPOSAL FORM FOR THE CONSTRUCTION OF CONTRACT NO. C201406

IN UNION COUNTY NORTH CAROLINA

Date _____ 20__

DEPARTMENT OF TRANSPORTATION,

RALEIGH, NORTH CAROLINA

The Bidder has carefully examined the location of the proposed work to be known as Contract No. C201406; has carefully examined the plans and specifications, which are acknowledged to be part of the proposal, the special provisions, the proposal, the form of contract, and the forms of contract payment bond and contract performance bond; and thoroughly understands the stipulations, requirements and provisions. The undersigned bidder agrees to bound upon his execution of the bid and subsequent award to him by the Board of Transportation in accordance with this proposal to provide the necessary contract payment bond and contract performance bond within fourteen days after the written notice of award is received by him. The undersigned Bidder further agrees to provide all necessary machinery, tools, labor, and other means of construction; and to do all the work and to furnish all materials, except as otherwise noted, necessary to perform and complete the said contract in accordance with the 2002 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. C201406

In Union 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 2002 with all amendments and supplements thereto, is by reference incorporated into and made a part of this contract; that, except as herein modified, all the Construction and work included in this contract is to be done in accordance with the specifications contained in said volume, and amendments and supplements thereto, under the direction of the Engineer.

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

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

An increase or decrease in the quantity of any 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.

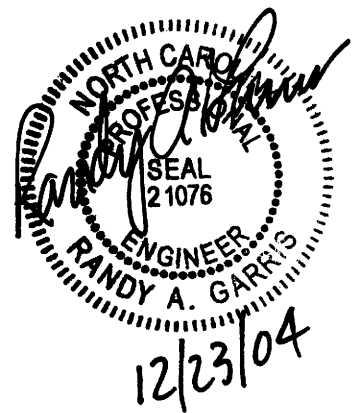


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7-1-95

SP1G01

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SP1G04

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SP1G04

CONTRACT EXECUTION PROCEDURE:

In order to expedite the execution of the contract the following revisions have been made to the 2002 Standard Specifications.

Article 103-7 and Article 103-9 shall apply with the following exception:

A contract payment bond and a contract performance bond shall be delivered by the lowest responsive bidder to be received by the Contract Officer by 2:00 p.m., Wednesday January 12, 2005.

Page 1-55, Article 108-2

Delete the second paragraph of this Article and insert the following:

“The proposed progress schedule shall be submitted by the date of the preconstruction conference and shall have been approved before any work is begun on the project.”

Page 1-56, Article 108-3

Delete the first sentence of this Article and insert the following:

“The preconstruction conference will be held at the Division 10 Traffic Services Office, located at 915 Coble Avenue, off NC 24/27 in Albemarle, in Stanly County, on Friday January 14, 2005 at 10:00 a.m.

SAFETY INDEX RATING:

6-18-02

Revise the 2002 Standard Specifications as follows:

Page 1-10, Article 102-2

Before the last paragraph on this page, add the following paragraph:

"All subcontractors performing work for the Department shall have received a passing grade on the Safety Index Rating form, in accordance with Article 102-2, prior to beginning work. Subcontractors can request the Safety Index Rating form from the State Contractual Services Engineer."

SP1G14

MAJOR CONTRACT ITEMS:

2-19-02c

The following listed items are the major contract items for this contract (See Articles 101-54 and 104-5 of the Standard Specifications):

<u>Line #</u>	<u>Description</u>
9	Asphalt Concrete Surface Course, Type SF9.5A SP1G28

SPECIALTY ITEMS:

7-1-95

Items listed below will be the specialty items for this contract (See Article 108-6 of the Standard Specifications).

<u>Line #</u>	<u>Description</u>
13	Guardrail Items
17 thru 18	Erosion Control Items
20 thru 22	Drilled Piers
	SP1G37

SCHEDULE OF ESTIMATED COMPLETION PROGRESS:

07-20-04

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

<u>Fiscal Year</u>	<u>Progress (Dollar Value)</u>
2005 (07/01/04 – 06/30/05)	100% of Total Amount Bid

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

SP1G58

ELECTRONIC BIDDING:

03-16-04_R

Page 1-2, Article 101-11

Delete this article and replace with the following:

Bid (Or Proposal): The electronic offer of a Bidder via Bid Express™ to the Department to perform the work and to furnish the labor and materials at the prices quoted.

Page 1-3, Article 101-20, **Contract**

Add after the second paragraph of this article.

All references to contracts shall include electronic agreements and printed paper agreements. These may include but not be limited to the electronic bid bond, non-collusion statement, debarment certification, and award limits.

Page 1-6, Article 101-64 **Proposal Form**

Delete this article and replace with the following:

Proposal or Proposal Form: The electronic or paper form provided by the Department that the Bidder uses to develop his electronic offer to perform the work at designated bid prices.

Page 1-14, **Article 102-9**

Delete Article 102-9 in its entirety and replace with the following:

102-9 ELECTRONIC BIDDING.

The Bidder shall submit bids electronically using the following guidelines:

1. The prequalified Bidder shall have a fully executed *Non-Collusion Affidavit and Debarment Certification* on file in the Contract Office prior to submitting his bid. If the Bidder cannot provide the debarment certification required, he shall provide an explanation as shown in the certification. The explanation will not necessarily result in denial of participation in a contract. Non-collusion and debarment certification forms shall be downloaded at <http://www.NCDOT.org/business>. Forms shall be executed in accordance with Section 102-8. The affidavit and certification shall be received in the Contract Office by 5 p.m. the last business day before the bid letting. The Contract Office address is shown at the end of this provision.

If the prequalified Bidder's *status* changes, he shall immediately submit a new fully executed non-collusion affidavit and debarment certification with an explanation of the change.

Failure to have a fully executed non-collusion affidavit and debarment certification on file in the Contract Office prior to placing bids will cause those bids to be non-responsive.

2. Obtain on-line bidding information from Bid Express™ at www.bidx.com (Note: Obtain an account and valid Digital Signature from Bid Express™ in order to bid electronically).
3. An electronic corporate surety bid bond for at least 5% of the total amount bid shall accompany each electronic bid, or the Contractor may submit a certified check or cashier's check in lieu of an electronic bid bond. The certified check or cashier's check shall be for at least 5% of the total amount bid and shall be received by 5 p.m. the last business day before the bid letting and shall be delivered to the address shown at the end of this provision.

Contact either or both of the following bond management companies in order to acquire the necessary service to submit an electronic bid bond.

- a. Surety 2000 (www.surety2000.com)
- b. Surepath (www.insurevision.com)

4. Debarment Certification – The Bidder shall provide a debarment certification in the electronic bid submittal. If a Bidder cannot provide the debarment certification required, he shall provide an explanation in the Bid Express™ miscellaneous folder within the .ebs file. The explanation will not necessarily result in denial of participation in a contract. Failure to furnish a certification or an explanation will be grounds for rejection of a bid.
5. Zero (0) is considered a valid bid. Do Not enter zero (0) in any unit price field unless zero (0) is the intended bid for that item.
6. Include all addenda in the submitted electronic bid. Bid Express™ will not accept a bid which does not contain all addenda. Section 103-2 (Correction of Bid Errors) will not apply to On-Line Electronic Bidding. All addenda and attachments will be considered part of the bid.
7. The electronic bid may be changed and resubmitted as many times as desired prior to the advertised bid opening time specified in the Invitation to Bid. The latest time stamped electronically submitted bid prior to the advertised bid opening time will constitute the Bid.
8. The provisions of Section 102-8 will apply to the preparation of bids except that the bid shall be submitted via Bid Express™ On-Line Bid Submission.
9. All bids shall be submitted with an electronically affixed digital signature. For the purpose of this provision, affixing a digital ID to the bid shall be the equivalent of signing before a notary public and placing in force the non-collusion affidavit and debarment certification on file with the Department.
10. By submitting an electronic bid, the Bidder certifies that he has read, understands, accepts, acknowledges and agrees to comply with all statements, conditions and Specifications in the electronic bid submittal.
11. Bids will be decrypted, opened, printed to paper and read publicly at the time and place specified in the invitation to bid.

12. The successful Bidder if award be made shall submit a fully executed *Execution of Contract, Non-Collusion Affidavit and Debarment Certification* signature sheet, and payment and performance bonds within 14 calendar days of receipt of award letter.
13. The Department will not be responsible if a Bidder cannot submit his bid to Bid Express™ and claims will not be accepted for this. In the event of technical difficulties, the Department reserves the right to postpone the reading of bids for up to 4 hours past the advertised bid opening time.
14. The pre-bid *Non-Collusion Affidavit, Debarment Certification* signature sheet, *Execution of Contract, Non-Collusion Affidavit, Debarment Certification* signature sheet, certified check or cashier's check in lieu of electronic bid bond, payment and performance bonds shall be delivered to the Contract Office at the address shown herein:

Physical Address

State Contract Officer
 Project Services Unit
 Century Center Bldg. B
 1020 Birch Ridge Drive
 Raleigh, NC 27610

Mailing Address:

State Contract Officer
 NC Department of Transportation
 Contracts and Proposals
 1591 Mail Service Center
 Raleigh, NC 27699-1591

SP1G60

MINORITY AND WOMEN BUSINESS**07-17-01****POLICY**

It is the policy of the North Carolina Department of Transportation that minority and women businesses shall have the maximum opportunity to participate in the performance of contracts financed by Non-Federal Funds.

The Contractor is also encouraged to give every opportunity to allow MB/WB participation in Supplemental Agreements.

OBLIGATION

The Contractor and any subsequent Subcontractor shall ensure that minority and women businesses have the maximum opportunity to participate in the performance of the work included in this contract. The Contractor and any subsequent Subcontractor shall take all necessary and reasonable steps to ensure that minority and women businesses have the maximum opportunity to compete for and perform a portion of the work included in this contract and shall not discriminate on the basis of race, color, national origin or sex. Failure on the part of the Contractor to carry out the requirements set forth herein shall constitute a breach of contract and after proper notification, may result in award disqualification, termination of the contract, disqualification from bidding, or other appropriate remedy.

GOALS

Pursuant to the requirements of North Carolina General Statute 136-28.4, the following goals for participation are established for this contract:

Minority Business Enterprises 5%

Women Business Enterprises 5%

The Contractor shall exercise all necessary and reasonable steps to ensure that Minority Businesses (MB) and Women Businesses (WB) participate in at least the percents of the contract as set forth above as goals for this contract.

LISTING OF MB AND WB SUBCONTRACTORS

All bidders, at the time the bid proposal is submitted, must also submit a listing of MB and WB participation on the appropriate form (or facsimile thereof) contained elsewhere in this proposal in order for the bid to be considered responsive. Bidders must indicate the total dollar value of MB and WB participation of the contract. In the event the bidder has no MB and WB participation, he is still required to indicate this on the forms by entering the word or number zero. Blank forms will not be deemed to represent zero participation. **BIDS SUBMITTED WHICH DO NOT HAVE MB AND WB PARTICIPATION INDICATED ON THE APPROPRIATE FORM WILL NOT BE READ PUBLICLY DURING THE OPENING OF BIDS.** These bids will not be considered for award by the Department and they will be returned to the bidder. Bidders have the option of submitting their MB and WB participation in an abbreviated format as required in Paragraph A below, or the bidders may submit their MB and WB participation in the additional detail required by Paragraph B below. In the event the bidder elects to submit MB and WB participation in accordance with Paragraph A and is determined to be the apparent lowest responsive bidder, that bidder must deliver to the Department no later than 12:00 noon of the sixth day following the opening of bids, a detailed MB and WB submittal as required by Paragraph B below.

Only those MB and WB firms with current certification by the Department will be considered acceptable for listing in the bidders submittal of MB and WB participation.

- A. The contractor shall indicate on the form for listing of MB and WB Subcontractors the following required information:

REQUIRED INFORMATION

- (1) The names of MB and WB firms committed to participate in the contract;
- (2) The Contract Item Numbers of work to be performed by each MB and WB firm; and
- (3) The total dollar amount to be paid to each MB and WB based on agreed upon prices.

