STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION 1

PROPOSAL

DATE AND TIME OF BID OPENING: MARCH 20, 2019 AT 2:00 PM

CONTRACT ID: DA00432

WBS ELEMENT NO.: 16SP.6.3.1 & 16SP.6.3.2

MILES: 0.07

COUNTIES: BRUNSWICK & NEW HANOVER

ROUTE NO.: NC 221 & NC 421

TYPE OF WORK: STRUCTURAL, MECHANICAL, AND ELECTRICAL REHABILITATION OF EXISTING RAMP STRUCTURES

NOTICE:

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

THIS IS A DIVISION LET PROJECT

5% BID BOND OR BID DEPOSIT REQUIRED

NAME OF BIDDER

ADDRESS OF BIDDER

PROPOSAL FOR THE CONSTRUCTION OF

CONTRACT NO. DA00432 IN BRUNSWICK & NEW HANOVER COUNTIES, NORTH CAROLINA

DATE: FEBRUARY 21, 2019

DEPARTMENT OF TRANSPORTATION,

RALEIGH, NORTH CAROLINA

The Bidder has carefully examined the location of the proposed work to be known as Contract No. **DA00432** 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 Department of Transportation in accordance with this proposal to provide the necessary contract payment bond and contract performance bond within fourteen days after the written notice of award is received by him. The undersigned Bidder further agrees to provide all necessary machinery, tools, labor, and other means of construction; and to do all the work and to furnish all materials, except as otherwise noted, necessary to perform and complete the said contract in accordance with *the 2018 Standard Specifications for Roads and Structures* by the dates(s) specified in the Project Special Provisions and in accordance with the requirements of the Engineer, and at the unit or lump sum prices, as the case may be, for the various items given on the sheets contained herein.

The Bidder shall provide and furnish all the materials, machinery, implements, appliances and tools, and perform the work and required labor to construct and complete State Highway Contract No.**DA00432** in **Brunswick & New Hanover Counties**, for the unit or lump sum prices, as the case may be, bid by the Bidder in his bid and according to the proposal, plans, and specifications prepared by said Department, which proposal, plans, and specifications show the details covering this project, and hereby become a part of this contract.

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

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

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

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

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

TABLE OF CONTENTS

INSTRUCTIONS TO BIDDERS

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

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

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

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

ELECTRONIC ON-LINE BID:

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

PROJECT SPECIAL PROVISIONS

MANDATORY PRE-BID CONFERENCE AND PROPOSAL REVIEW:

In order to bid on this contract, all prospective bidders shall attend a Mandatory Pre-Bid Conference to be held at the Southport City Hall Conference Room (Second Floor), 1029 N. Howe Street, Southport, NC, 28461 at 10:00 A.M. on Wednesday, March 6, 2019. Please contact Eric Sedlacek - (252) 439-2999 for any further information.

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

Only bidders who have attended and properly registered at the above scheduled pre-bid conferences will be considered qualified to bid on this project. A bid received from a bidder who has not attended and properly registered at the above scheduled pre-bid conferences will not be considered for award.

No questions concerning the project will be answered by any Department personnel at any time, except at the Mandatory Pre-Bid Conference.

This conference will be conducted by Department personnel for the purpose of providing additional information about the project and to give bidders an opportunity to ask any questions they may have.

The Engineer will explain areas of responsibility, standards of performance and expected results. This is also intended to be a time for the Contractor to raise questions.

Any changes made to the contract during the pre-bid conference will be documented and included in an addendum. The addendum must be returned with the bid package, signed and dated. Failure to do so will result in disqualification of bid. Pre-Bid Conference proceedings will be tape recorded.

Attendance at the Pre-Bid Conference will not meet the requirements of proper registration unless the individual attending has registered with the following information:

1. The individual writes his/her name on the official roster at the **beginning** of the pre-bid conference.
2. The individual writes in the name and address of the company he/she represents.
3. Only one company is shown as being represented by the individual attending.
4. The individual is an officer or permanent employee of the firm they represent.
5. The individual shall sign out when the end of the pre-bid conference is completed.

Only bids received from the bidders who have attended and properly registered at the Pre-Bid Conference will be considered.

BOND REQUIREMENTS:

(06-01-16) 102-8, 102-10 SPD 01-420A

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

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

CONTRACT TIME AND LIQUIDATED DAMAGES:

(7-1-95) (Rev. 12-18-07) 108 SP1 G10 A

The date of availability for this contract is **January 6, 2020**

The completion date for this contract is **April 5, 2020**

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

The liquidated damages for this contract are **Two Thousand Dollars ($ 2,000.00)** per calendar day.

PROSECUTION OF WORK:

(7-1-95) (Rev. 8-21-12) 108 SP1 G15R

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

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

POSTED WEIGHT LIMITS:

(7-1-95) (Rev.9-15-15) 105 SP1 G24R

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

NO MAJOR CONTRACT ITEMS:

(2-19-02) (Rev. 8-21-07) 104 SP1 G31

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

NO SPECIALTY ITEMS:

(7-1-95) 108-6 SP1 G34

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

MINORITY BUSINESS ENTERPRISE AND WOMEN BUSINESS ENTERPRISE (DIVISIONS):
(10-16-07)(Rev. 2-19-19) 102-15(J) SP1 G67

Description

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

Definitions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Forms and Websites Referenced in this Provision

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

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

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

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

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

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

Listing of MBE and WBE Subcontractors Form - Form for entering MBE/WBE subcontractors on a project that will meet the Combined MBE/WBE goal. This form is for paper bids only.

http://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/09%20MBE-WBE%20Subcontractors%20(State).docx

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

Combined MBE/WBE Goal

The Combined MBE/WBE Goal for this project is **0 %**

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

(A) Minority Business Enterprises **0 %**

(1) *If the anticipated MBE participation is more than zero*, the Contractor shall exercise all necessary and reasonable steps to ensure that MBEs participate in at least the percent of the contract as set forth above.

(2) *If the anticipated MBE participation is zero*, the Contractor shall make an effort to recruit and use MBEs during the performance of the contract. Any MBE participation obtained shall be reported to the Department.

(B) Women Business Enterprises **0 %**

(1) *If the anticipated WBE participation is more than zero*, the Contractor shall exercise all necessary and reasonable steps to ensure that WBEs participate in at least the percent of the contract as set forth above.

(2) *If the anticipated WBE participation is zero*, the Contractor shall make an effort to recruit and use WBEs during the performance of the contract. Any WBE participation obtained shall be reported to the Department.

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

Directory of Transportation Firms (Directory)

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

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

Listing of MBE/WBE Subcontractors

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

(A) Electronic Bids

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

(1) Submit the names and addresses of MBE and WBE firms identified to participate in the contract. If the bidder uses the updated listing of MBE and WBE firms shown in the electronic submittal file, the bidder may use the dropdown menu to access the name and address of the firms.

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

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

(B) Paper Bids

(1) *If the Combined MBE/ WBE goal is more than zero,*

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

(b) If bidders have no MBE or WBE participation, they shall indicate this on the *Listing of MBE and WBE Subcontractors* by entering the word "None" or the number "0." This form shall be completed in its entirety. **Blank forms will not be deemed to represent zero participation.** Bids submitted that do not have MBE and WBE

participation indicated on the appropriate form will not be read publicly during the opening of bids. The Department will not consider these bids for award and the proposal will be rejected.

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

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

MBE or WBE Prime Contractor

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

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

Written Documentation – Letter of Intent

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

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

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

Banking MBE/WBE Credit

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

When the apparent lowest responsive bidder fails to submit sufficient participation by MBE and WBE firms to meet the advertised goal, as part of the good faith effort, the Department will consider allowing the bidder to withdraw funds to meet the Combined MBE/WBE goal as long as there are adequate funds available from the bidder's MBE and WBE bank accounts.

Submission of Good Faith Effort

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

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

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

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

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

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

(A) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising, written notices, use of verifiable electronic means through the use of the NCDOT Directory of Transportation Firms) the interest of all certified MBEs/WBEs that are also prequalified subcontractors. The bidder must solicit this interest within at least 10 days prior to bid opening to allow the MBEs/WBEs to respond to the solicitation. Solicitation shall provide the

opportunity to MBEs/WBEs within the Division and surrounding Divisions where the project is located. The bidder must determine with certainty if the MBEs/WBEs are interested by taking appropriate steps to follow up initial solicitations.

(B) Selecting portions of the work to be performed by MBEs/WBEs in order to increase the likelihood that the Combined MBE/WBE goal will be achieved.

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

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

(C) Providing interested certified MBEs/WBEs that are also prequalified subcontractors with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.

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

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

(E) Not rejecting MBEs/WBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The bidder's standing within its industry, membership in specific groups, organizations, or associates and political or social affiliations (for example, union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the bidder's efforts to meet the project goal.

(F) Making efforts to assist interested MBEs/WBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or bidder.

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

(H) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; Federal, State, and local minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of MBEs/WBEs. Contact within 7 days from the bid opening the Business Opportunity and Work Force Development Unit at BOWD@ncdot.gov to give notification of the bidder's inability to get MBE or WBE quotes.

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

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

(1) Whether the bidder's documentation reflects a clear and realistic plan for achieving the Combined MBE/WBE goal.

(2) The bidders' past performance in meeting the contract goal.

(3) The performance of other bidders in meeting the advertised goal. For example, when the apparent successful bidder fails to meet the goal, but others meet it, you may reasonably raise the question of whether, with additional reasonable efforts the apparent successful bidder could have met the goal. If the apparent successful bidder fails to meet the advertised goal, but meets or exceeds the average MBE and WBE participation obtained by other bidders, the Department may view this, in conjunction with other factors, as evidence of the apparent successful bidder having made a good faith effort.

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

Non-Good Faith Appeal

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

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

(A) Participation

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

(B) Joint Checks

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

(C) Subcontracts (Non-Trucking)

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

(D) Joint Venture

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

(E) Suppliers

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

(F) Manufacturers and Regular Dealers

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

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

(2) With respect to materials or supplies purchased from a MBE/WBE, which is neither a manufacturer nor a regular dealer, count the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or

transportation charges for the delivery of materials or supplies required on a job site (but not the cost of the materials and supplies themselves), provided the fees are determined to be reasonable and not excessive as compared with fees customarily allowed for similar services.

Commercially Useful Function

(A) MBE/WBE Utilization

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

(B) MBE/WBE Utilization in Trucking

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

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

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

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

(4) The MBE may subcontract the work to another MBE firm, including an owner-operator who is certified as a MBE. The same holds true that a WBE may subcontract the work to another WBE firm, including an owner-operator who is certified as a WBE. When this occurs, the MBE or WBE who subcontracts work receives credit for the total value of the transportation services the subcontracted MBE or WBE provides on the contract. It should be noted that every effort shall be made by MBE and WBE contractors to subcontract to the same certification (i.e., MBEs to MBEs and WBEs to WBEs), in order to fulfill the participation breakdown. This, however, may not always be possible due to the limitation of firms in the area. If the MBE or WBE firm shows a good faith effort has been made to reach out to similarly certified transportation service providers and there is no interest or availability, and they can get assistance from other certified

providers, the Engineer will not hold the prime responsible for meeting the individual MBE or WBE participation breakdown.

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

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

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

MBE/WBE Replacement

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

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

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

(a) The listed MBE/WBE subcontractor fails or refuses to execute a written contract;
(b) The listed MBE/WBE subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards. Provided, however, that good cause does not exist

if the failure or refusal of the MBE/WBE subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the prime contractor;

(c) The listed MBE/WBE subcontractor fails or refuses to meet the prime contractor's reasonable, nondiscriminatory bond requirements;

(d) The listed MBE/WBE subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;

(e) The listed MBE/WBE subcontractor is ineligible to work on public works projects because of suspension and debarment proceedings pursuant to 2 CFR Parts 180, 215 and 1,200 or applicable state law;

(f) The listed MBE/WBE subcontractor is not a responsible contractor;

(g) The listed MBE/WBE voluntarily withdraws from the project and provides written notice of withdrawal;

(h) The listed MBE/WBE is ineligible to receive MBE/WBE credit for the type of work required;

(i) A MBE/WBE owner dies or becomes disabled with the result that the listed MBE/WBE contractor is unable to complete its work on the contract;

(j) Other documented good cause that compels the termination of the MBE/WBE subcontractor. Provided, that good cause does not exist if the prime contractor seeks to terminate a MBE/WBE it relied upon to obtain the contract so that the prime contractor can self-perform the work for which the MBE/WBE contractor was engaged or so that the prime contractor can substitute another MBE/WBE or non-MBE/WBE contractor after contract award.

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

(A) Performance Related Replacement

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

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

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

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

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

(3) A list of reasons why MBE/WBE quotes were not accepted.

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

(B) Decertification Replacement

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

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

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

Changes in the Work

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

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

When the Engineer makes changes that result in an alteration of plans or details of construction, and a portion or all of the work had been expected to be performed by a committed MBE/WBE, the Contractor shall seek participation by MBEs/WBEs unless otherwise approved by the Engineer.

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

Reports and Documentation

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

When using transportation services to meet the contract commitment, the Contractor shall submit a proposed trucking plan in addition to the SAF. The plan shall be submitted prior to beginning construction on the project. The plan shall include the names of all trucking firms proposed for use, their certification

type(s), the number of trucks owned by the firm, as well as the individual truck identification numbers, and the line item(s) being performed.

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

Reporting Minority and Women Business Enterprise Participation

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

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

(B) Removal of an approved contractor from the prequalified bidders' list or the removal of other entities from the approved subcontractors list.

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

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

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

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

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

Failure to Meet Contract Requirements

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

SUBSURFACE INFORMATION:

(7-1-95) 450 SP1 G112 A

There is **no** subsurface information available on this project. The Contractor shall make his own investigation of subsurface conditions.

COOPERATION BETWEEN CONTRACTORS:

(7-1-95) 105-7 SP1 G133

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

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

ELECTRONIC BIDDING:

(2-19-19) 101, 102, 103 SP1 G140

Revise the *2018 Standard Specifications* as follows:

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

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

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

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

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

OUTSOURCING OUTSIDE THE USA:

(9-21-04) (Rev. 5-16-06) SP1 G150

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

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

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

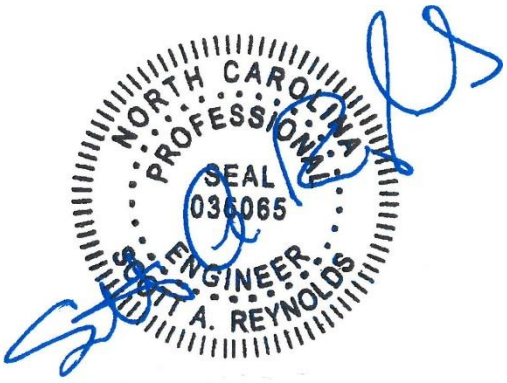
SCOPE OF WORK:

The work consists of the structural, mechanical and electrical rehabilitation of existing ferry ramp structures located at the Southport and Fort Fisher Ferry Terminals.

Please be aware the United States Coast Guard requires TWIC (Transportation Workers Identification Credential) to work unassisted at the ferry facilities. This contract requires one person working with each operation (can oversee up to 5 non TWIC workers) present at all times during construction with a valid TWIC identification card.

Removal of Existing Structure

Table of Contents



REMOVAL OF EXISTING STRUCTURE (SPECIAL)

1.0 DESCRIPTION

This Special Provision replaces Section 402 of the Standard Specifications for Roads and Bridges dated January 2018. Dismantle, salvage, and stockpile materials and components of the structure and preserve those portions that should remain intact. Dispose of waste and debris.

Maintain traffic on the existing structure unless otherwise stipulated by the contract. Do not exceed the posted load limits or damage the existing structure while maintaining traffic. Maintenance of the existing structure, if required, will be performed by Department forces.

2.0 REMOVAL OF EXISTING STRUCTURE

A. General

Use approved methods and operations for removal of ramp structures. Upon removal, all materials become property of the Contractor unless otherwise indicated in the contract. Dispose of waste and debris from the structures in accordance with Section 802.

Perform removal operations while preventing damage to adjacent property. Protect new construction during the operations necessary for removal of existing structure.

Prevent erosion of soil and silting of rivers, streams, lakes, water impoundments, ground surfaces or other property. Do not deposit excavated or removed materials and do not construct earth dikes, or other temporary earth structures in rivers, streams or impoundments, or so near to such waters that they are carried into any river, stream or impoundment by stream flow or surface runoff. Do not use equipment in any body of water unless it is impossible or impractical to perform specific operations in any other way. When this occurs, these operations are specifically allowed through applicable environmental permits and controls to minimize erosion and siltation through best management practices. Submit a plan for demolition of ramp structures over water for approval before beginning removal. Do not drop components of structures into any body of water. Remove these existing structures by any non-shattering methods. Remove any component of a structure from the water so as to minimize siltation.