Failure to indicate the required information on the specified form will cause the bid to be considered nonresponsive and it may be rejected.

- B. In lieu of submitting the information required by (A) above, the bidder may submit the detailed information required below along with the bid proposal.

REQUIRED INFORMATION

- (1) The names of MB and WB firms committed to participate in the contract;
- (2) The Contract Item Numbers and Contract Item Descriptions and agreed upon prices of work to be performed by each MB and WB firm; and
- (3) The total dollar amount to be paid to each MB and WB based on agreed upon prices.

Failure to indicate the required information on the specified form will cause the bid to be considered nonresponsive and it may be rejected.

The Department will not allow any substitutions, deletions, or other alterations to the listing of firms committed for MB and WB participation and/or the respective listed contract item numbers after opening of bids. The Department will not allow adjustments to total dollar amount of MB and/or WB participation after the opening of bids which would result in the MB and/or WB participation being less than the contract goal. The only exceptions to the requirements of this paragraph will be: (1) to allow for replacement of a MB or WB firm that had been decertified after opening of bids, and (2) to allow alteration of the listed contract item numbers subject to the Bidder submitting sufficient documentation to verify an obvious error in the initial submittal.

- C. If the bid of the lowest responsive bidder exceeds \$500,000 and if the MB and/or WB participation submitted in response to Paragraph B exceeds the algebraic sum of the MB and WB goals by \$1000 or more, the excess will be placed on deposit by the Department for future use by the bidder. Separate accounts will be maintained for MB and WB participation and these may accumulate for a period not to exceed 24 months.

If the MB and WB participation submitted in response to Paragraph A/B does not meet or exceed the MB and WB contract goals, the apparent lowest responsive bidder must submit information to satisfy the North Carolina Department of Transportation that sufficient reasonable efforts have been made to meet the contract goals. One complete set and nine (9) copies of this information must be received in the office of the State Contractual Services Engineer no later than 12:00 noon of the sixth day following opening of bids. Where the information submitted includes repetitious solicitation letters it will be acceptable to submit a sample representative letter along with a distribution list of the firms being solicited. Documentation of MB and WB quotations shall be a part of the good faith effort submittal as necessary to demonstrate compliance with the factors listed below which the Department considers in judging good faith efforts. This documentation may include written subcontractor quotations, telephone log notations of verbal quotations, or other types of quotation documentation.

Where the bidder fails to provide this information by the deadline, the Department may impose the following sanctions: (1) disqualify the contractor and any affiliated companies from further bidding for a period of time of no more than 90 days from the date of disqualification as established in notification by certified mail; and (2) disqualify the Contractor and any affiliated companies for award of all contracts for which bids have been received and opened.

The following factors are what the Department will consider in judging whether or not the bidder has made adequate good faith effort:

- (1) Whether the bidder attended any pre-bid meetings that were scheduled by the Department to inform MBs and WBs of subcontracting opportunities;
- (2) Whether the bidder provided written notice to a reasonable number of specific MBs and WBs that their interest in the contract is being solicited and whether the firms solicited could have reasonably been expected to quote the work in the contract;
- (3) Whether the bidder followed up on initial solicitations of interests by contacting MBs and WBs to determine with certainty whether they were interested;
- (4) Whether the bidder selected portions of the work to be performed by MBs and WBs in order to increase the likelihood of meeting the contract goals;
- (5) Whether the bidder provided interested MBs and WBs with adequate information about the plans, specifications and requirements of the contract;
- (6) Whether the bidder negotiated in good faith with interested MBs and Wbs not rejecting them as unqualified without sound reasons based on a thorough investigation of their capabilities;
- (7) Whether quotations were received from interested MB and WB firms but rejected as unacceptable without sound reasons why the quotations were considered unacceptable;
- (8) Whether the bidder made efforts to assist interested MBs and WBs in obtaining any required insurance or bonding that may be required by the bid proposal or by the bidder;
- (9) Whether the bidder specifically negotiated with Subcontractors to assume part of the responsibility to meet the contract MB and WB goal when the work to be sublet includes potential for MB and WB participation.

In the event one bidder is the apparent low bidder on two non-federally funded projects within the same letting located in the same geographic area of the state, as a part of the good faith effort the Department will consider allowing the bidder to combine the MB participation on the two projects so long as the overall MB goal value of both projects is achieved.

In the event one bidder is the apparent low bidder on two non-federally funded projects within the same letting located in the same geographic area of the state, as a part of the good faith effort the Department will consider allowing the bidder to combine the WB participation on the two projects so long as the overall WB goal value of both projects is achieved.

Where the apparent lowest responsive bidder fails to submit sufficient participation by MB firms to meet the contract goal, as part of the good faith effort the Department will consider allowing the bidder to withdraw funds to meet the MB goal so long as there are adequate funds available from the bidders MB bank account.

Where the apparent lowest responsive bidder fails to submit sufficient participation by WB firms to meet the contract goal, as part of the good faith effort the Department will consider allowing the bidder to withdraw funds to meet the WB goal so long as there are adequate funds available from the bidders WB bank account.

Where the apparent lowest responsive bidder fails to submit sufficient participation by MB and WB firms to meet the contract goal and upon a determination by the Goal Compliance Committee based upon the information submitted that the apparent lowest responsive bidder failed to make sufficient reasonable efforts to meet the contract goal, the Department may reject the bid.

In the event that 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 the Department that the contract goal can be met or that adequate good faith efforts have been made to meet the goal.

DIRECTORY OF CERTIFIED BUSINESSES

Included with this Proposal is a list of Businesses which have been certified by the North Carolina Department of Transportation. Only those MB firms with current certification may be used to meet the contract MB goal. Only those firms with current certification may be used to meet the contract WB goal.

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

REPLACEMENT OF MBs AND WBs

(A) Performance Related

If any MB or WB Subcontractor indicated on the form for listing of MB and WB Subcontractors, contained elsewhere in this proposal, does not perform satisfactorily to the extent indicated or anticipated, the Contractor shall take all necessary, reasonable steps to replace the MB Subcontractor with another MB Subcontractor and/or the Contractor shall take all necessary, reasonable steps to replace the WB Subcontractor with another WB Subcontractor.

Any substitution of MB or WB firms after award of the contract shall be approved by the Department. The Contractor shall submit any requests for substitutions through the Resident Engineer and the request must provide a valid basis or reason for the proposed substitution.

To demonstrate necessary, reasonable efforts, the Contractor shall document the steps he has taken to replace any MB or WB Subcontractor that is unable to perform successfully with another MB or WB Subcontractor. Such documentation shall include but not be limited to the following:

- (a) Copies of written notification to MBs/WBs that their interest is solicited in subcontracting the work defaulted by the previous MB or WB Subcontractor or in subcontracting other items of work in the contract.
- (b) Efforts to negotiate with MBs and WBs for specific subbids including at a minimum:
 - (1) The names, addresses, and telephone numbers of MBs and WBs that were contacted;
 - (2) A description of the information provided to MBs and WBs regarding the plans and specifications for portions of the work to be performed; and
 - (3) A statement of why additional agreements with MBs and WBs were not reached.
- (c) For each MB or WB contacted but rejected as unqualified, the reasons for the Contractor's conclusion.
- (d) Efforts made to assist the MBs and WBs contacted, if needed, in obtaining bonding or insurance required by the Contractor.

Failure of the Contractor to demonstrate reasonable efforts to replace a MB or WB firm that does not perform as intended or anticipated, shall be just cause to disqualify the Contractor from further bidding for a period of up to 6 months after notification by certified mail.

(B) Decertification

1. If the Department has approved a Request for Subcontract for a particular MB or WB Subcontractor and that MB or WB Subcontractor is subsequently decertified by the Department; then the Department will not require the Prime Contractor to solicit replacement MB or WB participation equal to the remaining work to be performed by the decertified firm.

2. If a Prime Contractor has listed a MB or WB firm in his low bid submittal and the MB or WB firm is decertified prior to the Department approving a Request for Subcontract for the named MB or WB firm, the Prime Contractor may be required to make a good faith effort to:
 - (a) Replace the decertified firm with a certified firm, or
 - (b) To obtain replacement MB or WB participation in other areas of work.

DEFINITIONS

For purposes of this provision, the following definition will apply:

Minority Business or MB means a small business concern, which is owned and controlled by one or more minorities. Except that such term shall not include any concern or group of concerns controlled by the same minority or minorities which has average annual gross receipts over the preceding 3 fiscal years in excess of \$14,000,000, as adjusted by the Department for inflation. For the purposes of this part, owned and controlled means a business:

- (a) Which is at least 51 percent owned by one or more minorities or in the case of a publicly owned business, at least 51 percent of the stock of which is owned by one or more minorities; and
- (b) Whose management and daily business operations are controlled by one or more such individuals.

Minority is defined as a citizen or lawful permanent resident of the United States and who is:

- (1) Black (a person having origins in any of the black racial groups of Africa);
- (2) Hispanic (a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race);
- (3) Asian American (a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands);
- (4) American Indian

Women Business or WB means a small business concern, which is owned and controlled by one or more women. Except that such term shall not include any concern or group of concerns controlled by the same woman or women which has average annual gross receipts over the preceding 3 fiscal years in excess of \$14,000,000, as adjusted by the Department for inflation. For the purposes of this part, owned and controlled means a business:

- (a) Which is at least 51 percent owned by one or more women or in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and
- (b) Whose management and daily business operations are controlled by one or more of the women who own it.

COUNTING MB/WB PARTICIPATION TOWARD MEETING THE MB/WB GOAL

- (1) If a firm is determined to be an eligible MB or WB firm and certified by the Department, the total dollar value of the participation by the MB or WB will be counted toward the appropriate MB or WB goal. The total dollar value of participation by a certified MB or WB will be based upon prices agreed upon by the Prime Contractor and MB or WB Subcontractor.
- (2) The Contractor may count toward its MB or WB goal a portion of the total dollar value of participation with a joint venture, eligible under the standards of this provision, equal to the percentage of the ownership and controls of the MB or WB partner in the joint venture.
- (3)
 - (a) The Contractor may count toward its MB or WB goal only expenditures to MBs or WBs that perform a commercially useful function in the work of a contract. A MB or WB is considered to perform a commercially useful function when it is responsible for execution of a distinct element of the work of a contract and carrying out its responsibilities by actually performing, managing, and supervising the work involved. To determine whether a MB or WB is performing a commercially useful function, the Department will evaluate the amount of work subcontracted, industry practices, and other relevant factors.
 - (b) Consistent with normal industry practices, a MB or WB may enter into subcontracts. If a MB or WB Contractor or Subcontractor subcontracts a significantly greater portion of the work of the contract than would be expected on the basis of normal industry practices, the MB or WB shall be presumed not to be performing a commercially useful function. The MB or WB may present evidence to rebut this presumption to the Department. The Departments decision on the rebuttal of this presumption shall be final.
- (4) A Contractor may count toward its MB or WB goal 60 percent of its expenditures for materials and supplies required to complete the contract and obtained from MB or WB regular dealer and 100 percent of such expenditures to a MB or WB manufacturer.
 - (a) For purposes of this provision, a manufacturer is a firm that operates or maintains a factory or establishment that produces on the premises the materials or supplies obtained by the Contractor.
 - (b) For purposes of this provision, a regular dealer is 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. To be a regular dealer,

the firm must engage in, as its principal business and in its own name, the purchase and sale 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 or operates distribution equipment. Brokers and packagers shall not be regarded as manufacturers or regular dealers within the meaning of this section.

- (5) A contractor may count toward its MB or WB goal the following expenditures to MB or WB firms that are not manufacturers or regular dealers:
- (a) The fees or commissions charged for providing a bona fide service, such as professional, technical, consultant or managerial services and assistance in the procurement of essential personnel, facilities, equipment, materials or supplies required for performance of the contract, provided that the fee or commission is determined by the Department to be reasonable and not excessive as compared with fees customarily allowed for similar services.
 - (b) The fees charged for delivery of materials and supplies required on a job site (but not the cost of the materials and supplies themselves) when the hauler, trucker, or delivery service is not also the manufacturer of or a regular dealer in the materials and supplies, provided that the fee is determined by the Department to be reasonable and not excessive as compared with fees customarily allowed for similar services.
 - (c) The fees or commissions charged for providing any bonds or insurance specifically required for the performance of the contract provided that the fee or commission is determined by the Department to be reasonable and not excessive as compared with fees customarily allowed for similar services.

REPORTS

Within 30 days after receipt of materials, supplies, or services from MBs or WBs, not otherwise documented by Request for Subcontracts (RS-1A/RS-1B), the Contractor shall furnish to the Engineer appropriate documentation (canceled checks, paid invoices, etc.) to verify expenditures with MB and WB concerns. The documentation should also indicate the percentage (60% or 100%) of expenditures claimed for MB or WB credit.

All requests for subcontracts involving MB or WB Subcontractors shall be accompanied by a certification executed by both the Prime Contractor and the MB or WB Subcontractor attesting to the agreed upon prices and extensions for the affected contract items. This document shall be on the Departments Form RS-1-D, or in lieu of using the Departments Form, copies of the actual executed agreement between the Prime Contractor and the MB or WB Subcontractor may be submitted. In any event, the Department reserves the right to require copies of actual subcontract agreements involving MB and WB Subcontractors.

The RS-1-D certification forms may be obtained from the Departments Resident Engineer.

These certifications shall be considered a part of the project records, and consequently will be subject to any penalties under State Law associated with falsifications of records related to projects.

REPORTING MINORITY BUSINESS ENTERPRISE OR WOMEN BUSINESS ENTERPRISE PARTICIPATION

When payments are made to Minority Business Enterprise firms or Women Business Enterprise firms, including material suppliers, contractors at all levels (prime, subcontractor, or second tier subcontractor) shall provide the Engineer with an accounting of said payments. This accounting shall be furnished the Engineer for any given month by the end of the following month. Failure to submit this information accordingly may result in (1) withholding of money due in the next partial pay estimate; or (2) removal of an approved Contractor from the prequalified bidders list or the removal of other entities from the approved subcontractors list. The accounting shall list for each payment made to a MB/WB Enterprise firm the following:

DOT Project Number

Payee Contractor Name

Receiving Contractor or Material Supplier

MB/WB Certification Basis, e.g., Woman Owned, Native American, African American, etc.

Amount of Payment

Date of Payment

A responsible fiscal officer of the payee contractor, subcontractor, or second tier subcontractor who can attest to the date and amounts of the payments shall certify that the accounting is correct. A copy of an acceptable report may be obtained from the Engineer.

SP1G67

PROMPT PAYMENT:

6-19-01c

Prompt Payment of Monies Due Subcontractors, Second Tier Subcontractors and Material Suppliers and Release of Retainage

Contractors at all levels; prime, subcontractor, or second tier subcontractor, shall within seven calendar days of receipt of monies, resulting from work performed on the project or services rendered, pay subcontractors, second tier subcontractors, or material suppliers as appropriate. This seven-day period begins upon knowledgeable receipt by the contracting firm obligated to make subsequent periodic or final payment. These prompt payment requirements will be met if each firm mails the payment to the next level firm by evidence of postmark within the seven-day period.

This provision for prompt payment shall be incorporated into each subcontract or second tier subcontract issued for work performed on the project or for services provided. If any retainage is held on subcontractors, all retainage shall be released within seven calendar days of release by the Department.

Failure of any entity to make prompt payment as defined herein may result in (1) withholding of money due to that entity in the next partial payment until such assurances are made satisfactory to this provision; or (2) removal of an approved contractor from the prequalified bidders list or the removal of other entities from the approved subcontractors list.

SP1G76

PARTIAL PAYMENTS**1-01-02**

The 2002 Standard Specifications are revised as follows:

Page 1-69, Subarticle 109-4(A)

In the first line of the third paragraph change the amount of "\$200,000.00" to read "\$500,000.00".

SP1G82

RECYCLED STEEL**05-18-04**

Recycled steel shall be incorporated into this project provided it meets the following requirements:

1. Recycled steel shall meet the Department's specifications and standards.
2. Recycled steel shall be acquired competitively for a reasonable price, and within a reasonable time period.

SP1G95

DOMESTIC STEEL AND IRON PRODUCTS:**7-1-95**

All steel and iron products which are permanently incorporated into this project shall be produced in the United States except minimal amounts of foreign steel and iron products may be used provided the combined project cost of the bid items involved does not exceed one-tenth of one percent (0.1 percent) of the total amount bid for the entire project or \$2,500.00, whichever is greater. This minimal amount of foreign produced steel and iron products permitted for use by this Special Provision is not applicable to fasteners. Domestically produced fasteners are required for this project.

All steel and iron products furnished as "domestic products" shall be melted, cast, formed, shaped, drawn, extruded, forged, fabricated, produced, or otherwise processed and manufactured in the United States. Raw materials including pig iron and processed pelletized and reduced iron ore used in manufacturing "domestic" steel products may be imported; however, all manufacturing processes to produce the products, including coatings, must occur in the United States.

Before each steel or iron product is incorporated into this project or included for partial payment on a monthly estimate, the Contractor shall furnish the Resident Engineer a notarized certification certifying that the product conforms to the above requirements of this Special Provision. The Resident Engineer will forward a copy of each certification to the Materials and Tests Unit.

Each purchase order issued by the Contractor or a subcontractor for steel and iron products to be permanently incorporated into this project shall contain in bold print a statement advising the supplier that all manufacturing processes to produce the steel or iron shall have occurred in the United States. The Contractor and all affected subcontractors shall maintain a separate file for steel products permanently incorporated into this project so that verification of the Contractor's efforts to purchase "domestic" steel and iron products can readily be verified by an authorized representative of the Department or the Federal Highway Administration.

SP1G97

COMPENSATION AND RECORD KEEPING

03-16-04

Revise the *2002 Standard Specifications* as follows:

104-8 Compensation and Record Keeping

Change Article (A), subarticle 1. with the following:

In line 3 and line 6, change \$15,000.00 to \$25, 000.00.

SP1G110

CONTRACTOR BORROW SOURCE

10-19-04

Revise the *2002 Standard Specifications* as follows:

Page 2-17, Article 230-4(C) Contractor Furnished Sources, add the following;

If the Contractor proposes a borrow source, the environmental assessment shall include wetland and stream delineation extending 400 feet beyond the proposed borrow source limits.

1. If wetlands or streams are present within 400 feet of the borrow source and the contractor proposes to dewater:
 - a. Submit a hydrologic analysis (Skaggs Method) to determine if lateral effects will permanently impact or cause degradation to wetlands or streams. The analysis shall be performed by an environmental or hydraulics engineer with expertise in this discipline and shall consist of, but not be limited to:
 - Hydric soil type
 - Average profile depth to restrictive soil layer
 - Average hydraulic conductivity or permeability
 - Average drainable porosity or available water capacity
 - Required buffer width, including safety factor
 - b. Attach a conservation easement specifying that the completed pit impoundment, shall not be drained, ditched, used for irrigation, or any other manner that would degrade wetlands and streams.

- c. Provide copy of recorded conservation easement to Engineer prior to commencement of any work on proposed pit.
2. If wetlands or streams are not present within 400 feet, no additional documentation will be required.

During Department review of the proposed borrow area, the hydrologic analysis will be submitted to the U. S. Army Corps of Engineers for evaluation.

Obtain copy of Skaggs Method for Determining Lateral Effects of a Borrow Pit on Adjacent Wetlands from Roadside Environmental Unit web site:

http://www.doh.dot.state.nc.us/operations/dp_chief_eng/roadside/fieldops/

Copies may also be obtained from Room 558, Transportation Building, 1 S. Wilmington Street, Raleigh, NC 27601.

SP1G111

SUBSURFACE INFORMATION:

07-01-95

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

SP1G118

PLANT AND PEST QUARANTINES:

03-18-03

(IMPORTED FIRE ANT, GYPSY MOTH, WITCHWEED, AND OTHER NOXIOUS WEEDS)

Within quarantined area:

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

Originating in a quarantined county:

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

Contact:

Contact the N.C. Department of Agriculture/United States Department of Agriculture at 1-800-206-9333, 919-733-6932, or <http://www.ncagr.com/plantind/> to determine those specific project sites located in the quarantined area or for any regulated article used on this project originating in a quarantined county.

Regulated Articles Include:

1. Soil, sand, gravel, compost, peat, humus, muck, and decomposed manure, separately or with other articles. This includes movement of articles listed above that may be associated with cut/waste, ditch pulling, and shoulder cutting.
2. Plants with roots including grass sod.
3. Plant crowns and roots.
4. Bulbs, corms, rhizomes, and tubers of ornamental plants.

- 5. Hay, straw, fodder, and plant litter of any kind.
- 6. Clearing and grubbing debris.
- 7. Used agricultural cultivating and harvesting equipment.
- 8. Used earth-moving equipment.
- 9. Any other products, articles, or means of conveyance, of any character, if determined by an inspector to present a hazard of spreading imported fire ant, gypsy moth, witchweed or other noxious weeds.

SP1G130

SAFETY VESTS:

6-19-01R

All Contractors' personnel, all subcontractors and their personnel, and any material suppliers and their personnel shall wear a reflective vest or outer garment conforming to the requirements of MUTCD at all times while on the project.

SP1G139

DIRECTOR OF CONSTRUCTION IN LIEU OF CHIEF ENGINEER

03-16-04

Revise the 2002 Standard Specifications as follows:

Wherever the term *Chief Engineer* or *Chief Engineer of Operations* occurs in the Specifications, the actions and responsibilities referred to will be performed by the Director of Construction, Division of Highways, North Carolina Department of Transportation, acting directly or through his duly authorized representative.

Revision to Definitions of Terms

Page 1-4, Article 101-35

101-35 ENGINEER

The Chief Engineer of Operations, and/or Director of Construction, Division of Highways, North Carolina, Department of Transportation, acting directly or through their duly authorized representative.

SP1G143

TWELVE MONTH GUARANTEE:

07-15-03

- 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 shall 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.

SP1G145

OUTSOURCING OUTSIDE THE USA

09-21-04

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

SP1G150

DISQUALIFICATION OF BIDDERS

11-16-04

The 2002 *Standard Specifications* are revised as follows:

Page 1-17 Article 102-16, replace No.12 with the following:

- 12. Failure to submit the documents required by Article 109-10 within 60 days after request by the Engineer.

Page 1-18 Article 102-16, add the following after Number 15.

16. False information submitted on any application, statement, certification, report, records and/or reproduction.

Conviction of any employee of company, of any applicable state or federal law, may be fully imputed to the business firm with which he is or was associated or by whom he was employed or with the knowledge or approval of the business firm or thereafter ratified by it.

17. Being debarred from performing work with other city, state, and federal agencies.

18. Failure to perform guaranty work within the terms of the contract.

SP1G155

CRANE SAFETY

01-18-05

Comply with the manufacturer's specifications and limitations applicable to the operation of 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. Changes in personnel or equipment shall be reported to the Engineer and all applicable items listed below shall 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, experience and training of the persons responsible for rigging operations. Training should include, but not be limited to, weight calculations, center of gravity determinations, sling selection and capacities, sling and rigging equipment inspection, safe rigging practices, and determining load weights.

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

Crane Operators: By January 1, 2006, all crane operators shall be certified by NC CCO (National Commission for the Certification of Crane Operators), or have satisfactorily completed the Carolinas AGC's Professional Crane Operator's Proficiency Program. Other approved nationally accredited programs will be considered upon request. Submit current certification for the type of crane operated, such as but not limited to small hydraulic, large hydraulic, small lattice, and large lattice, and medical evaluations for each operator.

Medical evaluations shall meet the CCO medical evaluation requirements and shall remain current within a 3-year expiration date. Use either the CCO Physical Examination Form or a current DOT Medical Examiner's Certificate.

SP1G160

TRAFFIC CONTROL AND PAVEMENT MARKING:

The Contractor will be required to give the Engineer a minimum of two (2) weeks written notice before starting work. The Department will be responsible for erection and maintenance of all traffic control devices except for the traffic barricades at the immediate site which shall be erected by the Department and maintained by the Contractor.