B. Requirements for Materials Which Remain the Property of the Department

Do not use any materials, either temporarily or permanently, which are removed from the structure unless so permitted by the contract.

Remove structural materials carefully without damage.

C. Requirements for Partial Removal

Perform partial removal to the lines indicated on the plans. Submit plan for partial removal of ramp structures for approval before beginning removal. Do not remove portion of the existing structure by method or use of equipment that can cause damage to the existing structure to remain or to be used in the completed structure.

3.0 MEASUREMENT AND PAYMENT

The price and payment below will be full compensation for all items required to remove existing structures including, but not limited to, those items contained in Item 2.0.

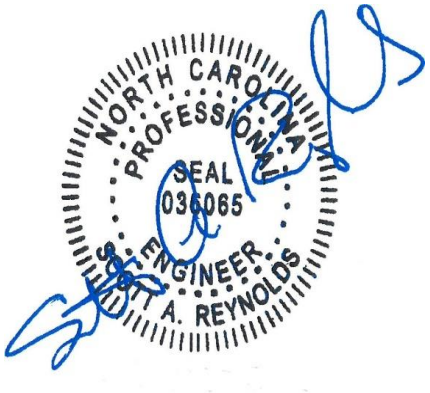
For the item of Removal of Existing Structures at Station ____ in the contract, the work of removing the structure will be paid at the contract lump sum price for this item.

Payment will be made under:

Pay Item	Pay Unit
Removal of Existing Structures at Station 17+01.73	Lump Sum
Removal of Existing Structures at Station 1+99.80	Lump Sum

Falsework & Formwork

Table of Contents



FALSEWORK AND FORMWORK (SPECIAL)

1.0 Description

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

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

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

2.0 MATERIALS

Select materials suitable for temporary works; however, select materials that also ensure the safety and quality required by the design assumptions. The Engineer has authority to reject material on the basis of its condition, inappropriate use, safety, or nonconformance with the plans. Clearly identify allowable loads or stresses for all materials or manufactured devices on the plans. Revise the plan and notify the Engineer if any change to materials or material strengths is required.

3.0 DESIGN REQUIREMENTS

A. Working Drawings

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

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

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

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

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

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

Member Type (PCG)	Member Depth, (inches)	Max. Overhang Width, (inches)	Max. Slab Edge Thickness, (inches)	Max. Screed Wheel Weight, (lbs.)	Bracket Min. Vertical Leg Extension, (inches)
II	36	39	14	2000	26
III	45	42	14	2000	35
IV	54	45	14	2000	44
MBT	63	51	12	2000	50
MBT	72	55	12	1700	48

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

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

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

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

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

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

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

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

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

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

1. Wind Loads

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

Table 2.2 - Wind Pressure Values

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

2. Time of Removal

The following requirements replace those of Article 3.4.8.2.

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

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

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

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

B. Review and Approval

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

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

The time period for review of the working drawings does not begin until complete drawings and design calculations, when required, are received by the Engineer. Working Drawings, and supporting documentation (catalog cuts, calculations, etc.), submitted after 3:30pm (EST) on Friday will be considered to have been submitted the following Monday morning.

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

4.0 CONSTRUCTION REQUIREMENTS

All requirements of Section 420 of the Standard Specifications apply.

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

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

A. Maintenance and Inspection

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

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

B. Foundations

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

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

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

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

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

5.0 REMOVAL

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

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

6.0 METHOD OF MEASUREMENT

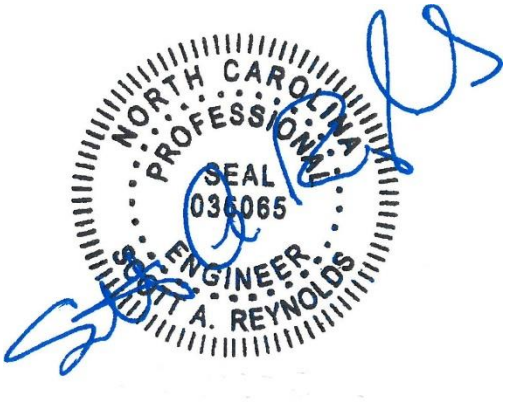
Unless otherwise specified, temporary works will not be directly measured.

7.0 BASIS OF PAYMENT

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

Steel Structures

Table of Contents



STEEL STRUCTURES **(SPECIAL)**

1.0 DESCRIPTION

This work shall consist of furnishing all labor, equipment, and materials necessary to construct the structural steel of the ferry ramp structures in conformity with the lines, grades and dimensions shown in the plans and as specified in these specifications.

Furnish, fabricate, galvanize, deliver, place, erect, clean, shop paint or galvanize and field paint structural metals and all other materials; furnish, erect and remove falsework; set anchorage; weld and furnish all materials for and assemble all structural elements of the project. Structural metals include structural steels, metallic electrodes, and any incidental metal construction.

Before starting work, inform the Engineer as to the proposed method of erection.

2.0 MATERIALS

Refer to Division 10.

Item	Section
High Strength Bolts, Nuts, Washers and Direct Tension Indicators	1072-5
Organic Zinc Repair Paint	1080-9
Structural Steel	1072
Miscellaneous Metals and Hardware	1074

3.0 SUBMITTALS

Submit working drawings for the following items to the Engineer for review and approval before fabrication of these structural steel members. Working drawings for steel structures shall consist of shop drawings, detail, erection, and other shop drawings showing details, dimensions, sizes of units, and other information necessary for the fabrication and erection of metal work.

1. Lift Bent Structural Steel members, including steel cross beam, brackets, braces, and miscellaneous channels and angles.
2. Access Platform steel, including steel gratings, and channels and angles.
3. Handrails and its supports
4. Access Ladders, including steel angle braces, and supports.

The time period for review of the working drawings does not begin until complete drawings and design calculations, when required, are received by the Engineer. Working Drawings, and supporting documentation (catalog cuts, calculations, etc.), submitted after 3:30pm (EST) on Friday will be considered to have been submitted the following Monday morning.

Refer to Section 105 of the Standard Specifications for other requirements of the working drawings submittals.

The Contractor shall submit as-built shop and other working drawings upon completion of the Work. The cost of working drawings furnished by the Contractor shall be included in the cost of appropriate contract pay items.

4.0 HANDLING AND STORING MATERIALS

Move, handle and store all structural steel, in the shop, in the field and while being transported in accordance with Article 1072-9.

5.0 FIELD ERECTION

Report immediately any error in the shop fabrication or deformation resulting from handling and transporting, which prevents the proper assembling and fitting up of parts by more than the moderate use of drift pins or by more than a moderate amount of reaming, chipping or cutting. Correct errors in the presence of the Engineer by approved methods. Do not perform hammering which injures or distorts the members.

Limit the drifting during assembly to only that needed to bring the parts into position, and not sufficient to enlarge the holes or distort the metal. If any holes require enlarging to admit the bolts, ream or correct them by approved methods. Do not enlarge the holes more than 1/16 inch over the nominal size hole called for without written approval.

Before assembling the members, clean and dry to touch all bearing surfaces and permanently contacting surfaces.

For bolted splices and field connections, fill 25% of the holes with bolts and 25% of the holes with cylindrical erection pins, before placing permanent fasteners. For continuous units, pin and bolt all beam and girder splices and bring the splices to the correct elevations before permanently fastening. For bolted connections use fit-up bolts and optional shipping bolts with the same nominal diameter as the permanent fasteners, and use cylindrical erection pins which are 1/32 inch larger. Use permanent bolts as fit-up bolts if desired.

Use temporary bolts, including, but not limited to, shipping and fit-up bolts, supplied with square or hexagon heads and square or hexagon nuts. The use of hexagon head temporary bolts and nuts is allowed, but paint both the head and nut with a durable yellow paint before installation.

Do not reuse permanent bolts for final installation unless the nut is easily turned onto the bolt for the full threaded length by hand and without use of tools.

The use of erection bolts for field welded joints is allowed. Use erection bolts that are galvanized when the finish paint is applied in the structural steel fabrication shop and meet ASTM F3125 Grade A325. Supplement these bolts with clamps as necessary to meet the AWS Specifications. Where unpainted AASHTO M 270 Grade 50W structural steel is used, use erection bolts meeting ASTM F3125 A325.

After field welding the connection, leave the erection bolt in place with at least the minimum bolt tension shown in Table 440-1. Use holes that are 3/16 inch larger than the nominal erection bolt diameter.

6.0 FIELD WELDING

Perform field welding only when called for in the plans and in accordance with Article 1072-18.

Remove paint, galvanizing or other coating at the location of field welds by blast cleaning (SSPC SP-6 finish) or power tool cleaning to bare metal, (SSPC SP-11 finish) just before welding. Clean sufficiently to bare metal to prevent contamination of the weld by the coating.

7.0 Connections Using High Strength Bolts

A. General

This article covers the assembly of structural joints using plain or galvanized high strength carbon steel bolts with suitable nuts and washers tightened to a high tension. Use bolt holes that conform to Article 1072-16.

Protect bolts, nuts and washers from moisture during storage and so they show no signs of rust at the time of installation.

Make sure that plain bolts and washers have a thin coat of lubricant at the time of installation.

Use nuts that are pre-waxed by the producer or supplier before shipping to the project.

Apply beeswax, stick paraffin or other approved lubricant to the threads of galvanized bolts just before installing the bolts.

Use bolt, nut and washer (when required) combinations from the same rotational-capacity lot.

B. Bolted Parts

Make sure that the slope of surfaces of bolted parts in contact with the bolt head and nut does not exceed 1:20 with respect to a plane normal to the bolt axis. Make sure bolted parts fit solidly together when assembled and are not separated by gaskets or any other interposed compressible material. Provide contact surfaces, including those adjacent to the bolt heads, nuts or washers, that are free of scale, dirt, burrs, oil, lacquer, loose rust, rust inhibitor, other foreign material and other defects that prevent solid seating of the parts.

C. Installation

Refer to Section 440-8 (C) of the Standard Specifications.

D. Inspection

Refer to Section 440-8 (D) of the Standard Specifications

8.0 MEASUREMENT AND PAYMENT

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

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

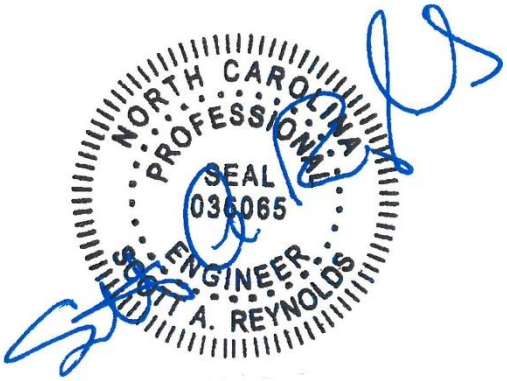
The price and payment will be full compensation for all items required to construct steel structures including, but not limited to, those items contained in Section 1.

Payment will be made under:

Pay Item	**Pay Unit**
Approx. 23,800 Lbs. Structural Steel at Sta. 17+01.73	Lump Sum
Approx. 23,800 Lbs. Structural Steel at Sta. 1+99.80	Lump Sum

Painting Existing Structure

Table of Contents



PAINTING EXISTING STRUCTURE **(SPECIAL)**

1.0 DESCRIPTION

This work shall consist of furnishing all labor, equipment, and materials necessary to clean and paint the structural steel of the existing ferry ramp gantry frame. Work includes: removal, containment and disposal of the existing paint system; preparation of the surface to be painted and applying the new paint system; a containment enclosure; and any incidentals necessary to complete the project as specified and shown on the plans.

2.0 TWELVE-MONTH OBSERVATION PERIOD

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

(A) No visible rust, contamination or application defect is observed in any coated area.

(B) Painted surfaces have a uniform color and gloss.

(C) Painted surfaces have an adhesion that meets an ASTM D3359, 3A rating.

Final acceptance is made only after the paint system meets the above requirements.

3.0 SUBMITTALS

Submit all of the following to the Engineer for review and approval before scheduling the pre-construction meeting. Allow at least two (2) weeks for the review process.

(A) The existing paint systems include toxic substances such as red lead oxide, which are considered hazardous if improperly removed. The contractor shall be currently Society for Protective Coatings (SSPC) Quality Program (QP) 2, Category A certified, and have successfully completed lead paint removal and field painting on similar structures within 18 months prior to this bid. Lead abatement work completed within the 18 month period shall have been completed in accordance with contract specifications, free of citation from safety or environmental agencies. Lead abatement work shall

include, but not be limited to: abrasive blasting; waste handling, storage and disposal; worker safety during lead abatement activities (fall protection, personal protective equipment (PPE), etc.); and containment. This requirement is in addition to the contractor pre-qualification requirements covered by Article 102-2 of the *Standard Specifications*.

(B) The apparent low bidder shall submit a list of projects for which QP 2 work was performed within the last 18 months including owner contact information and submit to the Engineer a "Lead Abatement Affidavit". This form may be downloaded from: http://www.ncdot.gov/projects/ncbridges/#stats.

(C) Work schedule which shall be kept up to date, with a copy of the revised schedule being provided to the Engineer in a timely manner.

(D) Containment system plans and design calculations in accordance with SSPC Guide 6, Class 2A and other project requirements, signed and sealed by a Professional Engineer licensed by the State of North Carolina.

(E) Structure wash water sampling and disposal plan.

(F) Subcontractor identification.

(G) Lighting plan for night work in accordance with Section 1413 of the *Standard Specifications*.

(H) Traffic control plan with NCDOT certified supervisors, flaggers and traffic control devices.

(I) Health and safety plan addressing at least the required topics as specified by the SSPC QP 1 and QP 2 program and including hazard communication, respiratory health, emergency procedures, and local hospital and treatment facilities with directions and phone numbers, disciplinary criteria for workers who violate the plan and accident investigation. The plan shall address the following: hazardous materials, personal protective equipment, general health and safety, occupational health and environmental controls, fire protection and prevention, signs signals, and barricades, materials handling, storage, use, and disposal, hand and power tools, welding and cutting, electrical, scaffolds, fall protection, cranes, derricks, hoists, elevators, and conveyors, ladders, toxic and hazardous substances, airless injection and high pressure water jet (HPWJ).

(J) Provide the Engineer a letter of certification that all employees performing work on the project have blood lead levels that are below the Occupational Safety and Health Administration (OSHA) action level.

(K) Provide the Engineer with Competent Person qualifications and summary of work experience.

(L) Environmental Compliance Plan.

(M) Quality Control Plan (Project Specific) with quality control qualifications and summary of work experience.

(M) Structure and Public Protection Plan (Overspray, Utilities, etc. - Project/Task Specific).

(N) Abrasive Blast Media:

(1) Product Data Sheet.

(2) Blast Media Test Reports in accordance with Article 1080-12 of the *Standard Specification*.

(O) Coating Material:

(1) NCDOT HICAMS Test Reports (testing performed by NCDOT Materials and Tests Unit).

(2) Product Data Sheets.

(3) Material Safety Data Sheets.

(4) Product Specific Repair Procedures.

(5) Acceptance letters from paint manufacturer's for work practices that conflict with special provisions and/or paint manufactures product data sheets.

4.0 PRE-CONSTRUCTION MEETING

Submittals shall be reviewed and approved by the Engineer prior to scheduling the pre-construction meeting. Allow no less than two (2) weeks for a review process. When requesting a pre-construction meeting, contact the Engineer at least seven (7) working days in advance of the desired pre-construction date. The contractor's project supervisor, Competent Person, quality control personnel and certified traffic control supervisor shall be in attendance at the pre-construction meeting in order for the Contractor and NCDOT team to establish responsibilities for various personnel during project duration and to establish realistic timeframes for problem escalation.

5.0 CONTAINMENT SYSTEM

Prior to performing any construction or painting operations on the structure, the Contractor shall furnish the Engineer with plans and design calculations for a sufficiently designed containment system, which will provide access for any repairs on structural steel members, cleaning and surface preparations for structural steel members, and coating operations for structural steel members of the ferry ramp gantry frame. The containment system shall not be installed, and no work shall begin, until the Engineer has reviewed and approved, in writing, the submitted containment system plans and design calculations. Containment system plans and design calculations shall be prepared, sealed, and signed by a Professional Engineer licensed by the State of North Carolina. Allow a minimum of two (2) weeks for review of the containment plans and calculations.