Pavement Marking shall be included in Bid Item "Placement of Superstructure." Contractor shall pre-mark pavement and have the state inspector approve pre-marking before painting pavement. Contractor shall have pavement marking painted prior to opening to traffic. State forces shall apply Thermoplastic Pavement Markings.

UTILITY CONFLICTS:

The Department will be responsible for the adjustment of any utility at the bridge site prior to the date of availability. No utility conflicts are anticipated.

CLASS I RIP RAP, CLASS II RIP RAP AND CLASS "B" RIP RAP:

Placement of all rip rap shall be in accordance with the Specifications. Compensation for filter fabric used in conjunction with rip rap shall be included in the Contract unit price for Class I Rip Rap, Class II Rip Rap or Class "B" Rip Rap.

ASPHALT BINDER FOR ASPHALT CONCRETE:

There will be no separate measurement or payment for asphalt binder required for asphalt concrete. Payment for the various types of asphalt concrete will be full compensation for the asphalt binder required for each mix type.

DRILLED PIERS**(10-03-02)****1.0 General****A. Description**

The work in this special provision governs the construction of Drilled Piers, also known as "Drilled Shafts" and "Caissons". Drilled piers are a reinforced concrete section, cast-in-place against in situ, undisturbed material. Drilled piers are a straight shaft type and vertical. Construct drilled piers in accordance with the details and dimensions shown on the plans and the requirements of this special provision.

B. Work Experience

The Contractor/Subcontractor and the Contractor's/Subcontractor's superintendent performing the work described in this special provision is required to have installed drilled piers of both diameter and length similar to those shown on the plans and have a minimum of five years experience with underwater concrete placement prior to the bid date for this project. This work is performed under the supervision of the Contractor's/Subcontractor's superintendent, who is knowledgeable and experienced in the construction of drilled piers using casing and/or slurry. Use equipment that has the capacity to undertake the work and is sufficient to complete the work within the specified contract time. Furnish evidence of experience and expertise that the Contractor/Subcontractor meets the following requirements.

To verify the ability to construct drilled piers for this project, submit a list containing a description of at least two projects completed in the last five years on which those responsible for the drilled pier construction have installed drilled piers of similar size as shown in the plans and with similar excavation techniques anticipated for this project. Include on the list of projects the names and phone numbers of the project owner's representatives who can verify the Contractor/Subcontractor's participation on the project.

C. Construction Sequence Plan

Develop and submit a drilled pier construction sequence plan for all the drilled piers for review and acceptance 10 days prior to beginning construction of the drilled piers. Provide detailed project specific information in the drilled pier construction sequence plan including:

1. Work experience in accordance with Section 1.0, Item B.
2. List and size of proposed equipment including: cranes, kelly bars, drill rigs, vibratory hammers, augers, core barrels, cleanout buckets, airlifts and/or submersible pumps, tremies and/or concrete pumps, casing (diameters, thicknesses and lengths), desanding equipment (for slurry construction), etc.

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3. Details of the sequence of drilled pier construction, including the order of drilled pier construction.
4. Details of pier excavation methods.
5. Details of proposed methods to clean the pier excavation bottom.
6. Details of reinforcement placement including support and method to center in the excavation.
7. Details of concrete placement including proposed operational procedures for the concrete tremie or pump; including initial placement, how the tremie or pump is raised during concrete placement and what type of discharge control is proposed to prevent concrete contamination when the tremie or pump is initially placed in the excavation.
8. Details of casing installation and temporary casing removal including order of telescoped casing removal.
9. Required submittals for concrete mix designs.
10. Details of the slurry to be used (if applicable), including: product information, manufacturers mixing instructions, slurry equipment information and how the Contractor proposes to use the slurry. Also, submit a written approval from the bentonite supplier that the water to be used is acceptable.
11. Details on the handling of drilling spoils and slurry overflow including environmental control procedures used to prevent the loss of concrete, slurry and spoils.
12. Details of how the level of slurry is maintained above the highest piezometric pressure head (if applicable).
13. Other information shown in the plans or requested by the Engineer.

The Engineer reviews the drilled pier construction sequence plan for conformance with the plans, specifications and special provisions. Within *5 working* ~~X~~ days of receiving the plan, the Engineer notifies the Contractor of any additional information required and/or changes that are necessary to satisfy the plans, specifications and special provisions. Submit changes for re-evaluation of any unsatisfactory part of the construction sequence plan that is rejected. The Engineer responds to the Contractor within *3 working* ~~X~~ days after receiving the proposed changes.

If any changes in procedure are made during the construction of the drilled piers, inform the Engineer in writing and await approval of the proposed modifications prior to the construction of the remaining drilled piers.

D. Preconstruction Conference

After the drilled pier construction sequence plan is accepted but prior to beginning any drilled pier work, schedule a drilled pier preconstruction conference with the drilling superintendent, the Concrete Supplier, the Resident Engineer including the inspector, the Area Bridge Construction Engineer and the Soils and Foundation Design Engineer to discuss construction and inspection of the drilled piers.

E. Definition of Rock

For the purposes of this special provision, "Rock" is defined as a continuous intact natural material in which the penetration rate with a rock auger is less than 2 inches (50 mm) per 5 minutes of drilling at full crowd force. This definition excludes discontinuous loose natural materials such as boulders and man-made materials such as concrete, steel, timber, etc.

F. Rock Socket

When required by a plan note, provide a minimum penetration into rock as directed by the Engineer.

2.0 Excavation

Perform the excavations required for the drilled piers to the dimensions and elevations shown on the plans or otherwise required by the Engineer, including any miscellaneous grading or excavation to install the drilled pier.

Excavate the drilled pier with a drill rig of adequate capacity. Use a rig that is capable of drilling through soil and non-soil including rock, boulders, timbers, man-made objects and any other materials encountered. Blasting is not permitted to advance the excavation. Blasting for core removal is only permitted when approved by the Engineer. Use a drill rig capable of drilling a minimum of 25% deeper than the deepest drilled pier shown in the plans. Use drilling tools equipped with vents designed to stabilize the hydrostatic pressure above and below the tool during extraction from the excavation. For drilled piers constructed with slurry, monitor the rate at which the drilling tools are inserted and extracted so as to minimize

sidewall suction action in the excavation. Drilling below the tip elevations shown on the plans is required if necessary to achieve adequate bearing.

Maintain a drilling log during the drilled pier excavation and provide it to the Engineer. Include in the log information such as top and bottom elevation of each stratum encountered, drilling tools used and drilling time in each stratum and material descriptions of each soil and rock layer.

Drilling spoils consist of all material excavated including water removed from the excavation either by pumping or with augers. Dispose of spoils, with the exception

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of those containing slurry, as directed by the Engineer and in accordance with Section 802 of the Standard Specifications.

Construct drilled piers at the locations shown on the plans and within the tolerances specified herein. If tolerances are exceeded, provide additional construction as approved by the Engineer to bring the piers within the tolerances specified.

Construct the drilled piers such that the axis at the top of the piers is no more than 3 inches (75 mm) in any direction from the position indicated in the plans. Build drilled piers within 1% of the plumb deviation for the total length of the piers. Measure the plumbness of the drilled piers by an accurate procedure, such as an inclinometer on the kelly bar or other approved techniques. Unless a plan note requires the construction joint to be moved below the ground line, construct the finished top of pier elevation between 1 inch (25 mm) above and 3 inches (75 mm) below the top of pier elevation shown on the plans.

When drilling from a barge, use a fixed template that maintains shaft position and alignment during all excavation and concrete placement operations. Floating templates (attached to a barge) are not allowed unless approved by the Engineer.

Stabilize all drilled pier excavations with steel casing and/or bentonite slurry except, as approved by the Engineer, the portions of the excavations in rock as defined by Section 1.0, Item E. Stabilize excavations at all times from the beginning of drilling through concrete placement. Provide casing or slurry in rock if unstable material is anticipated or encountered during drilling. When slurry is used, a partially excavated pier is subject to the time requirements in Section 2.0, Item C,

Number 1. When slurry is not used, do not leave a partially excavated pier open overnight unless the excavation is cased to rock.

If the tip of the drilled pier excavation is in rock as defined by Section 1.0, Item E, dewater the excavation to the satisfaction of the Engineer. The minimum diameter of the drilled pier excavation in rock is 2 inches (50 mm) less than the design drilled pier diameter shown on the plans.

If electing to remove a casing and substitute a larger diameter or longer casing through unstable or caving material, either backfill the excavation or stabilize it with a bentonite slurry prior to removing the casing to be replaced. Use other methods, as approved by the Engineer, to control the stability of the excavation during casing replacement.

A. Permanent Steel Casing

Use permanent steel casings as directed by the Engineer and/or a note on the plans. Use permanent casings that are clean smooth non-corrugated watertight steel of ample strength to withstand handling and driving stresses and the pressures imposed by concrete, earth or backfill. Provide permanent casing steel conforming to ASTM A252, Grade 2. The minimum wall thickness of the permanent steel casing depends on the casing diameter and the following requirements.

CASING WALL THICKNESS

Casing Diameter	Minimum Wall Thickness
Less than 42 inches (1066 mm)	3/8 inch (9 mm)
42 inches (1066 mm) to 78 inches (1982 mm)	1/2 inch (12 mm)
Greater than 78 inches (1982 mm)	5/8 inch (16 mm)

Provide permanent casings with an outside diameter not less than specified size of the drilled pier. If approved by the Engineer, a permanent casing larger in diameter than the drilled pier design diameter is permitted. No payment will be made for additional construction materials or other costs associated with a request for a larger casing diameter. Extend the permanent casings from the top of pier elevation or top of permanent casing elevation if shown on the plans to a depth not greater than the permanent casing tip elevation shown on the plans. If electing to extend the permanent steel casing below the permanent casing tip elevation, get prior approval from the Engineer and provide additional drilled pier length if required. No payment will be made for the additional drilled pier length and casing unless the previously approved extension is necessary for dewatering purposes. Place all permanent casings in contact with undisturbed material. Install permanent casing in one continuous unit. If splices are necessary for the casing, use an approved method of splicing. Splices are considered incidental and no additional compensation will be allowed if approved.

Remove any portion of the permanent steel casing that extends above the top of the drilled pier after the drilled pier concrete has achieved a compressive strength of 4500 psi (31.0 MPa). The cost of casing removal will be considered incidental to the cost of the permanent steel casing.

B. Temporary Steel Casing

Provide temporary casing to stabilize drilled pier excavations, protect personnel and prevent caving or sloughing, that is clean smooth non-corrugated watertight steel of ample strength to withstand handling and driving stresses and the pressures imposed by concrete, earth or backfill.

Use temporary steel casings with an outside diameter not less than the specified size of the piers, except for casing to protect inspection personnel. Temporary steel casings are subjected to the same minimum wall thickness requirement as permanent steel casings as shown in Section 2.0, Item A.

Temporary steel casings that become bound or fouled during pier construction and cannot be practically removed constitute a defect in the drilled pier. Improve such defective shafts to the satisfaction of the Engineer by removing the shaft concrete and extending the shaft deeper, providing a replacement shaft, or other acceptable means. Complete all corrective measures including redesign as a result of defective shafts to the satisfaction of the Engineer without additional compensation or an extension of the completion date of the project.

C. Slurry

When slurry use is not noted on the plans, slurry construction is an option.

Use slurry composed of bentonite having a mineral grain size that remains in suspension and sufficient viscosity and gel characteristics to transport excavated material to a suitable screening system to minimize or eliminate bottom sedimentation. Provide material used to make the suspension with a percentage and specific gravity sufficient to maintain the stability of the excavation and allow for proper concrete placement.

When slurry is used and permanent steel casing is not required, use temporary casing a minimum of 10 feet (3 m) long at the top of the excavation. Maintain the top of the temporary casing a minimum of 1 foot (300 mm) above the ground surface surrounding the casing. This temporary casing is also subject to the minimum wall thickness as required for permanent steel casing as shown in Section 2.0, Item A.