The containment system shall meet or exceed the requirements of Class 2A containment in accordance with SSPC Guide 6. The Contractor shall determine the required capacity of the containment system, which, at a minimum, shall include loads due to wind, repair materials and repair operations, equipment, and tools; however, the capacity shall not be less than that required by Federal or State regulations. Design steel members to meet the requirements of the *American Institute of Steel Construction Manual*. Design timber members in accordance with the *National Design Specification for Stress-Grade Lumber and Its Fastenings* of the National Forest Products Association. The containment system shall be constructed of materials capable of withstanding damage from any of the work required on this project and shall provide a two (2) hour resistance to fire.

In the containment system plans, describe how debris is contained and collected. Describe the type of tarpaulin, bracing materials, and the maximum designed wind load. Design wind loads shall be in accordance with the Falsework and Formwork special provision. Describe the dust collection system and how a negative pressure of 0.03 inches of water column is maintained inside the enclosure, while blasting operations are being conducted. Describe how the airflow inside the containment structure is designed to meet all applicable OSHA Standards. Describe how water run-off from rain will be routed by or through the enclosure. Describe how wash water will be contained and paint chips separated. Describe what physical containment will be provided during painting application to protect the public and areas not to be painted.

Drilling holes in the superstructure for the purpose of attaching the containment system is prohibited.

The Contractor will be responsible for certifying the containment system has been constructed in accordance with the approved plans.

The containment system shall be cleaned after each workday.

Upon completion of work, remove all anchorages in the substructure and repair the substructure at no additional cost to the Department.

Protect non-metallic parts of bearings from blasting and painting (i.e.: Pot Bearings, Elastomeric Pads, and Disc Bearings).

6.0 WASH WATER SAMPLING AND DISPOSAL PLAN

All wash water shall be collected and sampled prior to disposal. Representative sampling and testing methodology shall conform to North Carolina Administrative Code 15A NCAC 02B.0103, "Analytical Procedures". Wash water shall be tested for pollutants listed in 15A NCAC 02B.0211(3), 15A NCAC 02T.0505(b)(1) and 15A NCAC 2T.0905(h). Depending on the test results, wash water disposal methods shall be described in the disposal plan. Wash water shall be disposed of in accordance with all current Federal and State regulations. See link for NCDOT Guidelines for Managing Bridge Wash Water: http://www.ncdot.gov/projects/ncbridges/#stats.

7.0 WASTE HANDLING OF PAINT AND ABRASIVES

Comply with all Federal, State, and local regulations. Failure to comply with the regulations could result in fines and loss of qualified status with NCDOT.

Comply with the Resource Conservation and Recovery Act (RCRA - 40 CFR 261 - 265) and the Occupational Safety and Health Act (OSHA - 29 CFR 1910 - 1926) regulations for employee training, and for the handling, storage, labeling, recordkeeping, reporting, inspections and disposal of all hazardous waste generated during paint removal.

A summary of Generator Requirements is available at the above NCDOT web link, which cites the specific regulations for each Generator category. Quantities of waste by weight and dates of waste generation shall be recorded. Waste stored at the project site shall be properly labeled. All waste, hazardous or non-hazardous, requires numbered shipping manifests.

The North Carolina Department of Environmental Quality (NCDEQ) have adopted RCRA as the North Carolina Hazardous Waste Management Rules and are responsible for enforcement. The *Hazardous Waste Generator Compliance Manual* is published by the Compliance Branch of the Division of Waste Management of NCDEQ, and can be found at: https://files.nc.gov/ncdeq/Waste%20Management/DWM/HW/Compliance/Generator%20Compliance%20Manual.pdf

Immediately after award of the contract, arrange for waste containers, sampling, testing, transportation, and disposal of all waste. No work shall begin until the Contractor furnishes the Engineer with a written waste disposal plan. Any alternative method for handling waste shall be pre-approved by the Engineer. Use an approved waste management company from the following link:
https://www.ebs.nc.gov/VendorDirectory/results.html?sap-params=cD0xJTIwJmN1cnJlbnRfc2VhcmNoX3BhZ2U9d2Mmc2VsZWN0aW9uX2Zpcm1fbmFtZT0mc2VsZWN0aW9uX2NlcnQ9JnNlbGVjdGlvbl9maXJtdHlwZT0meXNjX2Zpcm10eXBlPSZzZWxlY3Rpb25fYWRkcnN0YXRlPSZzZWxlY3Rpb25fYWRkcnN0YXRlPSZzZWxlY3Rpb25fYWRkcmNvdW50eT0meXNjX2FkZHJjb3VudHk9JnNlbGVjdGlvbl93a2NvZGU9MDAzMDQwJnlzY193a2NvZGU9MDAzMDQwJTIwQ09OVEFNSU

5BVEVEJTIwTUFURVJJQUxTJTIwUkVNT1ZBTCZzZWxlY3Rpb25fZGlzYz0meXNjX2Rpc2M9JnNlbGVjdGlvbl9uYWljcz0meXNjX25haWNzPSZzZWxlY3Rpb25fY3R5cGU9MA%3d%3d

All removed paint and spent abrasive media shall be tested for lead following the SW-846 Toxicity Characteristic Leaching Procedure (TCLP) Method 1311 Extraction, as required in 40 CFR 261, Appendix 11, to determine whether it shall be disposed of as hazardous waste. Furnish the Engineer certified test reports showing TCLP results of the paint chips stored on site, with disposal in accordance with "Flowchart on Lead Waste Identification and Disposal" at:
https://ncdenr.s3.amazonaws.com/s3fs-public/document-library/Lead%20Disposal.pdf

All sampling shall be done in presence of the Engineer's representative.

The Competent Person shall obtain composite samples from each barrel of the wash water and waste generated by collecting two or more portions taken at regularly spaced intervals during accumulation. Composite the portions into one sample for testing purposes. Acquire samples after 10% or before 90% of the barrel has accumulated. The intent is to provide samples that are representative of widely separated portions, but not the beginning and end of wash water or waste accumulation.

Perform sampling by passing a receptacle completely through the discharge stream or by completely diverting the discharge into a sample container. If discharge of the wash water or waste is too rapid to divert the complete discharge stream, discharge into a container or transportation unit sufficiently large to accommodate the flow and then accomplish the sampling in the same manner as described above.

Comply with the NCDEQ *Hazardous Waste Compliance Generator Manual*. Record quantities of waste by weight and dates of waste generation. Until test results are received, store all waste, and label as "NCDOT Structure Paint Removal Waste - Pending Analysis" and include the date generated and contact information for the Engineer. Store waste containers in an enclosed, sealed, and secured storage container protected from traffic from all directions. Obtain approval for the protection plan for these containers from the Engineer. If adequate protection cannot be obtained by use of existing guardrail, provide the necessary supplies and equipment to maintain adequate protection. Once test results are received and characterized, label waste as either "Hazardous Waste - Pending Disposal" or "Paint Waste - Pending Disposal".

Once the waste has been collected, and the quantities determined, prepare the appropriate shipping documents and manifests and present them to the Engineer. The Engineer will verify the type and quantity of waste and obtain a Provisional Environmental Protection Agency (EPA) ID number from:

Melodi Deaver
Division of Waste Management/Hazardous Waste Section
North Carolina Department of Environmental Quality
1646 Mail Service Center
Raleigh, NC 27699
Phone: (919) 707-8204, Email: melodi.deaver@ncdenr.gov

At the time of shipping, the Engineer will sign, date, and add the ID number in the appropriate section on the manifest. The maximum on-site storage time for collected waste shall be 90 calendar days. All waste whether hazardous or non-hazardous will require numbered shipping manifests. The cost for waste

disposal (including lab and Provisional EPA ID number) is included in the bid price for this contract. Note NC Hazardous Waste Management Rules (15A NCAC 13A) for more information. Provisional EPA ID numbers may be obtained at:
https://deq.nc.gov/about/divisions/waste-management/hw/provisional-notification

Testing labs shall be certified in accordance with North Carolina State Laboratory Public Health Environmental Sciences. List of certified laboratories may be obtained at:
https://slphreporting.ncpublichealth.com/Certification/CertifiedLaboratory.asp

All test results shall be documented on the lab analysis as follows:

(A) For leachable lead:

(1) Soils/Solid/Liquid- EPA 1311/200.7/6010

Area sampling will be performed for the first two (2) days at each structure location. The area sample will be located within five (5) feet of the containment and where the highest probability of leakage will occur (access door, etc.). Results from the area sampling will be given to the Engineer within 72 hours of sampling (excluding weekends). If the results of the samples exceed 20 µg/m^3 corrective measures shall be taken and monitoring shall be continued until two (2) consecutive sample results are less than 20 µg/m^3.

Time Weighted Average (TWA) may suspend the work if there are visible emissions outside the containment enclosure or pump monitoring results exceeding the level of 30 µg/m^3.

Where schools, housing and/or buildings are within 500 feet of the containment, the Contractor shall perform initial Total Suspended Monitoring (TSP) Lead monitoring for the first ten (10) days of the project during abrasive blasting, vacuuming and containment removal. Additional monitoring will be required during abrasive blasting two (2) days per month thereafter. Results of the TSP monitoring at any location shall not exceed 1.5 µg/m^3.

8.0 EQUIPMENT MOBILIZATION

The equipment used in any travel lanes and paved shoulder shall be mobile equipment on wheels that has the ability to move on/off the roadway in less than 30 minutes. All work conducted in travel lanes shall be from truck or trailer supported platforms and all equipment shall be self-propelled or attached to a tow vehicle at all times.

9.0 QUALITY CONTROL INSPECTOR

Provide a quality control (QC) inspector in accordance with the SSPC QP guidelines to ensure that all processes, preparation, blasting and coating application are in accordance with the requirements of the contract. The inspector shall have written authority to perform QC duties to include continuous improvement of all QC internal procedures. The presence of the engineer or inspector at the work site shall in no way lessen the contractor's responsibility for conformity with the contract.

10.0 QUALITY ASSURANCE INSPECTOR

The quality assurance inspector which may be a Department employee or a designated representative of the Department shall observe, document, assess, and report that the Contractor is complying with all of

the requirements of the contract. Inspectors employed by the Department are authorized to inspect all work performed and materials furnished. Such inspection may extend to all or any part of the work and to the preparation, fabrication, or manufacture of the materials to be used. The inspector is not authorized to alter or waive the requirements of the contract. Each stage in preparing the structure to be coated which includes but not limited to washing, blasting, coating testing and inspection shall be inspected and approved by the Engineer or an authorized representative.

11.0 SUBLETTING OF CONTRACT

Only contractors certified to meet SSPC QP 2, Category A, and have successfully completed lead paint removal and field painting on all similar structures within 18 months prior to this bid are qualified for this work. Work is only sublet by approval of the Engineer.

12.0 PREPARATION OF SURFACES

Before any other surface preparation is conducted, all surfaces shall be power washed to remove dust, salts, dirt, and other contaminants. All wash water shall be contained, collected, and tested in accordance with the requirements of NCDOT Guidelines for Managing Bridge Wash Water. Obtain approval of the Engineer and allow all cleaned surfaces to dry to the touch and without standing water before beginning surface preparation or painting activities.

Surface preparation is done with materials meeting Article 1080-12 of the *2 Standard Specifications*. No silica sand or other silica materials are permitted for use. The profile shall be between 1.0 and 3.0 mils when measured on a smooth steel surface. Conduct and document at least two (2) tests per beam/girder and two (2) tests per span of diaphragms/cross bracing.

Spread tarpaulins over all pavements and surfaces underneath equipment used for abrasive blasting as well as equipment and containers used to collect abrasive media. This requirement will be enforced during activity and inactivity of equipment.

Before the Contractor departs from the work site at the end of the workday, collect all debris generated during surface preparation and all dust collector hoses, tarps or other appurtenances containing blasting residue in approved containers.

Clean a 3" x 3" area at each structure to demonstrate the specified finish, and the inspector will preserve this area by covering it with tape, plastic or some other suitable means so that it can be retained as the Dry Film Thickness (DFT) gauge adjustment standard. An acceptable alternative is for the Contractor to provide a steel plate with similar properties and geometry as the substrate to be measured.

The contractor and or quality assurance representative shall notify the Engineer of any area of corroded steel that has lost more than 50% of its original thickness.

All parts of the structures not to be painted and the travelling public shall be protected from overspray. Submit a plan to protect all parts of structure that are not required to be painted and a plan to protect the traveling public and surrounding environment while applying all coats of paint to a structure.

Ensure that chloride levels on the surfaces are 7 $\mu g/cm^2$ or lower using an acceptable sample method in accordance with SSPC Guide 15. The frequency of testing shall be two (2) tests per span after all surface

preparation has been completed and immediately prior to painting. Select test areas representing the greatest amount of corrosion in the span as determined by the Engineers' representative. Additional testing may be required if significant amounts of chloride are detected.

All weld splatter, slag or other surface defects resulting in a raised surface above the final paint layer shall be removed prior to application of primer coat.

13.0 PAINTING OF STEEL

Paint System 3, as specified in these special provisions and Article 442-8 of the *Standard Specifications*, is to be used for this work. System 3 is an inorganic zinc primer, two coats coal tar epoxy paint over blast-cleaned surfaces in accordance with SSPC-SP-10 (Near White Blast). Perform all mixing operations over an impervious surface with provisions to prevent runoff to grade of any spilled material. The contractor is responsible for reporting quantities of thinner purchased as well the amounts used. No container with thinner shall be left uncovered, when not in use.

Any area where newly applied paint fails to meet the specifications shall be repaired or replaced by the Contractor, at no additional cost to the Department. The Engineer approves all repair processes before the repair is made. Repaired areas shall meet the *Standard Specifications*. The Contractor applies an additional finish coat of paint to areas where the tape adhesion test is conducted.

14.0 MATERIALS

Only paint suppliers that have a NCDOT qualified inorganic zinc primer may furnish paints for this project. All paints applied to a structure shall be from the same supplier. Before any paints are applied the Contractor shall provide the Engineer a manufacturer's certification that each batch of paint meets the requirements of the applicable Section 1080 of the *Standard Specifications*.

The inspector randomly collects a one pint sample of each paint product used on the project. Additional samples may be collected as needed to verify compliance to the specifications.

Do not expose paint materials to rain, excessive condensation, long periods of direct sunlight, or temperatures above 110°F or below 40°F. In addition, the Contractor shall place a device that records the high, low, and current temperatures inside the storage location. Follow the manufacturer's storage requirements if more restrictive than the above requirements.

15.0 INSPECTION

Surface Preparation for System 3 shall be in accordance with SSPC SP-10. Any area(s) not meeting the requirements of SSPC SP-10 shall be remediated prior to application of coating. Surface inspection is considered ready for inspection when all blast abrasive, residue and dust is removed from surfaces to be coated.

(A) Quality Assurance Inspection

The Contractor furnishes all necessary OSHA approved apparatus such as ladders, scaffolds and platforms as required for the inspector to have reasonable and safe access to all parts of the work. The contractor illuminates the surfaces to be inspected to a minimum of 50-foot candles of light. All access points shall be illuminated to a minimum of 20-foot candles of light.

NCDOT reserves the right for ongoing Quality Assurance (QA) inspection to include but not limited to surface contamination testing, adhesion pull testing, and DFT readings as necessary to assure quality.

Inform the Engineer and the Division Safety Engineer of all scheduled and unannounced inspections from SSPC, OSHA, EPA and/or others that come on site. Furnish the Engineer a copy of all inspection reports except for reports performed by a third party and or consultant on behalf of the Contractor.

(B) Inspection Instruments

At a minimum, furnish the following calibrated instruments and conduct the following quality control tests:

(1) Sling Psychrometer - ASTM E337 - bulb type
(2) Surface Temperature Thermometer
(3) Wind Speed Indicator
(4) Tape Profile Tester - ASTM D4417 Method C
(5) Surface Condition Standards - SSPC VIS-1 and VIS-3
(6) Wet Film Thickness Gage - ASTM D4414
(7) Dry Film Thickness Gage - SSPC-PA2 Modified
(8) Solvent Rub Test Kit - ASTM D4752
(9) Adhesion Test Kit - ASTM D3359 Method A (Tape Test)
(10) Adhesion Pull test - ASTM D4541
(11) Surface Contamination Analysis Kit or (Chloride Level Test Kit) SSPC Technology Guide 15

(C) Quality Control

Maintain a daily quality control record in accordance with Subarticle 442-12(D) of the *Standard Specifications* and make such records available at the job site for review by the inspector and submit to the Engineer as directed. In addition to the information required on Form M&T-610, submit all Dry Film Thickness (DFT) readings on a form equivalent to Form M&T-611. These forms can be found at:
https://connect.ncdot.gov/resources/Materials/Pages/Materials-Manual-by-Material.aspx?Order=MM-03-02

(1) Measure DFT at each spot on the attached diagram and at the required number of locations as specified below:
   (a) For span members less than 45 feet; three (3) random locations along each girder in each span.
   (b) For span members greater than 45 feet; add one additional location for each additional ten (10) feet in span length.

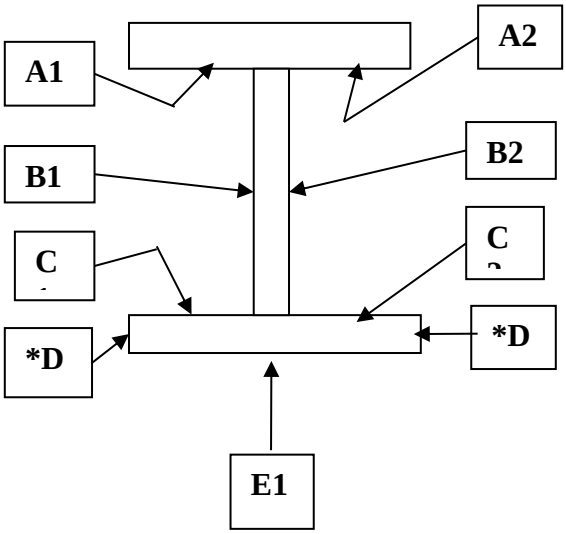
   DFT measurements for the prime coat shall not be taken for record until the zinc primer has cured in accordance with ASTM D4752 (MEK Rub Test) with no less than a four (4) resistance rating.

   Stiffeners and other attachments to beams and or plate girders shall be measured at no less than five (5) random spots per span. Also, dry film thickness is measured at no less than six (6) random spots per span on diaphragms/cross frames.

Each spot is an average of three (3) to five (5) individual gage readings as defined in SSPC PA-2. No spot average shall be less than 80% of minimum DFT for each layer applied; this does not apply to stripe coat application. Spot readings that are non-conforming shall be re-assessed by performing additional spot measurements not to exceed one-foot intervals on both sides of the low areas until acceptable spot averages are obtained. These non-conforming areas shall be corrected by the Contractor prior to applying successive coats.

Less than 36" in height and/or bottom flanges less than 16" in width.
7 Spot Areas
21 Individual DFT Readings

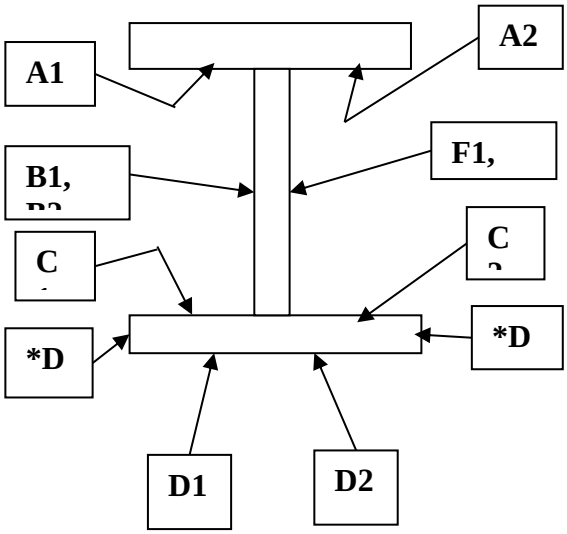
7 Spot Areas



***D areas are only included when flange thickness is one inch (1") or greater.**

36" in height or greater and/or bottom flanges greater than 16" in width.

10 Spot Areas
30 Individual DFT Readings



***D areas are only included when flange thickness is one inch (1") or greater.**

(2) Two (2) random adhesion tests (1 test = 3 dollies) per span are conducted on interior surfaces in accordance with ASTM D4541 (Adhesion Pull Test) after the prime coat has been properly cured in accordance with ASTM D4752 (MEK Rub Test) with no less than a four (4) resistance rating, and will be touched up by the Contractor. The required minimum average adhesion is 400 psi.

(3) Cure of the intermediate and stripe coats shall be accessed by using the thumb test in accordance with ASTM D1640 (Curing Formation Test) prior to the application of any successive layers of paint.

(4) One random Cut Tape adhesion test per span is conducted in accordance with ASTM D3359 (X-Cut Tape Test) on interior surface after the finish coat is cured. Repair areas shall be properly tapered and touched up by the Contractor.

16.0 SAFETY AND ENVIRONMENTAL COMPLIANCE PLANS

Personnel access boundaries are delineated for each work site using signs, tape, cones, or other approved means. Submit copies of safety and environmental compliance plans that comply with SSPC QP 2 Certification requirements.

17.0 HEALTH AND SAFETY RESPONSIBILITIES

This project may involve toxic metals such as arsenic, lead, cadmium and hexavalent chromium. It is the contractor's responsibility to test for toxic metals and if found, comply with the OSHA regulations, which may include medical testing.

Ensure a "Competent Person" as defined in OSHA 29 CFR 1926.62; one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them; is on site during all surface preparation activities and monitors the effectiveness of containment, dust collection systems and waste sampling. Before any work begins, provide a written summary of the Competent Person's safety training.

Comply with Subarticle 442-14(B) of the *Standard Specifications*.

Comply with Subarticle 442-14(D) of the *Standard Specifications*. Ensure employee blood sampling test results are less than 50 micrograms per deciliter. Remove employees with a blood sampling test of 50 or more micrograms per deciliter from work activities involving any lead exposure.

An employee who has been removed with a blood level of 50 micrograms per deciliter or more shall have two (2) consecutive blood sampling tests spaced one week apart indicating that the employee's blood lead level is at or below 40 micrograms per deciliter before returning to work activities involving any lead exposure.

All OSHA recordable accidents that occur during the project duration are to be reported to the Engineer within twenty-four (24) hours of occurrence. In addition, for accidents that involve civilians or property damage that occurs within the work zone the Division Safety Engineer shall be notified immediately.

Prior to blasting operations, the Contractor shall have an operational OSHA approved hand wash station at each structure location and a decontamination trailer at each structure or between structures unless the work is on the roadway, or the Contractor shall show reason why it is not feasible to do so and provide an alternative site as approved by the Engineer. The Contractor shall assure that all employees whose airborne exposure to lead is above the Permissible Exposure Limit (PEL) shall shower at the end of their work shift.

18.0 STORAGE OF PAINT AND EQUIPMENT

Provide a location for materials, equipment, and waste storage. Spread tarpaulins over all pavements and surfaces underneath equipment used for abrasive recycling and other waste handling equipment or containers. All land and or lease agreements that involve private property shall disclose to the property owner that heavy metals may be present on the Contractor's equipment. Prior to storing the Contractor's equipment on private property, provide a notarized written consent signed by the land owner received by the Engineer at least forty-eight (48) hours before using property. All storage of paint, solvents, and other materials applied to structures shall be stored in accordance with Subarticle 442-9(C) of the *Standard Specifications* or the manufacturers' requirements. The more restrictive requirements will apply.

19.0 UTILITIES

Protect all utility lines or mains that may be supported on, under, or adjacent to structure work sites from damage and paint overspray.

20.0 MEASUREMENT AND PAYMENT

The cost of inspection, surface preparation, and repainting the existing structure is included in the lump sum price bid for *Cleaning and Repainting of Structure #090209* and *Cleaning and Repainting of Structure #640050*. This price is full compensation for furnishing all inspection equipment, all paint, cleaning abrasives, cleaning solvents and all other materials; preparing and cleaning surfaces to be painted; applying paint in the field; protecting work area, traffic and property; and furnishing blast cleaning equipment, paint spraying equipment, brushes, rollers, any other hand or power tools and any other equipment.

Pollution Control will be paid at the contract lump sum price which will be full compensation for all collection, handling, storage, air monitoring, and disposal of debris and wash water, all personal protective equipment, and all personal hygiene requirements, and all equipment, material and labor necessary for the daily collection of the blast debris into specified containers; and any measures necessary to ensure conformance to all safety and environmental regulations as directed by the Engineer.

Painting Containment for Structure #090209 and *Painting Containment for Structure #640050* will be paid at the lump sum contract price and will be full compensation for the design, materials, installation, maintenance, and removal of the containment system.

Payment will be made under:

Pay Item	Pay Unit
Cleaning and Repainting of Structure #090209	Lump Sum
Cleaning and Repainting of Structure #640050	Lump Sum
Pollution Control for Structure #090209	Lump Sum
Pollution Control for Structure #640050	Lump Sum
Painting Containment for Structure #090209	Lump Sum
Painting Containment for Structure #640050	Lump Sum

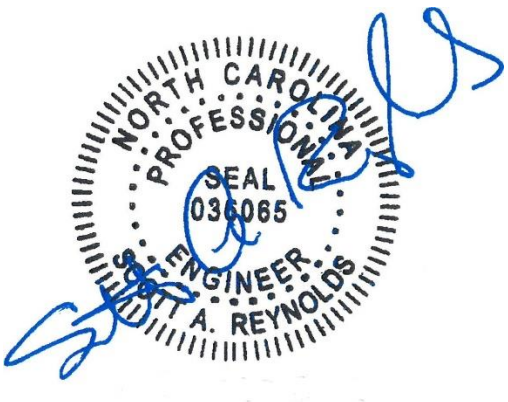
21.0 STRUCTURE INFORMATION

Structure #090209 (Southport Ferry Ramp): The existing ferry ramp and lift bent was constructed in 1988 while the approach spans were replaced in 1996. The approach spans and ferry ramp provide a means for traffic on Ferry Road SE in Southport to load the Southport – Ft. Fisher Ferry. The approach span superstructure consists of 4 simple spans comprised of 1'-9" deep precast cored slab units with an asphalt wearing surface. The total approach span length is 167'-2¾" and the approach clear roadway width is 14'-1¼". The movable ferry ramp is a steel pony truss structure with an open steel grid deck. The total ferry ramp span length is 94'-0" and the ferry ramp clear roadway width is 14'-0". The paint system for the existing lift bent piles, bracing, and access platform supports to remain is aluminum over red lead, and the estimated area to be cleaned and painted is **1,250** sq. ft.

Structure #640050 (Ft. Fisher Ferry Ramp): The existing ferry ramp and lift bent was constructed in 1988 while the approach spans were replaced in 1996. The approach spans and ferry ramp provide a means for traffic on Ft. Fisher Boulevard S in Kure Beach to load the Southport – Ft. Fisher Ferry. The approach span superstructure consists of 2 simple spans comprised of 1'-9" deep precast cored slab units with an asphalt wearing surface. The total approach span length is 46'-1" and the approach clear roadway width is 14'-1¼". The movable ferry ramp is a steel pony truss structure with an open steel grid deck. The total ferry ramp span length is 92'-0" and the ferry ramp clear roadway width is 14'-0". The paint system for the existing lift bent piles, bracing, and access platform supports to remain is aluminum over red lead, and the estimated area to be cleaned and painted is **1,250** sq. ft.

Mechanical Work

Table of Contents



MECHANICAL WORK FOR SOUTHPORT/FT. FISHER FERRY RAMPS (SPECIAL)

GENERAL

DESCRIPTION

The work under this item shall consist of furnishing, installing, and placing into satisfactory operating condition all mechanical equipment for permanent operation of the ferry ramp systems. The major parts of this construction will include but are not limited to, floating mechanism and hydraulic system.

Work on the Bridge Machinery includes two work items:

Floating Mechanism

Hydraulic System

All special machining, tools and installation shall be included as part of the work. This work shall include shimming and alignment.

The Contractor, except as noted otherwise on the Plans or as specified otherwise in these Specifications, shall furnish, install, lubricate, test, paint and place in satisfactory operating condition the items described above. This includes all related submittals, documentation, spare components and training specified herein.

BASIS OF MACHINERY DESIGN

The design of new machinery conforms to the applicable requirements of the 2010 American Association of State Highway and Transportation Officials (hereinafter referred to as the AASHTO Standard), except as otherwise noted on the Contract Drawings or otherwise specified herein. The fabrication and installation of new machinery shall conform to the same AASHTO Standard, unless otherwise noted.

System Narrative:

The electro-hydraulic control systems for the Southport/Fort Fisher ferry slips each consist of a PLC controlled hydraulic power unit (HPU) connected to four hydraulic cylinders which support their respective ramp. The existing systems have counterweights which will be removed as part of this contract. In the new systems configuration, the entire water end weight of the ramps will be hung from the hydraulic cylinders. The land end of the ramps rest upon pivot bearings atop the pier.

The four hydraulic cylinders are arranged with two per side of the ramp for redundancy and safety. In normal operation, all four cylinders will operate while sharing the load. In the event of a malfunction, the ramp can temporarily be operated using two cylinders only, provided there is at least one operable cylinder on each side of the ramp. The system is never intended to be operated using one or two cylinders on one side of the ramp only. It is also never intended that the system be operated with three cylinders as this will create an unbalanced load and may damage the ramp structure. The system should always be operated with either four cylinders or two cylinders with the same number of cylinders

operating on each side of the ramp. In the event two cylinders need to be taken out of service, it will be the responsibility of the operator(s) to configure the cylinders correctly by shutting off six manual shutoff valves accessible from the upper platform. If any two cylinders are removed from service, it will also be the responsibility of the operator(s) to disengage the pins connecting the two non-operating cylinders to the float mechanism, and to swing and secure them out of the way so they do not interfere with normal operation of the remaining two cylinders. The operators must also switch the control switch on the panel from four-cylinder operation to two-cylinder operation when operating with two cylinders. The (12) manual ball valves accessible from the upper platform shall have 90 degree handles and shall all be located directly over their respective cylinder and shall be oriented the same so as to make it readily apparent to the operator which ones are open, and which are closed.

The HPU will include two Parker PV023 variable displacement constant horsepower axial piston pumps. Each pump will be driven using a 1750 RPM, 3 phase electric motor and the pumps shall be set to limit power input to 15 HP. In normal operation with four cylinders operating, both pumps will operate while delivering a nominal flow of 10.63 GPM each. In two-cylinder operation, only one pump shall operate. In the event of a pump malfunction, the system shall be capable of being configured to operate all four cylinders using the good pump (at half speed) using the switches on the control panel.

The HPU shall include a reservoir of at least 80-gallon capacity with heat exchanger cooling unit. The cooling unit shall be sized by the contractor to maintain the oil temperature below 120°F assuming the ramp operates in the loaded condition for 15 minutes out of every hour at an ambient temperature of 100°F. The contractor shall provide manufacturers data and calculations to confirm proper selection. The reservoir shall include thermostat-controlled heaters to maintain the oil temperature above 50°F assuming an ambient temperature of 20°F. The contractor shall include manufacturers data and calculations to confirm proper selection. The heaters shall be selected to avoid overheating the oil in direct contact with heating element which may cause damage to the oil.

The system will include four solenoid operated valves including an unloading valve, two directional valves (two solenoids each) and a blocking valve. The unloading valve is intended to direct all pump flow thorough filters back to tank when the system is idle and not operating the cylinders. There is a low level and high-level pressure relief valve which are used for four and two-cylinder operation respectively. The blocking valve removes the low-level pressure relief valve from the circuit when in two-cylinder operation. Each directional valve operates either one or two cylinders associated with its respective side of the ramp.

Each cylinder manifold includes relief valves, a counterbalance valve, check valves and needle valves. There are three fluid lines connecting to each manifold including a tank line and the A and B lines from the directional valves. There are manual valves on each line between the pipes or tubes leading from the HPU and the hoses which can be shut off when the cylinder is removed from the circuit or for maintenance. Each manifold will also include two pressure switches which will trigger a high-pressure shutdown if the pressure setting is exceeded on the rod end port of the cylinder. These switches are intended to indicate either an unbalanced load condition such as may happen if one of the directional valves were to fail or if an obstruction blocks movement of the ramp. The pressure switch set to the lower setting is for four-cylinder operation and the switch set to the higher setting

is for two-cylinder operation. The settings shall be adjustable. Initially the switches should be set at 2,200 psi and 3,200 psi for low and high pressure respectively. During commissioning the contractor shall measure pressure during operation to determine if these settings are adequate. The settings shall be nominally set to 200 psi above the normal pressure range unless surges during starting or stopping cause nuisance trips. The needle valves on the cylinder manifolds can be used to manually allow cylinder or ramp movement by directly passing oil between the tank line and the cylinder ports.