Maintain the slurry in the pier excavation at a level not less than 5 feet (1.5 m) or the drilled pier diameter (whichever is greater) above the highest piezometric pressure head along the depth of the pier. It is anticipated that the highest piezometric pressure head is the static water elevation or the groundwater

elevation. However, the Contractor is responsible for determining the highest piezometric pressure head. The use of steel casing to maintain the required slurry level is permitted; however, in accordance with the basis of payment for permanent steel casing, no payment will be made for casing that is cut off. If the slurry level in the excavation suddenly changes or cannot be practically maintained, or the slurry construction method does not produce the desired result, stop the pier construction until an alternate construction procedure is approved by the Engineer.

Thoroughly premix the bentonite slurry with clean, fresh water. Have a sample of the water used on the project tested by an independent laboratory, at no additional cost to the Department, to verify that it is suitable for use with the bentonite slurry. Submit written approval from the bentonite supplier that the water to be used is acceptable. Allow 24 hours for hydration of the slurry, prior to introduction into the pier excavation. Slurry tanks of adequate capacity are required for slurry circulation, storage and treatment. Excavated slurry pits are not allowed in lieu of slurry tanks without prior approval from the Engineer. Take all steps necessary to prevent the slurry from "setting up" in the drilled pier. Such methods include, but are not limited to: agitation, circulation and/or adjusting the properties of the slurry. Provide desanding equipment as necessary to achieve a slurry sand content of 2% or less by volume prior to placement of the reinforcement steel.

1. Time

Adjust the excavation operations so that the maximum time the slurry is in contact with the sidewalls of the uncased portions of the drilled pier excavation (from time of drilling to completing concrete placement) does not exceed 24 hours. Also, agitate the slurry in the drilled pier excavations a minimum of every 4 hours. Do not allow an excavated slurry shaft below the steel casing to go unagitated overnight. Do not work on more than two drilled piers per drill rig below the steel casing at any time.

If the 24 hour time limit is exceeded, overream the drilled pier excavation beneath the steel casing a minimum of 1 inch (25 mm) and a maximum of 3 inches (75 mm), or as required by the Engineer, prior to performing other operations in the excavation. Overream with a grooving tool, overreaming bucket or other approved equipment at a minimum spacing of 12 inches (300 mm). The Contractor bears all costs associated with both overreaming and additional shaft concrete placement at no additional cost to the Department.

If concrete placement is not completed within three days of beginning drilling, enlarge the design drilled pier diameter by a minimum of 6 inches (150 mm), or as required by the Engineer, the entire length of the pier at no additional cost to the Department. Enlarging the drilled pier includes replacing the steel casing with

steel casing the same size to which the drilled pier is enlarged at no additional cost to the Department.

2. Sampling

Take all slurry samples using an approved sampling tool. Test slurry samples to determine density, viscosity and pH to establish an acceptable working pattern during slurry use. Test a minimum of four samples during each 8 hours of slurry use for each drilled pier. Take the first sample for the first 8 hours from the slurry tank prior to introduction into the pier excavation. Take the remaining samples from the bottom of the drilled pier excavation. When the test results are acceptable and consistent, a decrease in the testing frequency to one sample per 4 hours of slurry use is permitted.

Prior to placing the reinforcing steel in any drilled pier excavation, extract slurry samples from the bottom of each pier excavation and at intervals not exceeding 10 feet (3 m) up the pier, until two consecutive samples produce acceptable values for density, viscosity, pH and sand content.

3. Testing

Have a qualified Engineer or technician, approved by the Engineer, conduct control tests to determine density, viscosity and pH. Use suitable apparatus for the control tests. The following table shows the acceptable range of values for those physical properties:

BENTONITE SLURRY Sodium Montmorillonite (Commercial Bentonite) Acceptable Range of Values			
Property (units)	At Time of Slurry Introduction	In Hole at Time of Drilling	Test Method
Density, pcf (kg/m ³)	64.3 – 69.1* (1030-1107*)	64.3 – 75.0* (1030-1201*)	Density Balance
Viscosity, sec./quart (sec./0.95 liters)	28 – 45	28 – 45	Marsh Cone
PH	8 – 11	8 – 11	pH paper pH meter
* Increase the density by 2 pcf (32 kg/m ³) in saltwater.			
Notes:			
1. Perform tests when the slurry temperature is above 40°F (4.4°C).			
2. The maximum sand content is 2% by volume at any point in the borehole prior to placement of the reinforcement steel as determined by the American Petroleum Institute sand content base.			
3. When field conditions warrant, an adjustment to the limits and test methods in the above table is permitted only after a successful test hole demonstration. Obtain the Engineer's written approval before use.			

When any slurry samples are found to be unacceptable, take whatever action is necessary to bring the bentonite slurry within specification requirements. Do not place reinforcement steel until resampling and testing produce acceptable results.

Generate reports of all tests required above, have them signed by an authorized representative, and submit them to the Engineer upon completion of each drilled pier. Representatives of the Department reserve the right to perform comparison tests as determined necessary during bentonite slurry operations.

4. Slurry Disposal

Comply with all applicable local, state and federal regulations, as well as with the environmental permits of the project when disposing of excavated materials contaminated with slurry. Keep

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all excavated materials, spoils from the desanding unit and slurry out of the water and contain them at all times. The cost of the containment, removal and disposal of excavated materials contaminated with slurry, as well as the slurry itself, is incidental to the cost of constructing the drilled piers.

3.0 Cleaning

Excavate the bottom of the drilled pier to a level plane or stepped with a maximum step height of 12 inches (300 mm). Regardless of construction methods used, clean the bottom of the excavation of loose material using a technique approved by the Engineer. When the drilled pier excavation can not be dewatered and is not hand cleaned, clean the bottom of the excavation with a cleanout bucket and an airlift or submersible pump.

4.0 Inspection Methods and Requirements

After the drilled pier excavation is complete and immediately prior to placement of the reinforcing steel and concrete, demonstrate the proper condition of the drilled pier excavation to the Engineer for verification. Provide bosun chairs, gas meters, safety equipment, lights, mirrors, weighted tape measures, steel probes, personnel and all assistance required for the Engineer to inspect the drilled pier excavations.

A. Bearing Capacity

One or more of the following tests are used to verify the conditions and continuity of the bearing material prior to placement of the reinforcing steel. If the required tip bearing capacity is not satisfied, then increase the drilled pier length as determined by the Engineer. Payment for the additional length of the drilled pier to achieve adequate bearing will be made per the drilled pier pay items.

1. Visual Inspection

The tip bearing of the drilled pier excavation is inspected either by entering the excavation or visually from the top of the excavation as directed by the Engineer.

2. Test Hole

If the tip of the drilled pier excavation is in rock as defined by Section 1.0, Item E, drill one or more 1½ inch (38 mm) diameter test holes in each drilled pier to a depth at least 6 feet (1.83 m) below the tip elevation.

3. Standard Penetration Test (SPT)

When noted on the plans that a SPT is required, drive a split barrel sampler a minimum of 18 inches (450 mm) below the drilled pier tip elevation or to refusal in accordance with ASTM D1586. Complete the SPT using NW rods through casing or another stabilizing method as approved by the Engineer. Extend the SPT rods from the top of the drilled pier excavation to the drilled pier tip elevation. Firmly support the SPT casing at the top of the drilled pier excavation and rest it on the bottom of the excavation. Conduct the SPT a minimum of 12 inches (300 mm) away from the sidewalls of the excavation and be sure not to scrape the sidewalls of the excavation while inserting or withdrawing the SPT equipment. Have the SPT device on-site prior to reaching the drilled pier tip elevation. Report the number of blows needed to drive the split barrel sampler and a description of the recovered soil sample to the Engineer. The Engineer determines the number of blows required for bearing.

B. Bottom Cleanliness

One or more of the following inspection procedures are used to check the cleanliness of the pier excavation bottom prior to placement of the reinforcement steel and concrete.

The pier excavation bottom is considered clean if a minimum of 50% of the bottom area has less than ½ inch (13 mm) of sediment and no portion of the bottom area has more than 1½ inches (38 mm) of sediment as determined by the Engineer.

1. Visual Inspection

The cleanliness of the drilled pier excavation bottom is observed either by entering the excavation or from the top of the excavation as directed by the Engineer.

2. Steel Probe

If the excavation is not dewatered or if the Engineer requires it, lower a steel probe to the bottom of the drilled pier excavation to ensure that cleaning has been satisfactorily completed. Supply a steel probe that is 2 feet (0.6 m) long with a flat tip on the sounding end, weighs approximately 9 pounds (#10 rebar) (4 kg, #32 rebar) and is suspended from the opposite end with a non-stretch cable.

3. Shaft Inspection Device (SID)

When noted on the plans, the SID is used to take sediment measurements and observe the bottom conditions of the drilled pier excavation at a minimum of five locations selected by the Engineer. The SID is a remotely operated camera capable of observing bottom conditions and measuring sediment underwater and slurry. Each SID inspection (including all 5 locations) takes approximately 1 hour after the equipment has been set up. The Engineer provides the SID and the personnel to operate the device.

Notify the Engineer a minimum of 2 days prior to beginning the drilled pier excavation so the Engineer can arrange for the transportation of the SID to the site and the personnel to perform the inspections. SID inspections are required until the cleanliness of the drilled pier excavation bottom is acceptable in accordance with Section 4.0, Item B of this special provision. Do not conduct operations that interfere with the SID inspections as directed by the Engineer. Remove all cleaning and drilling equipment from the drilled pier excavation during any SID inspection. Provide a working area large enough for the SID equipment, within the reach of the cabling supplied, and within clear sight distance of the drilled pier excavation, as directed by the Engineer. Assist the Engineer in the transportation and handling of the SID and all the associated equipment and in supporting the electric hoist and/or hoisting tripod for the SID, as directed by the Engineer. Provide a safe and secure storage area for the SID and all the associated equipment while it is located unattended on the project site. If any

of the SID equipment is damaged, lost or stolen due to the Contractor's negligence, then replace the equipment at no additional cost to the Department. Provide replacement equipment that exactly matches the damaged, lost or stolen equipment as directed by the Engineer. All costs involved with the initial SID inspection of each drilled pier excavation will be made per the SID pay item. No additional payment will be made for subsequent or repeated SID inspections of the same drilled pier excavation. Claims against the Department for either lost time or actual expense of any SID inspections that do not find the cleanliness of the drilled pier excavation bottom in compliance with this special provision are not permitted.

5.0 Reinforcing Steel

Completely assemble a cage of reinforcing steel, consisting of longitudinal and spiral bars and place it in the drilled pier excavation as a unit immediately after the proper condition of the excavation is demonstrated to the Engineer. When concrete placement does not follow immediately after cage placement, remove the steel from

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the pier excavation unless the Engineer directs otherwise. If the cage is removed, recheck pier excavation cleanliness in accordance with this special provision prior to reinstallation of the cage.

If the drilled pier excavation is cased down to rock, immediate placement of the reinforcing steel and the concrete is not required. If electing to delay placement of the reinforcing steel and concrete due to the presence of rock, recheck the excavation for proper cleanliness immediately prior to placement of the reinforcing steel.

A. Construction, Placement, Support and Alignment

If it is determined in the field that the drilled pier must be longer, adequate reinforcement is required in the extended length as directed by the Engineer.

Lift the cage so racking and cage distortion does not occur. Keep the cage plumb during concrete operations and casing extraction. Check the position of the cage before and after placing the concrete. Position the splice length of the drilled pier cage so that the column or footing has the minimum concrete cover shown on the plans.

Securely cross-tie the vertical and spiral reinforcement at each intersection with double wire. Support or hold down the cage so that the vertical displacement during concrete placement and casing extraction does not exceed 6 inches (150 mm).

B. Bolsters, Blocks and Spacers

Do not set the cage on the bottom of the drilled pier excavation. Place plastic bolsters under each vertical reinforcing bar. If required by the Engineer, provide concrete blocks instead of plastic bolsters to limit rebar cage settlement. Place blocks under each vertical rebar that have a 4 inch (100 mm) minimum diameter and that have a depression to receive the vertical reinforcing bar. Ensure that the blocks are tall enough to raise the rebar cage off the bottom of the drilled pier excavation a minimum of 3 inches (75 mm).

In order to ensure a minimum of 4 inches (100 mm) of concrete cover and achieve concentric spacing of the cage within the pier, tie plastic spacer wheels, subject to the Engineer's approval, at five points around the cage perimeter. Use spacer wheels that provide a minimum of 4 inches (100 mm) "blocking" from the outside face of the spiral bars to the outermost surface of the drilled pier except in rock as defined by Section 1.0, Item E. Use spacer wheels in the rock zone that provide a minimum of 2 inches (50 mm) "blocking". Tie spacer wheels that snap together with wire and allow them to rotate. Use spacer wheels that span at least two adjacent vertical bars. Start placing spacer wheels at the bottom of the cage and continue up along its length at maximum 10 foot (3 m) intervals. At the Engineer's direction, supply additional peripheral spacer wheels and closer intervals if necessary.

6.0 Concrete

Begin concrete placement immediately after inserting reinforcing steel into the drilled pier excavation. Prior to placing concrete, assure the Engineer that sufficient quantities of concrete are available and that sufficient transportation is committed to the project to deliver the concrete within the time frame set forth within this special provision.

A. Concrete Mix

Provide the mix design for Drilled Pier Concrete for approval and, except as modified herein, meeting the requirements of Section 1000 of the Standard Specifications.

Designate the concrete as Drilled Pier Concrete with a minimum compressive strength of 4500 psi (31.0 MPa) at 28 days. Make certain the cementitious material content complies with one of the following options:

- Provide a minimum cement content of 640 lbs/yd³ (380 kg/m³) and a maximum cement content of 800 lbs/yd³ (475 kg/m³); however, if the alkali content of the cement exceeds 0.4%, reduce the cement content by 20% and replace it with fly ash at the rate of 1.2 lb (1.2 kg) of fly ash per lb (kg) of cement removed.
- If Type IP blended cement is used, use a minimum of 665 lbs/yd³ (395 kg/m³) Type IP blended cement and a maximum of 833 lbs/yd³ (494 kg/m³) Type IP blended cement in the mix.

Limit the water-cementitious material ratio to a maximum of 0.45. Do not air-entrain Drilled Pier Concrete.

Produce a workable mix so that vibrating or prodding is not required to consolidate the concrete. When placing the concrete, make certain the slump is between 5 and 7 inches (125 and 175 mm) for dry placement of concrete or 7 and 9 inches (175 and 225 mm) for wet placement of concrete.

Use Type I or Type II cement or Type IP blended cement and either No. 67 or No. 78M coarse aggregate in the mix. Use an approved water-reducer, water-reducing retarder, high-range water-reducer, or high-range water-reducing retarder to facilitate placement of the concrete if necessary. Do not use a stabilizing admixture as a retarder in Drilled Pier Concrete without approval of the Engineer. Use admixtures that satisfy AASHTO M194 and add them at the concrete plant when the mixing water is introduced into the concrete. Redosing of admixtures is not permitted.

Place the concrete within 2 hours after introducing the mixing water. Ensure that the concrete temperature at the time of placement is 90°F (32°C) or less.

1. Slump Loss Test

If any drilled pier concrete pour is greater than 40 yd³ (31 m³) per pier, provide a slump loss test before beginning the drilled pier operation. The slump loss test verifies that the drilled pier concrete maintains a slump of at least 4 inches (100 mm) a minimum of 4 hours after batching. Perform the test with a Division of Highways representative present. Have the concrete producer notify the Department at least 72 hours prior to the test.

Conduct the slump loss test as follows:

- a. Batch the actual mix design at 9 inches (225 mm) initial slump and at the highest concrete temperature expected on the job, but no less than 60°F (15.5°C).
- b. Batch at least 4 yd³ (3 m³) in a mixer truck. Begin timing the test when the mixing water is introduced into the mix.
- c. After initial mixing, measure and record the slump, ambient temperature, concrete temperature and percent air. Ensure all concrete properties are within specifications.
- d. Mix the concrete intermittently at agitation speed for 30 seconds every 15 minutes.
- e. Measure and record the slump, ambient and concrete temperatures, and percent air after every second 15 minute interval until the slump is 3½ inches (90 mm).

Make certain the concrete maintains a minimum slump of 4 inches (100 mm) 4 hours after batching.

Once a mix design is accepted and the slump loss test is on file with the Materials and Tests Unit, resubmit the design for subsequent projects without the slump loss test.

B. Concrete Placement

Place concrete such that the drilled pier is a monolithic structure. Vibration is only permitted, if needed, in the top 10 feet (3 m) of the drilled pier or as directed by the Engineer. Remove any contaminated concrete from the top of the drilled pier and the wasted concrete from the area surrounding the drilled pier. Contain all concrete that spills over the permanent casing of the drilled pier.

Do not remove temporary casing until the level of concrete within the casing is in excess of 10 feet (3 m) above the bottom of the casing being removed. Maintain the concrete level at least 10 feet (3 m) above the bottom of innermost casing throughout the entire casing extraction operation, except when concrete is at or above the top of drilled pier elevation. Sustain a sufficient head of concrete above the bottom of casing to overcome outside soil and water pressure. As the casing is withdrawn, exercise care in maintaining an adequate level of concrete within the casing so that fluid trapped behind the casing is displaced upward and discharged at the ground surface without contaminating or displacing the drilled pier concrete. Exerting downward pressure, hammering and/or vibrating the temporary casing is permitted to facilitate extraction.

After all the pumps have been removed from the excavation, the water inflow rate determines the concrete placement procedure. If the inflow rate is less than 6 inches (150 mm) per half hour, the concrete placement is considered dry. If the water inflow rate is greater than 6 inches (150 mm) per half hour, the concrete placement is considered wet.

Keep a record of the volume of concrete placed in each drilled pier excavation and make it available to the Engineer. For drilled piers constructed with slurry or as directed by the Engineer, record a graphical plot of the depth versus theoretical concrete volume and actual measured concrete volume for each drilled pier and provide it to the Engineer when finished placing concrete.

1. Dry Placement

Prior to placing concrete, make certain the drilled pier excavation is dry so the flow of concrete completely around the reinforcing steel can be certified by visual inspection. If the concrete free fall does not exceed 60 feet (18.3 m), placing the concrete by a central drop method where the concrete is chuted directly down the center of the excavation is permitted.

For drilled piers exceeding 60 feet (18.3 m) in length, use a tremie or a pump to place concrete as described in Section 6.0, Item B, Number 3. Support the tremie or pump so that the concrete free fall is less than 60 feet (18.3 m) at all times.

2. Wet Placement

Maintain a static water or slurry level in the excavation prior to placing concrete underwater. When temporary casing is used as the method to stabilize the excavation, place concrete only with a pump (no tremie).

Once the concrete in the excavation reaches the same elevation as the static water level, placing concrete with the dry method is permitted. Before changing to the dry method of concrete placement, remove the water above the concrete and clean the

concrete surface of all scum and sediment to expose clean, uncontaminated concrete.

3. Tremie and Pump

Place concrete with a tremie or a pump in accordance with the applicable parts of Sections 420-6 and 420-8 of the Standard Specifications that concern tremie and/or concrete pumping operations. Use a tremie consisting of a sectional tube a minimum of 10 inches (254 mm) in diameter unless otherwise approved or directed by the Engineer. Use a tremie tube or pump pipe made of steel with watertight joints. Passing concrete through a hopper at the tube end or through side openings as the tremie is retrieved during concrete placement is permitted. Use a discharge control to prevent concrete contamination when the tremie tube or pump pipe is initially placed in the excavation. Extend the tremie tube or pump pipe into the concrete a minimum of 5 feet (1.5 m) at all times except when the concrete is initially introduced into the pier excavation. If the tremie tube or pump pipe pulls out of the concrete for any reason after the initial concrete is placed, restart concrete placement with a steel capped tremie tube or pump pipe.

4. Placement Time

Place concrete within the time frames specified in Table 1000-2 of the Standard Specifications for Class AA concrete and this special provision. Never place concrete so fast as to trap air, slurry, water, fluids, soil or any other deleterious materials in the vicinity of the reinforcing steel and the annular zone between the rebar cage and the excavation walls. Should a delay occur because of concrete delivery or other factors, reduce the placement rate to maintain some movement of the concrete. No more than 45 minutes is allowed between placements.

7. Scheduling and Restrictions

After the first drilled pier is successfully completed, do not make any significant changes in construction methods, equipment or materials, unless approved by the Engineer.

If caving or sloughing occurs, compensation is not provided for additional concrete to fill the resulting voids.

Within the first 16 hours after a drilled pier has achieved its initial concrete set (as determined by the Engineer), do not drill adjacent piers, do not install adjacent piles, and do not allow any equipment wheel loads or "excessive" vibrations to occur at any point within a 20 foot (6 m) radius of the drilled pier.

In the event that the procedures described herein are performed unsatisfactorily, the Engineer reserves the right to shut down the construction operations and/or reject the drilled piers. If the integrity of a drilled pier is in question, use core drilling, sonic or other approved methods at no additional cost to the Department and under the direction of the Engineer. Dewater and backfill core drill holes with an approved high strength grout with a minimum compressive strength of 4500 psi (31.0 MPa) as directed by the Engineer. Remedial measures are directed by and require approval from the Engineer. No compensation will be paid for losses or damage due to remedial work or any investigation of drilled piers found defective or not in accordance with this special provision or the construction plans.

8. *Non-Destructive Testing (NDT)*

The Engineer furnishes the non-destructive testing (NDT) equipment. NDT requires the attachment of an accelerometer to the top of the drilled pier. Measurements are made while tapping the top of the drilled pier with a hammer. The Engineer furnishes the materials, labor and equipment necessary for the installation of the accelerometer.

If the NDT instruments and supporting equipment are damaged due to the fault or negligence of the Contractor, replace the damaged equipment at no additional cost to the Department.

After installation, notify the Engineer that the drilled piers are ready to be tested. A drilled pier is tested only after the concrete has been in place for 5 days and the concrete has achieved a minimum compressive strength of 3000 psi (20.7 MPa). Grind four flat dry areas on top of the drilled pier down to exposed aggregate with a grinder or some other acceptable device. The Engineer selects the location of the four ground surfaces. Several velocity records as a function of time are averaged at each test location. The NDT field data is recorded with digital data acquisition equipment. Field testing is estimated to take 1 hour per drilled pier. Evaluation and interpretation of the field data requires 3 working days after testing. Further construction above the drilled piers that were tested is not allowed until the analysis of the NDT field data is complete.

The Engineer determines the number of drilled piers to be tested with NDT. It is anticipated that all drilled piers require testing. The cost of this work is included in the contract unit price bid for the drilled pier pay items. No separate payment will be made. Claims are not permitted for any delay incurred, including but not limited to the installation of the instrumentation or the collection and analysis of the NDT data.

9. Compensation

A. Method of Measurement

1. Drilled Piers in Soil

The quantity of “Drilled Piers in Soil” to be paid for will be the linear feet (meters) of the drilled piers exclusive of the linear feet (meters) of “Drilled Piers Not in Soil” computed from elevations and dimensions as shown on the plans or from revised dimensions authorized by the Engineer. Drilled piers through air or water will be paid for as “Drilled Piers in Soil”.

2. Drilled Piers Not in Soil

The quantity of “Drilled Piers Not in Soil” to be paid for will be the linear feet (meters) of drilled piers excavated in non-soil as determined by the Engineer. Non-soil is defined as material that can not be cut with a rock auger and requires excavation by coring, air tools, hand removal or other acceptable methods. Top of non-soil elevation is that elevation where the rock auger penetration rate is less than 2 inches (50 mm) per 5 minutes of drilling at full crowd force and coring, air tools, etc. are used to advance the excavation. For pay purposes, after non-soil is encountered, earth seams, rock fragments and voids in the excavation less than 3 feet (0.9 m) in total length will be considered “Drilled Piers Not in Soil”. If the non-soil is discontinuous, payment will revert to “Drilled Piers in Soil” at the elevation where non-soil is no longer encountered.