Each pair of cylinders is connected to a float mechanism intended to allow the ramp to rest on the ferry and "float" during loading or unloading without transmitting ramp loads to the cylinders. The float mechanisms each have three limit switches. There is a crescent shaped target which trips all three limit switches when the mechanism is centered, and the ramp is clear to load or unload. When either the top or bottom switch drops off the target due to vertical movement of the ferry and ramp, adjustments will be made automatically by the control system to bring the float mechanism back to the center position where all three switches are again tripped. The PLC control program shall include timers to allow the cylinder to travel for a short distance past the upper or lower switches to center the target and prevent the need for frequent adjustments. Note: the target is designed to end ¾" above and below the center of the upper and lower switches respectively. Under normal operation while lifting or lowering the ramp, the upper limit switch will be tripped.

If for any reason while in float mode or while the operator is manually lowering the float mechanism into the neutral position - the center switch is not sensed while the bottom switch is sensed, a fault will occur, the lower permissive shall be disabled and the cylinder(s) shall be raised to move the float mechanism such that the upper and lower switches are again both tripped. A fault light shall alert the operator in this case that a limit switch fault has occurred. If while in float mode the upper switch is sensed while the center switch is not sensed, the cylinders shall immediately be extended until the upper and lower switches are again tripped and the limit switch fault shall be triggered.

The operator interface shall be like the existing using a pendant located at the end of the ramp. Under normal operation, the operator will turn control power on which starts the HPU. When he or she wants to raise the ramp, the raise button is pressed. To lower the ramp the lower button is pressed. To lower the ramp onto the ferry, the lower button is pressed until the float mechanism is centered and all three limit switches are made. The control system will stop motion in this case even if the operator continues to hold the lower button and the float mode indication beacon will begin to flash. When flashing, the PLC will control cylinder position in float mode to maintain the float mechanisms in the center position. The intention is that the operators will lower the ramp onto the ferry until the float mode indication beacon begins to flash then let go of the pendant and allow the PLC to maintain proper position of the float mechanism. The operators do need to be aware that the cylinders may move automatically in this case without them pressing any buttons. The raise and lower buttons will not again be active until the operator has released the lower button for at least 1 second after float mode is triggered. Once the ferry is loaded, the operator will press the raise button which will stop float mode operation and the ramp will raise normally.

The HPU control panel will be mounted on the HPU and shop tested to prove out all functions. The panel shall include indicator lights for all potential fault conditions or the need for a filter change. There will be a lockable power disconnect which de-energizes the

entire system. There will be a switch which selects either two or four-cylinder operation. When two-cylinder operation is selected, valve V-3 solenoid will be energized. There will also be lighted pushbuttons to select either Pump-A, Pump-B or Both. The "Both" pushbutton shall not be active in two-cylinder operation. If Pump-B is selected, then Pump-B shall be energized, and Pump-A disconnected from the circuit regardless of whether two-cylinder or four-cylinder operation is selected. Likewise, if Pump-A is selected then then Pump-A shall be energized, and Pump-B disconnected from the circuit regardless of whether two-cylinder or four-cylinder operation is selected. A maintained emergency stop pushbutton shall be included on the face of the HPU panel. All control panels and electrical devices exposed to the elements shall be Nema-4X rated or higher for ingress protection. The HPU supplier shall provide, install and test all electrical control hardware mounted to the HPU. It shall be the HPU supplier's responsibility to supply and program the PLC to control all functions of the ferry ramps and to provide all associated outputs and inputs in panels configured for efficient wiring in the field of all remote components.

SUBMITTALS

A hydraulic schematic shall be provided for review and approval. The schematic shall conform to the requirements of ISO 4413. The hydraulic schematic shall contain, at a minimum:

An item name and description for all components.

Design set points for all adjustable components

Item numbers and call outs for all components

Pipe and tube sizes and materials for all fluid conduits

A hydraulic power unit assembly drawing shall be provided for review and approval. The drawing shall conform to the requirements of ISO 4413. The mounting of the HPU shall be coordinated with the steel structure supplier. The hydraulic power unit assembly drawing shall contain, at a minimum:

Outside envelope dimensions of the hydraulic power unit assembly and mounting details.

- Scale drawing of unit including plan and elevation.

Maintenance envelope dimensions.

A complete bill of materials for all components including item number, item name/description, and original equipment manufacturer part number shall be provided. The description shall have sufficient detail so that all items can be replaced without having the original stock number of the item.

Call out bubbles shall be provided for all items.

Final set points shall be provided for all adjustable components.

Fill procedure

Piping diagrams shall be provided for review and approval by the Engineer. The drawings shall conform to the requirements of ISO 4413. The drawings shall contain a complete pipe and fitting schedule. The descriptions in the pipe and fitting schedules shall have sufficient detail such that all items can be replaced without the original stock numbers.

Pressure drop calculations of hydraulic system based on ambient temperature of 20°F to 100°F in 10°F increments. These calculations shall assume the oil in the cylinders and piping system external to the HPU is at ambient temperature and will affect pressure drops through contractor selected valves accordingly returning to tank.

Piping layouts and assembly drawings shall be provided for the hydraulic system. The drawings shall conform to the requirements of ISO 4413. These drawings shall clearly indicate the type and spacing of piping supports. The drawings shall be submitted and approved by NCDOT before field erection will be permitted. Piping supports shall meet the requirements herein.

A flushing procedure shall be provided for review and approval. The flushing procedure shall describe the flushing loop(s), flushing flow rates, durations, and required cleanliness level.

Assembly and detail drawings shall be provided for all machinery components. These drawings shall be sufficiently complete that the machinery parts may be duplicated without reference to patterns, other drawings, or individual shop practice. These drawings shall be reviewed and approved by the Engineer prior to purchasing any materials.

Cutsheets shall be provided for all commercial components. The cutsheet shall indicate the full part number of the component. Where multiple versions or sizes of components are given on the same cutsheet, the specific part shall be specifically indicated. All of the catalog sheets for the component shall be included with the cutsheet submittal. Cutsheets shall be reviewed and approved by the Engineer prior to purchasing any materials.

Certified test data shall be submitted to NCDOT for approval before shipment to the bridge site. Testing requirements are provided herein.

Certified dimension prints of the apparatus shall state in the certification the name of the job, the application of the apparatus, assembly/part designation, number required, right-hand or left-hand assembly, material, finish, and any other pertinent data to show that the apparatus meets the specified requirements.

Equipment shall not be shipped to the job site until the submittals are approved.

Upon completion of the work, the Contractor shall correct all shop or working drawings to show the work as constructed and provide As-Built copies to NCDOT. As-built drawings shall include dimensioned assembly views and all dimensions, tolerances, fit, and finishes of all parts manufactured and installed on the bridge by the Contractor.

Any other drawings, which may in the opinion of NCDOT, be necessary to show the mechanical work.

An operations and maintenance manual per AASHTO LRFD Movable Highway Bridge Design Specification with the addition of a PDF copy shall be furnished to NCDOT. Chapters shall be provided for Electrical Equipment, Mechanical Equipment, and Hydraulic Equipment. Note that all manuals shall be organized such that all operations, maintenance procedures, lubrication charts, and drawings shall be located in the front of the manual. Backup data such as cut sheets and standard equipment data shall be organized in an appendix. The pdf version shall include a bookmarked index for ease of navigation in the file.

Lubrication charts shall be provided for review and approval. The charts shall include all bearings, electrical equipment, and all elements of the bridge which require lubrication. The chart shall provide the recommended lubricant and the frequency of lubrication. The chart shall detail any purge plugs that need to be removed prior to lubrication. In addition, 24”x36” large format lubrication charts framed and covered with plexi-glass shall be provided for the bridge.

The Contractor shall submit to NCDOT for approval all of the aforementioned submittals. In case of correction or rejection, the Contractor shall resubmit until they are approved. The Contractor shall bear all costs for damages, which may result from the ordering of any materials prior to any required approval; and no work shall be done until the drawings have been approved.

The Contractor shall submit an installation procedure and schedule which shall include weights of all major components or assemblies. Procedure shall include written descriptions and drawings showing crane picks required for installation. Torque requirements for bolts shall be provided along with any other instructions which may be necessary for proper replacement in the future. Method of support for ramps shall be shown for portions of the work where the hydraulic cylinders are not supporting the weight. These procedures shall be included in the O&M manual.

DELIVERY AND STORAGE

Protection for Shipment

Machinery parts shall be cleaned of dirt, chips, grit and all other injurious materials prior to shipping.

Finished metal surfaces and unpainted metal surfaces that would be damaged by corrosion shall be coated as soon as practicable after finishing with a rust-inhibiting preservative. This coating shall be removed from operation and from all surfaces prior to painting after erection.

Any interface between stainless steel or aluminum and Structural Steel shall receive an Engineer approval coat of zinc-chromate primer prior to assembly.

Shims shall be coated prior to shipment with a rust-inhibiting preservative and before erection; this coating shall be removed from the shims that are used.

Machinery parts shall be completely protected from weather, dirt and all other injurious conditions during manufacture, shipment and storage.

Shaft journals that are shipped disassembled from their bearings shall be protected during shipment and before erection by a packing of oil-soaked rags secured in place by burlap and covered with heavy metal thimbles or heavy timber lagging securely attached. Every precaution shall be taken to ensure that the bearing surfaces are not damaged and that all parts arrive at their destination in satisfactory condition.

Assembled units shall be mounted on skids or otherwise crated for protection during handling and shipment.

GUARANTEE AND WARRANTIES

The Contractor shall warrant the satisfactory in-service operation of the mechanical equipment, material, products and related components. This warranty shall extend for a period of one year following the date of final acceptance of the Project.

SPARE PARTS

Spare parts shall be packaged and lubricated for long term storage.

In addition to the spare parts described under other items, the following spare parts shall be provided:

Two lubrication fittings of each different type and size used.

One desiccant breather for the reservoir.

Two spare solenoids for each different solenoid used.

Two spare filter elements for each filter.

Two spare seals/o-rings for each different type/size used.

Two spare hoses for each different size/length. Consistent hose sizes shall be used to the maximum extent practical.

One spare ball valve for each size used.

One spare pressure gage for each type/range.

One spare pressure relief valve for each unique valve.

One spare for each different pipe fitting (tee, union, etc.)

One 55-gallon drum of hydraulic oil.

One spare hydraulic cylinder for each unique cylinder.

QUALITY ASSURANCE

Qualifications, Personnel and Facilities

Products used in the work under the Machinery Specifications shall be produced by manufacturers regularly engaged in the manufacture of the specified products.

For the fabrication, installation, cleaning, aligning, testing and all other work required by the machinery specifications and drawings, the Contractor shall use adequate numbers of skilled, trained and experienced mechanics and millwrights who are thoroughly familiar with the requirements and methods specified for the proper execution of the specified work. The Contractor shall provide personnel and supervisory personnel with a minimum of two movable bridge or ferry ramp jobs as previous experience or equivalent.

The Contractor shall provide adequate plant and all necessary tools and instruments required for the proper performance of the personnel engaged in the execution of the specified work.

(Entire) Hydraulic system fabrication, installation and startup shall be performed by a single qualified Contractor. The Contractor shall have had at least ten years of experience in the design, fabrication, and installation of hydraulic systems of this size and type. Hydraulic supply shall include supply and wiring of devices and HPU mounted electrical control panel – including PLC programming. HPU shall be shop tested to demonstrate full functionality prior to shipment. See electrical specifications for electrical device specifications.

Piping and flushing shall be done under the direction of a certified fluid power technician with proper experience on similar systems.

At least one member of the installation crew shall be a certified fluid power technician. Their certification number and experience shall be submitted for review and approval demonstrated skill in this type of work.

CODES AND STANDARDS

Work under machinery specifications and drawings shall comply with, but not be limited to, all applicable requirements of the following codes and standards and their abbreviations used in this Specification shall be as shown:

American Association of State Highway and Transportation Officials AASHTO

American Society for Testing and Materials ASTM

American Welding Society AWS

National Fluid Power Association NFPA

National Lubricating Grease Institute NLGI

Society of Automotive Engineers SAE

Steel Structures Painting Council SSPC

American Society of Mechanical Engineers ASME

The work shall meet the requirements of all other codes and standards as specified elsewhere in these Specifications. Where codes and standards are mentioned, it is intended to call particular attention to them; it is not intended that any other codes and standards shall be assumed to be omitted if not mentioned.

RULES, REGULATIONS AND ORDINANCES

Work shall comply with all applicable Federal, State and Local rules, regulations and ordinances.

In the event of a conflict between these Specifications and the above-mentioned codes, standards, rules, regulations and ordinances, the most stringent requirement shall apply.

MEASUREMENTS AND VERIFICATION

Dimensions indicated on the Contract Drawings are nominal and are intended for guidance only. All variations from the nominal dimensions on the Contract Drawings shall be noted on the shop drawings.

SUBSTITUTIONS

The terms "approved equal", "of equal quality" and "or equal" which appear on the Contract Drawings and in these Specifications are intended to allow the Contractor to substitute other manufacturers and model numbers of products of equal quality and rating for those specified.

Prior to the Contractor's ordering of any substitute product, the Engineer's approval of the equivalence of the substitute product shall be obtained in writing. The acceptance of the substitute products is at the sole discretion of the Engineer who will establish the basis for equivalence and will review the quality of the materials and products described in detail on the submitted shop drawings and product data.

The Engineer will review and stamp substitute material either "Approved" or "Revise and Resubmit". Upon return of shop drawings showing rejection, the Contractor shall resubmit the shop drawing showing the specified product. Rejection shall not in any way result in any extra cost.

Approval by the Engineer of any substitute products submitted by the Contractor shall not relieve the Contractor of responsibility for the proper operation, performance, or functioning of that product.

Where a particular product is specified by a manufacturer's name and catalog or part number in this Specification or on the Contract Drawings, it is so specified to establish quality, configuration and arrangement of parts. An equivalent product made by another manufacturer may be substituted for the specified product subject to the approval of the Engineer; however, all necessary changes required by the substitution in related machinery, structural, architectural and electrical parts, shall be made by the Contractor at no additional cost.

If any departures from the Contract Drawings or these Specifications are deemed necessary by the Contractor, details of such departures and the reasons therefore shall be submitted as soon as practicable for approval. No such departures shall be made without approval by the Engineer.

INSPECTION AND TESTING

The Contractor shall give no less than ten (10) working days' notice to the Engineer of the beginning of work at foundries, forge, hydraulics supplier shops and machine shops so that inspection may be provided. No materials shall be cast, forged, machined or assembled before the Engineer has been notified where the orders have been placed.

The Contractor shall furnish all facilities for the inspection of material and workmanship in the foundries, forge, hydraulics supplier shops and machine shops and the Inspector designated by the Engineer shall be allowed free access to necessary parts of the premises. Work done while the Inspector has been refused access or presented in a manner that prevents adequate inspection will automatically be rejected.

The Inspector shall have the authority to reject materials or workmanship, which do not fulfill the requirements of these Specifications.

Inspection at the foundries, forge, hydraulics supplier shops and machine shops is intended as a means of facilitating the work and shall not relieve the Contractor of their responsibility in regard to imperfect material or workmanship and the necessity for replacing defective materials or workmanship which are delivered to the job site.

The Contractor shall furnish the Engineer with a copy of all orders covering work performed by subcontractors or suppliers.

Unless otherwise provided, the Contractor shall furnish without additional charge test specimens as required and all labor, testing machines, tools and equipment necessary to prepare the specimens and to make the physical tests and chemical analyses required by material specifications. A copy of all test reports and chemical analyses shall be furnished to the Engineer.

The acceptance of any material or finished parts by the Engineer shall not be a bar to their subsequent rejection if found defective. Rejected material and workmanship shall be replaced or made acceptable by the Contractor at no additional cost.

DEFECTIVE MATERIALS AND WORKMANSHIP

All machinery rejected during inspection and testing shall be removed from the work site and replaced without additional cost.

Delays resulting from the rejection of material, equipment or work shall not be the basis of any claim.

All defects found during the guarantee period resulting from faulty material, components, workmanship, or installation shall be corrected by the Contractor without cost. NCDOT reserves the right to make necessary correction with its own forces and charge the resulting costs to the Contractor.

TRAINING

The Contractor shall provide two – eight hour days of instruction to operator and maintenance personnel. The instruction shall include but not be limited to the following with respect to all machinery components:

a. All required maintenance activities
b. Checking and adding lubricants and hydraulic fluid
c. Purging and replacing lubricants and hydraulic fluid
d. Venting of the hydraulic system
e. Normal operation
f. Auxiliary operation
g. Adjustments for all adjustable components
h. Instructions how to remove and replace all hydraulic components
i. Instructions on how to operate the ramp

PRODUCTS

FASTENERS

All bolts for connecting machinery parts to each other or to supporting members shall be as shown on the plans or specified otherwise and conform to one of the following types:

Machinery Fit, high-strength bolts.

Structural Fit, high strength bolts.

Turned bolts, turned cap screws and turned studs.

Countersunk socket head cap screws.

All high strength bolts shown on the mechanical drawings shall be machinery fit unless otherwise noted. All high strength structural bolts shall meet the requirements of ASTM A325. All high strength machinery fit bolts shall meet the requirements of ASTM A449.

Holes for Machinery Fit high strength bolts shall be individually reamed for a clearance of not more than 0.010 inch with the actual bolt for that hole. The clearance shall be checked with a 0.011inch wire. The hole shall be considered too large if the wire can be inserted in the hole together with the bolt. To achieve this machinery fit throughout the entire grip length, it is the Contractors responsibility to correct any slight bend in to bolt shank. Structural Fit high strength bolts shall have a maximum clearance of 1/16 inch between the bolt shank and hole.

Both Machinery Fit and Structural Fit high strength bolts shall be connected using nuts meeting the requirements of ASTM A563.

Turned bolts, turned cap screws and turned studs shall have turned shanks and cut threads. Turned bolts shall have semi-finished, washer-faced, hexagonal heads and nuts. Turned cap screws shall have finished, washer-faced, hexagonal heads. All finished shanks of turned fasteners shall be 1/16 inch larger in diameter than the diameter of the thread, which shall determine the head and nut dimensions. The shanks of all turned fasteners shall have

Class LC6 fit in the finished holes in accordance with ANSI Standard B18.2. The material used for machining turned shank fasteners shall meet the requirements of ASTM A193, Grade B7. Turned bolts shall be connected using nuts meeting the requirements of ASTM A194. Turned fasteners shall be fully detailed on shop drawings.

Hex socket flat countersunk head cap screws shall conform to ANSI/ASME B18.5 and shall be fabricated from the material shown on the contract drawings.

Bolt holes through unfinished surfaces shall be spot faced for the head and nut, square with the axis of the hole.

Unless otherwise called for, all turned bolt holes in machinery parts or connecting these parts to the supporting steel work shall be subdrilled at least ¼ inch smaller in diameter than the bolt diameter and shall be reamed assembled for the proper fit at assembly or at erection with the steel work after the parts are correctly assembled and aligned.

Holes in shims and fills for machinery parts shall be reamed or drilled to the same tolerances as the connected parts at final assembly.

Wherever possible, high strength bolts connecting machinery parts to structural parts or other machinery parts shall be inserted through the thinner element into the thicker element.

High-strength bolts shall be installed with a hardened plain washer meeting ASTM F436 at each end.

Positive locks of an approved type shall be furnished for all nuts, except those on ASTM A325 bolts. If double nuts are used, they shall be used for all connections requiring occasional opening or adjustment. If lock washers are used for securing, they shall be made of tempered steel and shall conform to the SAE regular dimensions. The material shall meet the SAE tests for temper and toughness.

All fasteners shall be of United States manufacture and shall be clearly marked with the manufacturer's designation.

All cotters shall conform to the SAE standard dimensions and shall be made of half-round stainless steel wire, ASTM A276, Type 316.

BEARINGS AND BUSHINGS

Pillow block bearings shall be as called for on the drawings. Housings shall be fabricated from ASTM A36 and capable of withstanding the design radial load in any direction, including uplift. Undersized mounting holes shall be drilled from the solid in the shop to ensure perpendicularity and location. Cap bolts on pillow blocks shall be high-strength steel. The cap and cap bolts shall be capable of resisting the rated bearing load as an uplift force. Bearing and bushing diameters shall be finished to the limits of an ANSI Class RC6 running fit.

All grease-lubricated bronze bushed plain bearings shall have grease grooves cut in a spiral pattern for the length of the bearing and shall terminate no less than ¼" from the ends, unless otherwise shown on the Plans or in the Specifications. All grease grooves shall be machine-cut and smooth. The corners of all grooves shall be rounded to a radius of not more than half the width of the groove.

Laminated bearing liners shall be surface-bonded, laminated brass or bronze shim stock. The laminations shall be peelable by knife for reductions of 0.003 inch in thickness of the laminated stack. Laminated shims shall be as manufactured by one of the following companies, or approved equal.

Ohio Gasket & Shim Company, Akron, OH

Metallo Gasket Co., New Brunswick, NJ

Allinabal, Milford, CT

Spirol International Corp., Danielson, CT

Laminated Shim Company, Orange, CA

PIVOT PINS

Use pivot pins in conformance with ASTM A668 unless otherwise specified. All journal-bearing areas on shafts and pins shall be polished, with no trace of tool marks or scratches on the journal surface or adjoining shoulder fillets. All journal bearing areas shall have a finish of 8 micro-inch and shall be finished to the limits of an ANSI Class RC6 running fit.

Turned, ground and polished shafting straightness tolerances shall be 0.002 inches per foot for shafts up to and including 1-½ inches in diameter and 0.005 inches per foot for shafts over 1-½ inches in diameter.

Accurately finish all shafts and pins round, smooth, and straight and when turned to different diameters, round fillets at the shoulders. Bore lengthwise through the center (to a diameter approximately one-fifth the smallest body diameter) for each shaft or pin having a uniform diameter of more than 8-inches and each shaft or pin having several diameters, of which the smallest is more than 8-inches.

As required lengths are reached, fabricate each end of all shafts with a 60-degree lathe center, with a clearance hole at the exact center of the shaft. Prepare the ends of the shafts that have a hole bored lengthwise through the center for the attachment of a centering device equivalent to the lathe center. All such devices are furnished as part of the work.

Where it is required to use stepped shafts have fillets blended in smoothly to adjacent surfaces without tool marks or scratches, machine the surfaces to an ANSI maximum roughness of 63 micro inches.

Submit material certificates for all shafting to NCDOT.

HUBS AND BORES

The hubs of all gears, wheels and couplings shall be finished on both faces and polished where the hub face performs the function of a collar to prevent shaft movement. The hubs shall be bored concentric with the rims of gears and wheels or with the outside of couplings. All hubs shall have an ANSI Class FN2 shrink fit on the shafts, unless otherwise specified. Assembly shall be accomplished by heating the hub, cooling the shaft and moving the parts to correct position without force. The use of liquid nitrogen for cooling is prohibited. Dry ice is recommended for cooling.

SHIMS

All machinery shims required for leveling and alignment of equipment shall be steel, neatly trimmed to the dimensions of the assembled parts and drilled for all bolts that pass through the shims. Shims shall provide full bearing between machinery components and structural supports. In general, sufficient thicknesses shall be furnished to secure 1/64" variations of the shim allowance plus one shim equal to the full allowance. Shims shall be Stainless Steel ASTM A240 Type 304. Shims shall be provided without bolt holes and shall be reamed in the field to the same fit as the other connected components. Shims greater than ½ inch shall include one solid plate of thickness equal to ½ inch less than total shim thickness.

Shims shall be shown and fully dimensioned as details on the working drawings. Shims with open side or U-shaped holes for bolts will not be permitted. No shims shall have less than two holes for bolts.

The use of peelable laminated shims with solder or resin bonding will be permitted as previously specified. Plastic or other non-metallic shims will not be permitted.

WELDING

Welding required for machinery with the exception of the HPU support frame shall be performed in accordance with the requirements in Bridge Welding Code AWS D1.5. Stress relieving will be required whenever a weldment is to be machined. All welds used to fabricate machinery shall be completely tested by ultrasonic inspection per AWS D1.5 Section 12.16. All machining shall be performed after welding and stress relieving. The HPU support frame shall be performed in accordance with the requirements of Welding Code AWS D1.1 at a minimum.

Welding joint sizes and details shall be shown on working drawings. Where multi-pass welds are required, welding procedures shall be submitted on or with shop drawings.

Distortion during fabrication shall be kept to a minimum by the use of welding fixtures and proper welding procedures.

Hydraulic pipe welding shall be in accordance with ASME B31.1.

LUBRICATION

Standard grease fittings for a pressure system of lubrication shall be provided for all bearings and surfaces requiring external lubrication. The fitting shall be NPTF giant button head type.

The fittings shall be connected directly into the bearings by 1/4-inch minimum size, extra strong, threaded stainless steel pipe and forged threaded fittings.

Pipe extensions shall be provided to facilitate access for lubrication but shall be kept as short as practical and shall be rigidly supported at the fittings and at intermediate points.

During construction, the Contractor shall lubricate all rotating and sliding parts of the machinery and fill all pillow block housings and flexible couplings with lubricants indicated on the approved charts.

Lubrication fittings shall be as manufactured by one of the following companies, or approved equal:

Stewart Warner Alemite Corp., Charlotte, NC

Lincoln, Inc., St. Louis, MO

LUBRICANTS

General

The Contractor shall coordinate all lubricants to be used for ferry machinery with NCDOT Maintenance forces and submit selections to Engineer for approval.

PAINTS

All machinery to be painted shall be coated with one coat of epoxy mastic primer manufactured by one of the following companies or an approved equal:

Sherwin-Williams Co., Epoxy Mastic Aluminum II

Carboline, Carbomastic 15-Epoxy Mastic

Paint for the pre-final field painting of machinery shall consist of one intermediate coat of approved epoxy paint compatible with the prime coat system.

The final field applied paint shall consist of one coat of approved polyurethane paint resistant to weathering and abrasion and compatible with the intermediate coat.

No paints used shall contain lead. All layer thicknesses shall meet paint manufacturer’s specification.

Paint for painting pillow blocks and flexible couplings shall be special oil-resistant crankcase paint as approved by the paint manufacturer.

Contractor shall verify that paint for all components that may come in contact with the hydraulic fluid is compatible. As a minimum the float mechanism and all structural steel under the HPU will be included in this list.

Rubbing surfaces at thrust faces of bearings shall not be painted.

Stainless steel elements shall not be painted although welded portions of stainless steel elements such as the OD of the thrust collars shall be painted.

COATINGS

The threads of all machinery mounting bolts shall be coated with anti-seize compound before assembly of the nuts to prevent corrosion or galling and to facilitate future removal if necessary. This requirement does not apply to structural bolts.

Anti-seize compounds shall be as manufactured by the following companies, or approval equal:

Huron Industries, Port Huron, MI	Neolube #1
Fel-Pro, Inc., Skokie, IL	#C-670
SPC Technologies	Unbrako, Jenkintown, PA

Rust-inhibiting coatings for temporary protection of machined surfaces shall be as manufactured by one of the following companies, or approved equal:

E.F. Houghton & Co., Valley Forge, PA - Rust Veto 344, Cosomoline 1058’

Sanchem, Inc., Chicago, IL - No-Ox-Id "A” Special “X”

A.W. Chesterton, Co.,Stoneham, MA - Heavy-Duty Rust Guard

Texaco, Houston, TX Metal Protective Oil L.

HYDRAULIC POWER UNIT (HPU)

The HPU shall conform to ISO 4413. The HPU shall be rated for a working pressure of 3,000 psi or greater.

All HPU components shall be arranged to be readily accessible for adjustment and maintenance.

The reservoir shall be a JIC configuration. The reservoir shall be of heavy-duty welded steel 316 stainless steel construction as per AASHTO. The reservoir shall be structurally rigid to resist warpage and damage from the mounting of equipment on the reservoir top, handling during shipping, and erection at the bridge site. The reservoir shall have drains with valves which allow a complete fluid change without disconnecting any hydraulic components. The reservoir shall have a fill port with a filter. .

The reservoir shall contain a fluid conditioning magnet. The magnet shall extend from the top of the fluid level to 1" from the bottom of the reservoir and shall be removable without draining the reservoir.

The immersion heater shall be of the electric resistance, dry-well type. The watt density of the immersion heater shall not exceed the acceptable limits for the hydraulic fluid. The immersion heater shall maintain the fluid at a temperature of 100 degrees F. The immersion heater shall be sized by the manufacturer to maintain the minimum acceptable fluid temperature when the ambient temperature is 32 degrees F. The immersion heater shall be controlled by automatic thermostats.

The level indicator with integral thermometer shall be compatible with the hydraulic fluid. Permanent markings shall be provided showing the acceptable range of fluid levels and temperatures.

All fluid conduits used between components of HPU shall be sized to meet the requirements of AASHTO section 7.6.9 at a minimum.

HYDRAULIC POWER UNIT HARDWARE

All fastener bolts, nuts, washers and other mounting hardware mounted on the hydraulic power unit shall be of a similar material, i.e. type 316 stainless steel, unless otherwise approved.

HYDRAULIC CYLINDERS AND ACCESSORIES

Hydraulic cylinders shall be as specified on the plans, or approved equal.

Hydraulic cylinders shall conform to ISO 4413, Section 5.4.2.

Hydraulic cylinders shall be rated for 3,000 psi and shall have a minimum factor of safety of 3.33 against static failure pressure and buckling.

Protective flexible rod boots shall be provided for all cylinders that are normally extended.

Cylinder rods shall be made from stainless steel material and chrome plated.

Cylinders shall be configured to directly mount manifold to (bottom) rod port and have a tube fitting connection at the (top) blind port. Cylinder body shall have provisions to secure hoses leading from shutoff valves above to cylinder manifold at bottom. A minimum of three support locations shall be provided for three hoses each. The cylinders shall be configured so hose connection hardware does not coincide or interfere with tube or pipe leading to blind end port.

Cylinders shall be supplied with cushions at both ends of travel.

ACCUMULATORS

Gas accumulators shall be charged with nitrogen, or other inert gas as approved by the Engineer.

HYDRAULIC PIPING AND TUBING

All hydraulic piping material shall be seamless, low carbon stainless steel conforming to ASTM A312, type 316L. All hydraulic tubing material shall be seamless, annealed, low carbon stainless steel conforming to ASTM A269, type 316L, ISO 10763, and ANSI B31.1 standards. Maximum tubing size shall be 1.5 in nominal.

Pipe and tubing shall be designed such that the allowable working stresses established in ASME B31.1 are not exceeded at the maximum design working pressure of 3,000 psi. The sizes given on the contract drawings are minimum sizes. The maximum allowable flow velocities are as follows:

Suction Lines – 5 feet/second

Pressure Lines – 15 feet/second

Return Lines – 15 feet/second

HYDRAULIC PIPE AND TUBE SUPPORTS

Hydraulic pipe and tube supports shall be a cushion clamp system as manufactured by Hydra-Zorb Company or approved equal. All clamps, fasteners, and channels shall be 316 series stainless steel. Support spacing and locations shall be in accordance with ISO 4413, Section 5.4.6.

PIPE/TUBE FITTINGS

All pipe and tube fittings shall be 316 stainless steel and be similar to the pipes/tubes in which they are fitted. All pressure fittings shall be rated at 3,000 psi or greater. Acceptable welded pipe fittings shall be 37° flare type or SAE straight thread for sizes up to and including 1.5 inch NPS. Mating 37° surface shall have an O-ring and O-ring boss for a leak-free connection. For connections greater than 1.5 inch NPS, butt welded or welded four-bolt flanges utilizing a captive O-ring pressure seal system shall be used. Flange fittings materials shall be similar to the flange materials. Flange bolts shall be provided with locking washers. Pipe threads shall not be used on any portion of the system where pressures exceed 200 psi. Where pipe threads are permitted (200 psi and below), pipe sealant is not permitted.

JIC 37° flared fittings shall be used provided that: mating 37° surface use an O-ring and O-ring boss to provide a leak-free connection. OR: all tubing to device and tubing to tubing connections shall be flanged 90 degrees for O-Ring Face Seal stainless fittings – SAE J1453. The fittings to devices shall have straight thread with O-ring per SAE J514. Before final assembly of the tubing system, all appropriate surfaces of each fitting shall be covered by a light coat of anti-seize compound. The anti-seize compound shall be compatible with the material of the O-Rings.

The following standards apply for pipe and tube fittings

SAE J514 for JIC 37° fittings

SAE J514 for O-Ring Boss (ORB) fittings

SAE J1453 for O-Ring Face Seal (ORFS) fittings

SAE J518 for Flanges

FLEXIBLE HOSE

Flexible hose material shall be hydraulic duty. SAE J517 shall be used to determine the maximum allowable operating pressure for the hose. Hoses shall be designed for an operating pressure of 5,000 psi. Hose assemblies shall be shop assembled by the hose supplier.