3. Permanent Steel Casing

The quantity of “Permanent Steel Casing” to be paid for will be the linear feet (meters) of permanent steel casing as directed and authorized to be used. The length to be paid for will be measured along the permanent casing from the top of the casing elevation or top of the pier elevation, whichever is lower, to the casing tip elevation. Casing will be paid for only when permanent casing is authorized or when the Engineer directs the Contractor to leave a casing in place that then becomes a permanent part of the pier. No payment will be made for temporary steel casings that become bound or fouled during pier construction and cannot be practically removed.

4. Shaft Inspection Device (SID)

The quantity of “SID Inspection” to be paid for will be per drilled pier as noted on the plans and/or directed by the Engineer. SID inspections are performed until the bottom cleanliness of the drilled pier excavation is acceptable by this special provision; however, payment will only be made for the initial SID inspection of each drilled pier excavation.

B. Basis of Payment

1. Drilled Piers in Soil

Payment will be made at the contract unit price per linear foot (meter) for "42 in. Dia. Drilled Piers in Soil". Such payment will include, but is not limited to, furnishing all labor, tools, equipment, materials including concrete complete and in place and all incidentals necessary to excavate the drilled piers and complete the work as described in this special provision. No additional payment will be made for slurry use. No additional payment will be made for any miscellaneous grading or excavation to install the drilled pier. "Reinforcing Steel" and "Spiral Column Reinforcing Steel" will not be paid for separately and will be part of this pay item.

2. Drilled Piers Not in Soil

Payment will be made at the contract unit price per linear foot (meter) for "42 in. Dia. Drilled Piers Not in Soil". Such payment will include, but is not limited to, furnishing all labor, tools, equipment, materials including concrete complete and in place and all incidentals necessary to excavate the drilled piers and complete the work as described in this special provision. No additional payment will be made for slurry use. No additional payment will be made for any miscellaneous grading or excavation to install the drilled pier. "Reinforcing Steel" and "Spiral Column Reinforcing Steel" will not be paid for separately and will be part of this pay item.

3. Permanent Steel Casing

Payment will be made at the contract unit price per linear foot (meter) for "Permanent Steel Casing for 42 in Dia. Drilled Pier". Such payment will include, but is not limited to, furnishing all material, labor, tools, equipment and all incidentals necessary to install the casing in the pier excavation.

4. Shaft Inspection Device (SID)

The quantity of "SID Inspection" to be paid for will be per drilled pier as noted on the plans and/or directed by the Engineer. SID inspections are performed until the bottom cleanliness of the drilled pier excavation is acceptable by this special provision; however, payment will only be made for the initial SID inspection of each drilled pier excavation.

CROSSHOLE SONIC LOGGING (07-09-02)

1. General

Use the non-destructive testing method called Crosshole Sonic Logging (CSL) to verify the integrity of the drilled pier and the quality of the concrete. The Engineer will determine the number of CSL tests and which drilled piers will be CSL tested on this project. Drilled piers are referred to as piers in this special provision.

The CSL test measures the time for an ultrasonic pulse to travel from a signal source in one access tube to a receiver in another access tube. In uniform, good quality concrete, the travel time between equidistant tubes should yield relatively consistent arrival times and corresponds to a reasonable pulse velocity, signal amplitude and energy from the bottom to the top of the pier. Longer travel times, decrease in pulse velocity, and lower amplitude/energy signals indicate the presence of irregularities such as poor quality concrete, voids, honeycombing, cracking and soil intrusions. The signal may be completely lost by the receiver and CSL recording system for severe defects such as voids and soil intrusions.

The CSL Consultant must have a minimum 3 years experience of CSL testing and have a Registered North Carolina Professional Engineer supervising the testing and interpretation of results. **Submit** the proposed CSL Consultant to the Engineer for approval 30 days before beginning drilled pier construction. The following evidence of qualification needs to be included, unless previously approved by the Department and no changes have occurred since previous submittal:

- Written evidence of successful completion of CSL tests, brief descriptions and reference's phone numbers for three recent CSL projects.
- Personnel qualifications
- Equipment description
- Example report

Make all necessary arrangements with the CSL Consultant to have the CSL tests satisfactorily performed on the selected drilled piers and in accordance with this special provision. The CSL Consultant must supply to the Contractor technical instruction and guidance in preconstruction activities, and on-site technical assistance and guidance during set up and performance of the CSL tests. Provide suitable access to the site and to the top of piers to be tested. Follow instructions from the CSL Consultant unless the Engineer directs otherwise.

Place CSL tubes in all drilled piers. Perform CSL testing only on drilled piers selected by the Engineer a minimum 7 days after concrete placement and after concrete achieves a minimum compressive strength of 3000 psi (20.7 MPa), but within 30 days after concrete placement. After CSL test results have been reviewed

and the Engineer has accepted the drilled pier or approves grouting of the tubes, dewater the tubes and core holes, if any, and backfill with the approved grout. When the Engineer elects not to CSL test a pier, dewater the tubes and backfill them with an approved 4500 psi (31.0 MPa) compressive strength grout.

2. Preparation For CSL

Install four tubes in each drilled pier with a diameter of 5 feet (1524 mm) or less, and install six tubes in each pier with a diameter of greater than 5 feet (1524 mm). Provide 2 inch (50 mm) inside diameter Schedule 40 steel pipe conforming to ASTM A53, Grade A or B, Type E, F, or S. The tubes must have a round, regular internal diameter free of defects or obstructions, including any at tube joints, in order to permit the free, unobstructed passage of source and receiver probes. The tubes must provide a good bond with the concrete, and be watertight.

Fit the tubes with a watertight threaded cap on the bottom and a removable threaded cap on the top. Securely attach the tubes to the interior of the reinforcement cage. Install the tubes in each drilled pier in a regular, symmetric pattern such that each tube is equally spaced from the others around the perimeter of the cage. Tube placement must be such that large vertical reinforcing bars do not block the direct line between adjacent tubes. The tubes are typically wire-tied to the reinforcing cage every 3 feet (1 m) or otherwise secured such that the tubes remain in position during placement of the rebar cage and the concrete. The tubes must be as near to vertical and as parallel as possible, as non-vertical tubes can adversely affect data analysis. Extend the tubes from 6 inches (150 mm) above the pier tip to at least 3 feet (1 m) above the top of the pier. If the pier top elevation is below ground elevation, extend tubes at least 2 feet (610 mm) above ground surface. If the drilled pier tip elevation is excavated more than 1 foot (305 mm) below the tip elevation in the original plans, extend the tubes using proper threaded mechanical couplings to within 6 inches (150 mm) of the revised pier tip elevation.

Before placement of the reinforcement cage into the drilled pier, record the tube lengths and tube positions along the length of the cage. After placement of concrete, measure the stickup of the tubes above the top of the drilled piers and verify tube spacing.

Verify that unobstructed passage of the probes is achievable before the CSL Consultant arrives on site. If testing equipment will not pass through the entire length of the CSL tube, core a 2 inch (50 mm) diameter hole through the concrete the full length of the drilled pier at no cost to the Department. Locate the core hole approximately 9 inches (230 mm) inside the pier reinforcement from obstructed tube or as determined by the Engineer. Fill core hole with clean, potable water and cover to keep out debris.

Immediately after placement of the reinforcement cage and within 2 hours after concrete placement, fill the CSL tubes with clean, potable water, and cap them to keep out debris. The Engineer will reject CSL tubes that are not filled with water or capped. When removing the caps, exercise care not to apply excess torque, force or stress, which could break the bond between the tubes and the concrete.

Submit to the Engineer the CSL tube size, the manufacturer's certificate of compliance, cap details, couplings, any joints details, and the proposed method of attaching the tubes, 30 days before beginning drilled pier construction.

3. CSL Equipment

The minimum requirements of the CSL equipment are as follows:

- A microprocessor based CSL system for display of individual CSL records, analog-digital conversion and recording of CSL data, analysis of receiver responses and printing of report quality CSL logs
- Ultrasonic source and receiver probes which can travel through 2 inch (50 mm) I.D. steel pipe
- An ultrasonic voltage pulser to excite the source with a synchronized triggering system to start the recording system
- A depth measurement device to electronically measure and record the source and receiver depths associated with each CSL signal
- Appropriate filter/amplification and cable systems for CSL testing
- An acquisition system that stores each log in digital format, with drilled pier identification, date, time and test details, including the source and receiver gain. Arrival time data must be displayed graphically during data acquisition.
- 3D tomographic imaging software, or source for completing the work

4. CSL Test Procedure

Provide the Engineer and CSL Consultant with the following:

- Tube lengths and positions
- Record of the drilled pier construction information including the pier bottom and top elevations
- Construction dates before CSL testing

Conduct CSL tests between each perimeter pair and major principal diameter and log, unless otherwise directed by the Engineer.

Perform the CSL testing with the source and receiver probes in the same horizontal plane unless test results indicate defects or poor concrete zones, in which case the defect zones must be further evaluated with angle tests (source and receiver vertically offset at greater than 1.5 feet (460 mm) in the tubes). Report any defects indicated by decreased signal velocity and lower amplitude/energy signals to the Engineer at the time of testing, and conduct angle tests in the zones of the defects as defined by the Concrete Condition Rating Criteria (CCRC) in Section 5.0 of this special provision.

Make CSL measurements at depth intervals of 2 ½ inches (65 mm) or less from the bottom of the tubes to the top of each pier. Pull the probes simultaneously, starting from the bottom of the tubes, using a depth-measuring device to electronically measure and record the depths associated with each CSL signal. Remove any slack from the cables before pulling to provide for accurate depth measurements of the CSL records. In the event defects are detected, conduct additional logs, as needed, at no additional cost to the Department. The Department will not accept any claims for either lost time or the actual expense of further investigation of defects.

If steel tube debonding occurs, then core drill a 2 inch (50 mm) diameter hole to the depth of debonding for each debonded tube in order to perform the CSL logs at no additional cost to the Department.

5. CSL Results And Reporting

Submit the test results in the form of a report including four original copies of CSL results to the Engineer within 5 working days of completion of CSL testing. The CSL report should include but not limited to the following:

- Project identification
- Dates of testing
- Table and a plan view of each pier tested with accurate identification of tube coordinates and tubes referenced to the site
- Tube collar elevation
- Names of personnel that performed the tests/interpretation and their affiliation
- Equipment used
- Interpretation, analysis, and results.

Include CSL logs for each tube pair tested with analysis of the initial pulse arrival time, velocity, relative pulse energy/amplitude, and stacked waveform plotted versus depth. List all zones defined by the Concrete Condition Rating Criteria (CCRC) in a tabular format including the percent velocity reduction and the velocity values used from the nearby zone of good quality concrete. Discuss each zone defined by the CCRC in the CSL report as appropriate. Base the results on the percent reduction in velocity value from a nearby zone of good quality concrete with good signal amplitude and energy as correlated to the following:

Concrete Condition Rating Criteria (CCRC)			
CCRC	Rating Symbol	Velocity Reduction	Indicative Results
Good	G	$\leq 10\%$	Good quality concrete
Questionable Defect	Q	$>10\% \text{ \& } < 20\%$	Minor concrete contamination or intrusion. Questionable quality concrete.
Poor	P/D	$\geq 20\%$	Defects exist, possible water/slurry contamination, soil intrusion, and/or poor quality concrete.
No Signal	NS	No Signal received	Soil intrusion or other severe defect absorbed the signal (assumes good bond of the tube-concrete interface).
Water	W	V = 4750 fps (1450 mps) to 5000 fps (1525 mps)	Water intrusion, or water filled gravel intrusion with few or no fines present.

The following are a few examples of types and causes of defects:

- Necking or arching of the concrete on withdrawal of the temporary casing.
- Necking or contamination of the concrete due to collapse of the side walls.
- Soft toe due to incomplete cleaning or collapse of the side walls.
- Horizontal lenses of silt\mud\bentonite due to the tremie pipe rising above the concrete
- Voids due to the use of low-slump concrete.
- Honeycombing due to washout of fines.
- Trapping of contaminants due to pumping concrete too fast.