Hose end connections shall be Type 304 stainless steel for 37° female JIC swivel connections or Type 316 stainless steel for four-bolt, O-ring flange connections. Flange dimensions shall be in accordance with SAE J518. Flange bolts shall be provided with locking washers. Hose fittings shall conform to SAE J516 standards.

Flexible hoses shall be restrained or confined in all cases where a hose failure would constitute a hazard.

Hoses shall be supported and organized along length of cylinder body with clamps to present a neat appearance while allowing rotation at the upper pin joint. Note: that hoses shall be arranged so as to compliment rotation of float mechanism and not inhibit it.

VALVES

Valves shall conform to ISO 4413, Section 5.4.4. All valves required for span movement shall be provided with a manual override.

Adjustable valves shall be equipped with protective caps or locking nuts on the adjusting screws to prevent unintentional mis-adjustment.

Directional control valves and blocking valves shall be pilot controlled two stage valves provided with adjustable pilot control chokes or soft shifts to modulate valve opening and closing time for shock and surge pressure control. All solenoid valves shall include manual override capacity.

All solenoid operated valves shall be sized to limit pressure drop at full flow to 100 psi based on specified oil at 20°F or warmer.

All manual valves shall be full port ball valves with 90 degree handle operation and lockable in either the open or closed position using a padlock.

FILTRATION AND FLUID CONDITIONING

Filtration and fluid conditioning shall be in accordance with ISO 4413. All filters and strainers shall be equipped with an indicator to show when the filter requires servicing. Filters shall provide the degree and quality of filtration to meet the cleanliness requirements provided herein. Bypass valves shall be provided as required by the Plans. Filter flow capacity ratings shall be as recommended by the pump manufacturer.

PRESSURE INDICATORS

Gages shall be of durable construction. Dial faces shall be clearly calibrated for pressure ranges 50% and beyond the maximum design operating pressures of the hydraulic system. Gages shall be accurate and shall permit continuous monitoring. Gages shall have a minimum diameter of 4 inches, and preferably 6 inches. Shutoff valves shall be provided at each gage.

Portable gages shall be provided for maintenance and adjustment of the hydraulic system. The pressure ranges shall cover all possible values that will be needed for the system. One gage shall be provided for each pressure range such that the test pressure will be within the mid-half of the total pressure range of the gage. Connections for portable gages shall be of the quick-disconnect type. Test ports shall be equipped with removable, protective caps, secured by chains to the component. Shutoff valves shall be provided at each test port. Test ports shall be provided for all locations that can be pressurized without a permanent pressure gage indicating the pressure.

NAMEPLATES

Hydraulic cylinders shall have engraved permanent stainless steel nameplates which are securely attached to the head of the cylinder. The nameplate shall clearly indicate the manufacturer, model number, cylinder bore, rod diameter, stroke length, pressure rating, and a list of nonstandard features.

Nameplates shall be provided for each control valve indicating the name and function of the valve. Nameplates shall either be engraved stainless steel or a lamicoid nameplate showing white characters on a black background or black characters on a white background.

Nameplates shall be provided for each adjustable hydraulic component. The nameplate shall provide the name, function, and set point for the component. Nameplates shall either be engraved stainless steel or a lamicoid nameplate showing white characters on a black background or black characters on a white background.

MANIFOLDS

Manifolds shall be made of 316 stainless steel.

Manifolds shall be in accordance with ISO 4413.

HYDRAULIC FLUID

The hydraulic fluid shall be Dow UCON Trident AW 46 Hydraulic Fluid. No internal painted parts are permitted with the use of this hydraulic fluid. A rust inhibitor shall be added to the hydraulic fluid. The minimum fluid cleanliness level shall be as stated in the plans, or the cleanliness level required by the most contaminant-sensitive component in the system, whichever is cleaner. All components and seals which will, or may, come into contact with this fluid shall be compatible with this fluid.

QUICK DISCONNECTS

Quick disconnects shall not be used except where otherwise specified herein.

BENDS

5D bends or greater shall be utilized where practicable to eliminate pipe joints. Bends of any lesser radius are not permitted.

CONSTRUCTION

SHOP ASSEMBLY AND OPERATION

Machinery components shall be shop assembled to verify their correct fit prior to shipment. Components not mounted in a common base shall then be disassembled for shipment. Any components requiring selective assembly shall be match marked for future assembly. The Contractor shall notify the Engineer two weeks prior to the shop operation.

Visual inspection of the shop-assembled machinery shall be made by and shop tests shall be witnessed by, a designated representative of the Engineer. If any malfunctions are observed, they shall be corrected and such units shall pass all shop tests before release from the machinery manufacturer's shop.

The following shop tests shall be performed and witnessed by the Engineer:

Custom manifolds shall be pressure tested to 3 times the maximum working pressure. This requirement does not apply to commercial manifolds that are rated for the maximum working pressure.

The assembled HPU shall be shop tested for proper operation. Certified test data shall be submitted to NCDOT for approval prior to shipment to the bridge site.

The HPU shall be shop tested at full drive motor speed under conditions of maximum design pressure at minimum fluid flow, and reduced pressure at maximum fluid flow. Each test shall be conducted for a minimum of 1 hour continuously.

During all tests, the HPU shall be checked for fluid leaks, fluid temperature, proper relief valve operation, and proper operation of charge pumps (as applicable).

Pump control shall be tested for correct speed, response time and direction of rotation.

The settings for all adjustable hydraulic components shall be verified and recorded during shop testing.

Pumps and hydraulic motors shall be tested by the manufacturer before the HPU is assembled and catalog rating certification shall be provided to NCDOT. Tests shall be conducted for 15 minutes continuously, at a minimum test pressure equal to the maximum peak or intermittent pressure rating of the pump or motor.

Pumps shall be checked during testing for external leakage, charge pump pressure and flow (when applicable), and main pump pressure and flow. Integral relief valves shall be set at 3000 psi maximum and checked for proper operation.

Hydraulic motors shall be checked during testing for external leakage, pressure, flow, and torque.

Hydraulic cylinders shall be tested by the manufacturer before shipment to the site. Testing shall include a 30 minute static pressure test at a minimum pressure of 4,000 psi. The catalog rating certification shall be provided to NCDOT.

After each unit has passed all shop tests, the manufacturer shall prepare Certificates of Compliance with the specified tests and shall submit them to the Engineer.

Shafting

During shop testing, shafting that is required by the Plans to be shipped to the shop shall be observed for any out of balance condition or excessive vibrations. Any malfunction shall be reported to the Engineer.

Bearings

Bronze bushed plane bearings shall be shop assembled, lubricated and fastened. During testing, each bearing shall be visually and audibly inspected for operation. After testing, bearing wear, discoloration or defect shall be reported to the Engineer.

Couplings

For shop assembly, couplings shall be aligned within the manufacturer's tolerances, properly lubricated and fastened for testing. During testing, each coupling shall be visually and audibly inspected for proper operation. After testing is complete, each coupling shall be disassembled, cleaned of lubricant and inspected for abnormal wear. Any abnormal observation shall be reported to the Engineer

ERECTION

Procedures

The Contractor shall submit procedures detailing his intended scheme for constructing all machinery. The following procedures shall be submitted:

(a)HPU installation

(b) Hydraulic cylinder installation

(c)Float mechanism installation

Construction and installation shall be done in a coordinated manner to ensure that the machinery components fit the adjacent material furnished under other items.

The span shall not be operated by until all machinery is in pre-final alignment and bolted as approved by the Engineer.

Alignment

All parts of the machinery shall be match marked for proper assembly and correct orientation. Before drilling or reaming, all parts shall be adjusted to exact alignment by means of shims. Tapered shims shall be provided at no additional cost only if required to provide full bearing. After final alignment and bolting, all parts shall operate smoothly.

Fastening

ASTM A325 bolts shall be installed per the requirements of AASHTO LRFD Movable Highway Bridge Design Specification. The tension shall be checked using a calibrated wrench.

Torques for other grades or bolts shall be proportioned to their strength and shall be indicated on the erection drawings.

Quality

The machinery shall be constructed and adjusted by millwrights and foundrymen competent in the type of work involved. They shall be provided with all necessary measuring and leveling instruments as may be required.

The Contractor shall be responsible for verifying and documenting all measurements required to assure that the machinery has been properly installed. The Contractor shall schedule all final measurements with the Resident Engineer. All measurements will be subject to the Engineer's approval.

Hydraulics

It is the contractor's responsibility to maintain the required cleanliness level and verifying the level through resampling in the event of a deficient report from the first sample. The procedure of further cleaning the fluid, collecting, and processing additional samples shall be at the expense of the contractor.

CONTRACTOR'S INSPECTION

After construction is completed, the Contractor shall make a thorough inspection to insure that all parts are properly aligned and adjusted as closely as practicable without actual operation and that all bolts are properly tightened.

After system start-up is complete and unit is properly adjusted, the hydraulics subcontractor shall draw an oil sample from the reservoir using accepted NFPA techniques and

equipment. This sample will be analyzed by a qualified laboratory for particle content. Final report shall be forwarded, in shop drawing format, to the Engineer for review and approval. The required cleanliness level is defined herein; the Contractor shall be responsible to clean the oil until proper cleanliness level is verified through re-sampling of the fluid.

Inspection of tightened fasteners shall be in accordance with the AASHTO Standards. The Contractor's inspection shall also verify that field painting has been performed as specified herein. Touch-up painting shall be performed to correct all painting defects found during this inspection.

The Contractor's inspection shall also verify that all machinery components have been lubricated as specified herein.

The Contractor shall verify that there are no leaks on any of the hydraulic equipment during commissioning Any connections or components which leak shall be corrected or replaced to assure a system with zero leaks at the time of acceptance.

The Contractors shall be accompanied by the Engineer, during his final inspection before machinery testing. On the basis of the results of this inspection, the Engineer shall determine whether the bridge is ready for testing.

FIELD TESTING

When the mechanical and electrical equipment is ready for testing, the Contractor shall meet with the Engineer to arrange a test schedule and shall keep available a complete crew of mechanics for a minimum of four working days in order to provide operation of the span for all tests and to make all adjustments and corrections which shall be required to complete the tests.

The Contractor shall prepare a field-testing procedure, which shall be approved by the Engineer. The testing procedure shall be coordinated with tests required for any electrical equipment and shall include measurements of power and current drawn by the motors when operating under load as required hereinafter. The Contractor shall be responsible not to exceed the electrical design rating of any component during all testing.

Hydraulic system field testing shall be in accordance with AASTHO Part 6, Article 6.5.37.25.4.

PAINTING

General

Cleaning and painting of all unfinished surfaces of machinery shall comply with all the applicable requirements of NCDOT. The Contractor shall submit for review with the working drawings an outline of painting materials and methods as well as limits of painting for each component as well as limits of painting for each component.

Shop Painting

All unfinished machinery external surfaces shall be cleaned with final surface preparation, prior to painting, done by blast cleaning to meet the requirements of SSPC-SP6 "Commercial Blast Cleaning" with the following exceptions:

(d) Sleeve bearings with bushing/babbitting in place

(e) Other equipment with shaft seals

(f) Equipment excepted by the Engineer

The excepted machinery or equipment shall be cleaned with solvent and hand tools to meet the requirements of SSPC-SP2, Hand Tool Cleaning as depicted in SSPC Vis. 1.

After proper surface preparation, all unfinished machinery surfaces, except for those inside of gear housings, flexible couplings and pillow blocks shall be given one shop coat of epoxy primer by hand brushing. Application of primer shall adhere to all relative AASHTO Standards and the paint manufacturer recommendations.

Field Painting

After construction is complete, all machinery surfaces remaining exposed, except rubbing surfaces, shall be thoroughly cleaned with an approved high-flash solvent (noted below), all exposed metal surfaces such as mounting bolts, lifting points and all other paint defects or voids shall be given one coat of epoxy primer. After successfully completing the prime coat, all machinery shall be given one field coat of epoxy paint applied by hand brushing. Application of paint shall adhere to all relative NCDOT Standard Specifications and the paint manufacturer recommendations. Acceptable epoxy paint system manufacturers are given under MATERIALS. Colors for the field coats will be selected from manufacturer's standard samples with the approval of the Engineer.

The Contractor shall take special care to avoid painting of machinery surfaces that are in normal rubbing contact. All nameplates, legend plates and escutcheons mounted on machinery shall be masked for protection from paint. Lubrication fittings shall be kept clog-free.

After completion of the operating tests and acceptance of the machinery, all accumulated oil, grease, dirt and other contaminants shall be washed from exposed machinery surfaces, excepting rubbing surfaces, with an approved high-flash solvent. The cleaned exposed surfaces shall then he hand brush painted a third final field coat of polyurethane paint compatible with the epoxy paint specified above, which shall color-code the machinery to distinguish between fixed and moving parts. Again, the application of paint shall adhere to all relative NCDOT Standard Specifications and the paint manufacturer recommendations. The following colors shall be used unless otherwise required by NCDOT:

(g) Federal Safety Orange: Except for rubbing surfaces, for all moving parts of the machinery such as shafting and the side of gears.

(h) Federal Safety Green: For bearings and all stationary parts of the machinery.

Paint for the final field coat, which shall be compatible with the previous field coats, shall be resistant to weathering and abrasion, conforming to OSHA color requirements of the Safety Color Code for Marking Physical Hazards, ANSI Z53.1, unless otherwise directed by NCDOT. The brand and colors shall be submitted to the Engineer for approval. The Contractor shall place cautionary signs in the Operator's House and at the entrances to the machinery or control rooms that shall explain the color code. Details of the sign giving text, dimensions and materials shall be placed on a shop drawing.

The Contractor shall adhere to all relative AASHTO Standards and the paint manufacturer recommendations for application of the approved paint system. The Contractor shall also coordinate their shop and field schedule to coincide with time constraints of application of primer, intermediate and final coats of paint. The shop and field painting procedure listed here may be revised to meet the time constraints of application of the required coats of paint. Such revision shall not result in additional cost to NCDOT and shall be subject to approval by the Engineer.

MEASUREMENT AND PAYMENT

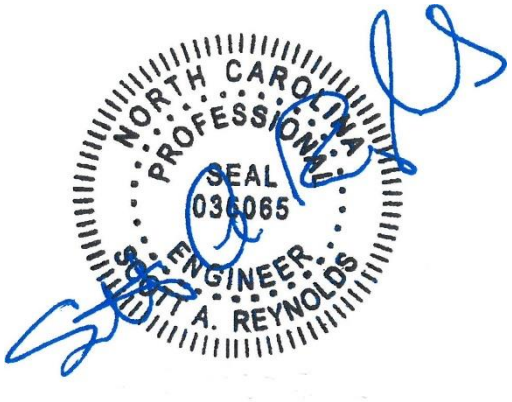
Mechanical Work for Southport/Ft. Fisher Ferry Ramps will not be measured for payment. All costs associated with furnishing, installing materials, labor, tools, and incidentals necessary to complete the work required herein shall be bid as part of the lump sum contract price for *Ramp Hydraulic System* for structure numbers 090209 and 640050.

Payment will be made under:

Pay Item	**Pay Unit**
Generic Ferry Item (Ramp Hydraulic System for Structure)	Lump Sum

Electrical Work

Table of Contents



ELECTRICAL WORK FOR SOUTHPORT/FT. FISHER FERRY RAMPS (SPECIAL)

DESCRIPTION

FIELD MEASURING AND VERIFICATION

The Contractor shall perform field measurements to determine necessary dimensions to locate and install new equipment.

The Contractor shall perform field measuring to verify the existing wiring to verify the wire tags, as-built documentation, and contract plans.

INCOMING SERVICE, TRANSFER SWITCH AND PANELBOARDS

Provide new 120/208VAC, three phase, four wire, 150A (minimum) shore power to the new distribution panel (B1) on Fort Fisher including new conduit and wire from the service point designated by NCDOT.

Provide new 120/208VAC, three phase, four wire, 150A (minimum) shore power to the new ramp distribution panel (R1) on Southport from the maintenance building panelboard. Reuse the existing conduit in a trench and furnish and install new wiring as shown on the plans. Provide new circuit breaker inside the existing panelboard in the maintenance building. The interrupting rating of the circuit breaker shall match or exceed the existing rating.

Furnish and install new 208/120VAC, three phase, four wire disconnect switches and receptacles on each ramp and associated SOOW cables with plugs for backup power of each ramp from the ferry.

Furnish and install new 208/120VAC, three phase, four wire disconnect switches and receptacles on Southport ramp and associated SOOW cables with plugs for charging the ferry from the existing panel SP.