Provide the original pulse signal data files and ASCII format of the picks with a header (identifying the pier tested, tube coordinates and each data column) in an electronic file to the Engineer. The Engineer will require 7 working days to evaluate the CSL test results and determine whether or not the drilled pier is acceptable. Evaluation of CSL test results, with ratings other than good (G) per the Concrete Condition Rating Criteria (CCRC) may require further investigation and additional time for review and analysis of the data. Do not grout the CSL tubes or perform any further work on the CSL tested drilled pier until the Engineer determines whether the drilled pier is acceptable. Perform tomography in order to further investigate and delineate the boundaries of any defective/unconsolidated zones with 20% or more reduction in velocity value as correlated to the CCRC. Process CSL data to construct easy to understand 2D/3D (2D cross-sections between tubes and 3D volumetric images for the entire pier) *color-coded* tomographic images indicating velocity variations along the pier. Location and geometry of defective/unconsolidated zones must be identified

in 3D color images with detailed discussion in the CSL report. Any further tests deemed necessary by the Engineer in order to determine the acceptability of the drilled pier will be determined after reviewing the CSL report. Additional test or analysis options include 3D tomographic imaging, single-hole sonic testing, gamma-gamma nuclear density logging, sonic echo or impact response tests, and concrete coring, in addition to load testing of the piers.

The Engineer will determine the depth, location, and the number of core holes when concrete coring is required. Drill a minimum of two PQ size core holes to intercept the suspected defect zones. Use a coring method that provides maximum core recovery and minimizes abrasion and erosion. Provide concrete cores properly marked in a wooden crate and labeling the drilled pier depth at each interval of core recovery to the NCDOT Materials and Test Unit for evaluation and testing. Submit to the Engineer a drilling report that includes the NCDOT project number, name of the Drilling Contractor, date drilled, percent core recovery and signed by the Contractor. Allow 7 working days after submitting the core records for the Department's review.

6. *Correction Of Unacceptable Drilled Pier*

When the Engineer determines a drilled pier is unacceptable, the Engineer will direct the Contractor to submit remedial measures to the Department for approval. No compensation will be made for remedial work or losses or damage due to remedial work of drilled piers found defective or not in accordance with the drilled pier special provision or the construction plans. Modifications to the drilled pier design or any load transfer mechanisms required by the remedial action must be designed and calculations sealed by a Registered North Carolina Professional Engineer. Include drawings sealed by a Registered North Carolina Professional Engineer for all foundation elements affected. Do not begin remedial action work until the Department has reviewed and accepted the remedial action plan. Allow 10 working days after submitting the remedial work plan for the Department's review and acceptance. Furnish all materials and work necessary to correct defective drilled piers.

7. *Measurement And Basis of Payment*

The complete and accepted crosshole sonic logging tubes will be included in the contract unit price bid per foot of drilled piers. No separate payment will be made. Such payment will be full compensation for furnishing, installing, dewatering and grouting all CSL tubes and 2 inch (50 mm) diameter core holes, if applicable, and for all materials, labor, tools, equipment and incidentals necessary to complete the work.

The complete and accepted CSL testing will be paid for in accordance with Article 104-8(A) of the Standard Specification. Such payment will be full compensation for all procurements, conducting the CSL testing, reporting of results and incidentals necessary to complete the work.

II. PRESTRESSED CORED SLAB BRIDGES

Material shall meet the requirements of the North Carolina Department of Transportation Standard Specifications.

A. GROUT FOR TRANSVERSE STRANDS

All recesses at the ends of transverse strands shall be filled completely with a non-shrink, non-metallic grout. All recesses shall be filled in a neat and workmanlike manner and the grout shall match the neat lines of the cored slabs.

B. EPOXY PROTECTIVE COATING: (10-12-01)

Description

This work consists of preparing the concrete surface and furnishing and applying an epoxy protective coating to the surfaces described in this Special Provision. When epoxy protective coating is required, cure the top surfaces of the bent or end bent caps in accordance with the Standard Specifications, but do not use the Membrane Curing Compound method.

Materials

Use an epoxy coating that meets the most recently published NCDOT Specification on the date of advertisement. Use the epoxy coating that meets NCDOT-Type 4A Flexible, epoxy coating, moisture insensitive.

Provide a certification for the proposed epoxy showing that it meets NCDOT- Type 4A.

The following companies have epoxies that meet Type 4A Specifications:

- E-Bond Epoxy, Inc.
Fort Lauderdale, Florida 33307
- Permagile Industries
Plainview, NY 11803
- Poly-Carb
Cleveland, OH 44139
- Tamms, Inc.
Mentor, OH 44060
- Adhesive Engineering
Cleveland, OH 44122-5554
- Kaufman Products
Baltimore, MD 21226-1131

- Prime Resins
Lithonia, GA 30058
- Sika Corporation
Lyndhurst, N. J. 07071

A copy of the specifications for Epoxy Resin Systems is available from the Materials and Tests Unit.

Surfaces

With the exception of cored slab bridges, apply the epoxy protective coating to the top surface area, including chamfer area, of bent caps under expansion joints and of end bent caps, excluding areas under elastomeric bearings. For cored slab bridges, do not apply the epoxy protective coating to the bent or end bent caps. Also, apply epoxy protective coating to the ends of prestressed concrete members as noted on the plans.

Use extreme care to keep the area under the elastomeric bearings free of the epoxy protective coating. Do not apply the epoxy protective coating in the notch at the ends of the prestressed concrete girders.

Thoroughly clean all dust, dirt, grease, oil, laitance, and other objectionable material from the concrete surfaces to be coated. Air-blast all surfaces immediately prior to applying the protective coating.

Only use cleaning agents pre-approved by the Engineer.

Application

Apply epoxy protective coating only when the air temperature is at least 40°F (4°C) and rising, but less than 95°F (35°C) and the surface temperature of the area to be coated is at least 40°F (4°C). Remove any excess or free standing water from the surfaces before applying the coating. Apply one coat of epoxy protective coating at a rate such that it covers between 100 and 200 ft²/gal (2.5 and 5 m²/liter).

Note: Under certain combinations of circumstances, the cured epoxy protective coating may develop “oily” condition on the surface due to amine blush. This condition is not detrimental to the applied system.

Apply the coating so that the entire designated surface of the concrete is covered and all pores filled. To provide a uniform appearance, use the exact same material on all visible surfaces.

Basis of Payment

No separate measurement or payment will be made for preparing, furnishing and applying the epoxy protective coating to the concrete surfaces.

The above work covered by this provision will be included in the contract lump sum price for "Placement of Superstructure". The above prices and payments will be full compensation for all work covered by this provision including but not limited to furnishing all materials, labor, tools, equipment and all incidentals necessary to complete the work.

C. TOLERANCES FOR PLACING RAIL ANCHORAGE BARS

The exterior cored slab sections shall be manufactured with the rail anchorage bars (#8b1) placed to meet the following tolerances:

Deviation from plan position of an individual bar	$\pm 1/4''$
Horizontal alignment (deviation from a straight line which coincides with the plan center line of bars)	$\pm 1/4''$
Projection of bars above top of cored slab (deviation from plan dimension)	$\pm 1/4''$

D. MATCHMARKING

In order to be assured of a good, neat field fit, spans shall be assembled by manufacturer in his yard and pieces match-marked. Pieces must fit together neatly and in a workmanlike manner.

E. ERECTION OF PRESTRESSED CONCRETE CORED SLABS

The transverse strands shall be greased and then placed in a non-corrosive 1/2" diameter, 1/16" wall thickness black polyethylene pipe meeting the requirements of ASTM D2239. The grease and pipe shall not be applied in the areas of the recesses at the ends of the tensioning strands where grout is to be applied.

In erecting the prestressed cored slabs, the 1/2" transverse post tensioning strands shall be placed and tensioned to 30,980 pounds in each span. After the 1/2" transverse strand has been tensioned in a span and before any equipment, material or barrier rail is placed on the span, the shear keys and dowel holes shall be filled with the mix or grout as specified else where in these special provisions, except as noted in the next four paragraphs:

- (1) The Contractor will be allowed with the approval of the Engineer, to place material and equipment on the cored slab spans on mats after the transverse strands have been tensioned to 30,980 pounds.
- (2) The Contractor must submit a detailed drawing for approval to the Engineer for the mats he intends to place on the cored slabs for his material and equipment. This drawing should give a complete description of the material and equipment that the Contractor intends to place on the mats.
- (3) In the event the Contractor uses mats and places material and equipment on the cored slabs, the transverse strands shall be retensioned to 30,980 pounds after the material and equipment is removed from the spans. The shear keys shall be grouted after the transverse strands have been retensioned.

F. GROUTING OF PRESTRESSED CORED SLABS

After all erection work has been completed the shear keys shall be grouted by the Contractor with a non-shrink, non-metallic grout.

The non-shrink, non-metallic grout shall be on the Department's approval list and shall meet the approval of the Engineer. The minimum strength for this grout shall be 3000 pounds per square inch after curing for 3 days minimum.

G. SURFACE FINISH

Top surface of slab sections shall be given a broom finish. No surface finish will be required for sides and bottom of slab sections.

H. CHAMFERS

Bottom corners on ends and sides of all slab sections and top outside corner of exterior slab sections shall be chamfered 3/4". Vertical corners at ends of slab sections shall not be chamfered except acute corners of skew slabs shall be chamfered 3/4". Pre-stressed caps shall be chamfered 3/4" on all corners.

III. PRECAST CONCRETE BARRIER RAIL

The precast concrete barrier rail sections shall be in accordance with the applicable parts of the Standard Specifications with the following exceptions and additions.

Concrete shall be CLASS "AA"

Steel forms shall be used in casting to insure uniformity of the precast concrete barrier rail sections. No surface finish will be required for the bottom of the precast barrier rail sections.

Precast concrete barrier rail sections shall be manufactured within the tolerances indicated as follows:

Depth (overall)	$\pm 1/4''$
Width (top or bottom)	$\pm 1/4''$
Length (any one rail section)	$\pm 1/8''$
Dowel Holes (deviation from plan position)	$\pm 1/4''$
Square ends (deviation from square)	$\pm 1/4''$
Horizontal alignment (deviation from a straight line parallel to centerline of rail section)	$\pm 1/8''$ per 10 ft.

A. ERECTION OF PRECAST CONCRETE BARRIER RAIL

The Contractor shall erect the precast concrete barrier rail including barrier rail delineators, placement of the grout bed and grouting of the rail anchorage bar voids.

B. GROUT BED AND GROUTING OF RAIL ANCHORAGE BAR VOIDS

A non-shrink, non-metallic grout shall be used for the grout bed and for grouting the rail anchorage bar voids. The non-shrink, non-metallic grout shall be on the Department's approved list and shall meet the approval of the Engineer. The minimum strength for this grout shall be 3000 pounds per square inch after curing for 3 days minimum.

Basis of Payment

The above work covered by this provision will be included in the contract lump sum price for "Placement of Superstructure". The above prices and payments will be full compensation for all work covered by this provision including but not limited to furnishing all materials, labor, tools, equipment and all incidentals necessary to complete the work.

IV. Elastomeric Bearings

(10-03-02)

Use Elastomeric Bearings in accordance with Article 1079-2 of the Standard Specifications except as follows:

**TABLE 1079-2
NATURAL RUBBER ELASTOMER REQUIREMENTS**

Grade (durometer)	50	60
PHYSICAL PROPERTIES	50 +5	60 +5
Hardness ASTM D2240	-5	-5

Basis of Payment

The above work covered by this provision will be included in the contract lump sum price for "Placement of Superstructure". The above prices and payments will be full compensation for all work covered by this provision including but not limited to furnishing all materials, labor, tools, equipment and all incidentals necessary to complete the work.

X. PLACEMENT OF SUBSTRUCTURE:

Placement of Substructure shall be in accordance with the Standard Specifications.

Payment for construction of substructure end bent caps and interior bent caps and columns, as indicated on the Plans, will be included at the lump sum bid price for "Placement of Substructure". This price shall be full compensation for all materials, tools, equipment, labor, and for all incidentals necessary to complete the work.