Furnish and install a manual transfer switch for each ferry ramp to transfer from shore to ferry power to operate the HPUs for each ramp. Provide associated SOOW cables with plugs for supply power from the ferry.

Provide new lighting and distribution panelboards as shown on the plans with mounting supports.

MOTOR CONTROLS

Furnish and install the new Hydraulic Power Unit (HPU) motor control enclosure and supports for each ramp as shown on the plans. The control enclosure shall be furnished and paid for under “Mechanical Work for Ft Fisher/Southport Ferry Ramps.”

Furnish and install a custom control pendant and movable support on each ramp as shown on the plans. The pendent shall be furnished and paid for under the item “Mechanical Work for Ft Fisher/Southport Ferry Ramps.”

Furnish and install an emergency stop and alarm enclosure for each ramp as shown on the plans. The emergency stop and alarm enclosure shall be furnished and paid for under the item "Mechanical Work for Ft Fisher/Southport Ferry Ramps."

Furnish and install PLC system as specified herein and elsewhere in the special provisions for operation of the ramp with associated controls as shown on the plans. The PLC system shall be paid for under the item "Mechanical Work for Ft Fisher/Southport Ferry Ramps."

Furnish and install proximity sensors for ramp position as shown on the plans with associated cord sets.

Connect, adjust and make operational temperature sensors, pressure switches, valves, heaters and float switches for the hydraulic systems provided under the mechanical work special provisions, "Mechanical Work for Ft Fisher/Southport Ferry Ramps".

WARNING GATE

Furnish and install one new warning gate for each ramp as shown on the plans with associated controls, contactors, overloads and circuit breakers.

Adjust limit switches inside gate housing as required for proper operation of the gate with the ferry ramp.

Furnish and install local controls either on the gate housing or as a separate pendent to operate the gate in the event of the failure of the main control system.

CONDUIT, WIRE AND CABLE

Furnish and install messenger cables and cable rings to support the flexible cables for each ramp as needed. Maintain a flexible loop to allow the ramp to move the required distance.

Furnish and install messenger supported flexible cables, a shore terminal box and a lift bent terminal box and any other boxes required to facilitate installation on each ramp.

Furnish and install all associated new conduit and wire to the new systems, including but not limited to the following at each ramp:

New lift hydraulic system
New ramp limit switches/prox sensors
New ramp lighting
New receptacle and manual transfer switch for ferry power back to the hydraulic system
New disconnect switches
New panelboards and control enclosures
New temperature switches, pressure switches, float switches and heaters
New flexible cable system
New messenger cable installation
New receptacles
New warning gates

Reconnect existing lighting and panelboard circuits to remain.

LIGHTING AND MISCELLANEOUS EQUIPMENT

Furnish and install a LED cobra head ramp light on each ramp. Each light shall be supplied with its own internal photo-electric sensor controller.

Furnish and install two receptacles on each ramp as shown on the plans.

Furnish and install new panelboards as shown on the plans.

Furnish and install new LED service lighting as shown on the plans.

DEMOLITION

Demolish and remove from site the existing panelboards to be replaced, manual transfer switches, enclosures, conduit, boxes, supports, receptacles, HPU's, control pendent and associated conduit, wire and cables and any other piece of equipment no longer used or required. All equipment to remain in service shall be protected at all times.

OPERATION AND MAINTENANCE MANUALS, TRAINING AND AS-BUILT DOCUMENTATION

The Contractor shall furnish complete operations and maintenance manuals with accurate as-built documentation for all work.

COMMISSIONING AND TESTING

The Contractor shall develop a complete written testing and commissioning procedure for each ramp. The Contractor shall completely commission the ramp systems in an onsite commissioning to show the equipment is installed accurately and safely in accordance with the plans and specifications. All equipment shall be operated to the satisfaction of the Engineer and a record kept to record the testing of all equipment.

REGULATORY REQUIREMENTS

The Contractor shall perform all work and install all materials and equipment in accordance with the applicable sections of the following:

National Fire Protection Association 70 National Electric Code (NEC)
National Fire Protection Association 101 Life Safety Code (NFPA-101)
Underwriter's Laboratory (UL)
American National Standards Institute (ANSI)
National Electrical Manufacturer's Association (NEMA)
Institute of Electrical and Electronics Engineers (IEEE)
International Cable Engineers Association (ICEA)
The Occupational Safety and Health Act (OSHA)
International Electrical Testing Association (NETA)
Insulated Power Cable Engineers Association (IPCEA)
American Society for Testing and Material (ASTM)

Nothing in these Plans and Special Provisions shall be construed to permit work that does not conform to governing codes or regulations. If conflict occurs between the aforementioned codes and the Plans and Special Provisions, the conflict shall be referred to the Engineer for resolution.

RESPONSIBILITY

The Contractor's responsibilities include:

Operation and maintenance of the new and existing ramp equipment up to acceptance of the final operating system.

Removal of all existing equipment to be replaced or otherwise note don the plans or specifications.

Complete installation of all equipment in accordance with these Contract Documents.

Coordinating the details of installation for all Special Provisions sections that affect the work covered under this Specification.

Hydraulic System Vendor

The Contractor shall retain the services of a qualified hydraulic system vendor (HSV) to supply the control system components including but not limited to control panels, PLC System, pendent stations, emergency stop panels, terminal boxes and other equipment related to the hydraulic system (circuit breakers, relays, etc.).

Refer to Special Provisions for the Hydraulic System for requirements, “Mechanical Work for Ft Fisher/Southport Ferry Ramps".

The HSV shall develop schematic wiring diagrams for the complete system in CAD format for review and approved as specified herein and provide field support during commissioning and start-up.

The HSV shall develop all the required programing for the PLC system as specified herein and in the Special Provisions for the Hydraulic System.

Contract Documents

Plans are partially diagrammatic. Exact conduit locations are not shown unless so indicated or specifically dimensioned. Installation of conduit stub-ups shall be in accordance with field conditions and actual manufacturer's shop plans. The Contractor shall be responsible for measuring all dimensions before proceeding with the work.

The electrical wiring diagrams may not completely reflect all connections required for equipment proposed by the Contractor. The Contractor is responsible for installing all wiring required to provide a complete and operable system. All revised wiring shall be documented on the as-built drawings.

At the Southport ramp, the Contractor shall retain the existing wiring and connections to/from panel SP and the new panel R2 for miscellaneous loads nor related to ferry ramp operation unless otherwise noted. New conduit and wire shall be required from

panel SP to the new ferry charging disconnect switch. Reconnection of existing circuits to the new equipment shall be included in this work. At Fort Fisher, all conduit and wire shall be new.

Wiring diagrams are not intended to indicate the exact course of raceways or exact location of outlets. Raceway and outlet locations are approximate and are subject to revision as may be necessary or desirable at the time of installation. One-line and riser diagrams are schematic and do not show physical arrangement of equipment.

Mechanical Hydraulic and Electrical Plans show a correct and workable design based on commercially available machinery and hardware. The Contractor shall be responsible for final makeup and fit to complete the assembly as required for the equipment actually furnished. All deviations shall be shown on full-size as-built drawings.

Departures from Contract Documents

Submit to the Engineer, in writing, details of all proposed departures from these Contract Documents and the reasons therefore. Make no such departures without written approval of the Engineer.

Warranty

Provide a written warranty that the work is free from all defects. The Contractor shall replace or repair, to the satisfaction of the Engineer, any Contractor furnished part that may fail within a period of twelve (12) months after the certificate of final acceptance, provided that such failure is due to defects in material or workmanship, or failure to follow these Special Provisions or Plans.

Working Drawings

The Contractor shall submit complete sets of shop, assembly, erection and working drawings and catalog cuts as called for in the Special Provisions. During preparation of working drawings, the Contractor shall detail, coordinate and verify the relationship of all parts for a complete working system. Methods of fabrication, machining, rigging, special shimming, assembly, lubrication, interfacing with existing components, testing and painting necessary to fabricate, install and operate the various systems shall be considered part of the work and documented on the working drawings.

The Contractor shall coordinate the submission of working drawings such that drawings for manufactured components are submitted and approved prior to, or in conjunction with, the related structural support drawings, mechanical assembly drawings and electrical interconnection diagrams. Working drawing preparation will require close coordination between the Contractor and all mechanical and electrical equipment suppliers to detail and verify the relationship and interconnection of all parts for a complete working system. Working drawings will not be reviewed and will be returned to the Contractor if, in the judgment of the Engineer, working drawing submittals are not coordinated by the Contractor.

Upon completion of the work, the Contractor shall correct all working drawings to show the work as constructed and provide one set of 22 inch by 34 inch mylar reproducibles.

One set of electronic copies shall be submitted on a thumb drive or other storage device and the drawing files shall be in '.pdf' and MicroStation or AutoCAD format.

Substitutions

Each proposed substitution shall be accompanied with a cover letter stating that the substitution meets or exceeds all of the project Plans and Special Provisions, and that all engineering necessary to incorporate the substitution into the project has been completed and is included in the submittal of the substitution.

An equivalent item made by another manufacturer may be substituted for the specified item (unless otherwise prohibited), subject to the written approval of the Engineer.

All necessary changes to the project required by the substitution related to mechanical, structural and/or electrical work and all the required engineering design to completely verify the adequacy of the substitution and subsequent related changes shall be made by the Contractor at no additional cost to the Contracting Agency.

The Contractor shall submit sufficient data for the proposed substitution to demonstrate its equivalency to the specified item, including engineering calculations.

The Engineer's decision on whether a proposed substitution is "equivalent" to the item specified shall be final. The approval of a proposed substitution by the Engineer shall not relieve the Contractor of any contractual responsibility in regard to defective material or workmanship and the necessity for replacing the same.

Submittals

All submittals shall be identified with the name of the ramp, the contract number, the contractor's name and the identification of the system or unit the submittal is in reference to. Three copies of each submittal shall be submitted. Working drawing submittals and other pertinent submittals shall include (but are not limited to the following):

i. Field Measurement and Survey Plan.

ii. Project schedules.

Conduit/raceway layout and installation drawings
All limit switch mounting details.

Working drawings, catalog cut sheets and mounting details shall be submitted for the following equipment:

HPU Motors
Disconnect Switches
Manual Transfer Switches
Limit Switches
Panels
Control Enclosures
Terminal Blocks

Indicating Lights
Transformers
Warning Gates
Wiring Devices
Panelboards
Grounding Equipment
Wire and Cable
Conduit and Fittings
Boxes
Lugs
Wire and Conduit Tags
Power Supplies and UPS
PLC System
Relays/Contactors
Limit Switches
Proximity Sensors

All pertinent electrical data, ratings, calculations and mounting details are to be included on the prints.

Working drawings showing the complete schematic wiring diagram, including all power and control connections for all equipment and point of interface with existing equipment. Each electrical device and each wire between devices shall be identified by an individual designation of letters, numbers, or a combination of both; and such designations shall be used wherever the devices or wires appear on other drawings.

Working drawings and internal connection diagrams of the control enclosures.

Working drawings showing the schedule of electrical apparatus for each panel which shall list each electrical device by its designation as shown on the schematic wiring diagram and shall state for each device its rating, number of poles or contacts, function, catalog number, and location. A complete set of catalog cuts for materials furnished shall be included for each piece of apparatus.

Working drawings showing the complete interconnection diagram(s) for all electrical apparatus. The diagram(s) shall be of the elementary type and shall show the external connections of all devices and equipment.

Submit all final settings on the control equipment supplied under this contract.

Electrical: Installation Submittals

i. Working drawings showing the complete schematic conduit and cable diagram or diagrams showing the interconnection of all devices and equipment, including ducts and junction boxes, and showing all multi-conductor cables. The size of each conduit, and the wire number of each conductor in conduit and multi-conductor cables, shall be shown on the diagrams. Each conduit and multi-conductor cable shall be suitably numbered or lettered, and percent wire fill shall be shown.

Working drawings showing the complete set of layout and installation drawings for the electrical work showing the location and installation, including support and mounting details, of all electrical apparatus and equipment. These drawings shall be made to scale and shall show the exact location of all conduits, cables, boxes, motors, switches, and other electrical equipment and the method of supporting them on the structure. These drawings shall be submitted prior to pertinent mechanical shop drawings so that the raceway installation details may be incorporated by the mechanical fabricators and erectors.

Working drawings of all multi-conductor cables, including the sizes of conductors, type and thickness of insulation, jackets and other components, and giving the outer diameter of each finished cable.

Working drawings showing outline drawings, catalog cut sheets and mounting details shall be submitted for the following equipment:

A. Wiring Devices

B. Grounding Equipment

C. Conduit

D. Boxes

E. Wire and Cable

F. Lugs

G. Wire and Conduit Tags

H. Utility Service Equipment

I. Manual Transfer Switch

J. Ground Rods and Bonding Conductor

Any other drawings, which may, in the opinion of the Engineer, be necessary to show the electrical work.

Wire compression terminal tools shall have been calibrated within the last six months by a calibration facility approved by the manufacturer of the test instruments. Written certification of calibration shall be submitted to and approved by the Engineer prior to connecting terminal lugs to any wires.

Documentation of all electrical conductor insulation resistance testing.

Spare parts list.

As built drawings for all items.

Operation and Maintenance Manuals.

Training syllabus and materials.

MATERIALS

GENERAL

Furnish materials and equipment approved by UL listing wherever standards have been established by that agency.

Where two or more units of the same class of material or equipment are required, furnish products of a single manufacturer.

Furnish materials and equipment with manufacturer's standard finish system, except where otherwise specified. Furnish manufacturer's standard finish color, except where specific color is indicated. If manufacturer has no standard color, finish equipment with ANSI Number 61, light gray color.

COMPLETE SYSTEM

All the systems mentioned shall be complete and operational in every detail except where specifically noted otherwise. Nothing in these Special Provisions shall be construed as releasing the Contractor from furnishing such additional materials and performing all labor required to provide complete and correctly operating systems.

PANELBOARDS

All new circuits for ferry ramp operation shall originate from the ramp panelboards located near the movable ramp. Lighting circuits and miscellaneous loads that are not critical to the ramp operation shall originate from the either the ramp panelboard or distribution panelboard as shown on the plans. It is the intent of these special provision to reconnect all existing circuits not being upgraded to match the existing conditions. The contractor shall field verify and adjust the details shown on the contract plans as required.

The panelboards shall be located shown on the plans and mounted outdoors.

Each panelboards shall be of the dead-front type and shall be provided with quick-make, quick-break, thermal-trip, E-frame, bolt-on branch circuit breakers. Each breaker shall trip free of the operating handle, and the handle shall indicate the position of the breaker. Panelboard circuit breakers shall be approved equal to the Eaton Industrial Quick Lag Circuit Breakers model QBHW.

Each panelboard shall be provided with a circuit breaker in the mains and with a full-sized neutral bar. All branch circuits shall be numbered, and a typewritten directory shall be provided on the inside of each door. Circuit breakers shall meet the requirements of UL Standard 489. Panelboards shall be provided with number of circuit breakers (including four spares) as indicated on the Plans or as otherwise required by the existing conditions. Panelboards shall be rated 120/208-Volt, 3-phase, 4-wire panel and shall be code gauge galvanized steel with ANSI 61 light gray enamel finish and rated NEMA 3R.

The panelboards at Fort Fisher shall be rated for 225 amperes minimum for the ramp panel and 400 amperes for the distribution panel. The panelboards for Southport shall both be rated for 225 amperes. All panelboards shall have a minimum interrupting rating to the match the existing. For Fort Fisher distribution panelboard the size of the panelboards and circuit breakers interrupting rating shall be coordinated with the new service.

The Contractor shall verify the actual existing panelboard ratings, existing circuit breakers, spare slots, and load current ratings of the actual equipment approved for installation and modify circuit breaker ratings and conductor capacities where necessary to accommodate equipment of higher electrical load requirements.

All conduit entrances are to be made only in the bottom of the enclosure unless otherwise noted or approved in writing.

COMMON CONTROL EQUIPMENT

Control apparatus shall conform to the applicable requirements of NEMA Pub. No. ICS Industrial Controls and Systems, latest revision, and to the following:

Circuit Breakers: All branch circuits unless otherwise noted shall be protected by molded-case circuit breakers mounted in the control panels meet the requirements herein. All breakers shall have quick-make, quick-break contacts and the mechanism shall be trip-free and trip indicating. The breakers shall be equipped with thermal-magnetic trips or adjustable instantaneous magnetic trip units. Molded case circuit breakers shall meet the requirements of UL 489, latest revision. Instantaneous magnetic trip circuit breakers, when used, shall only be used for motors and shall be part of a listed combination controller per NEC Article No. 430-52.

Miniature Circuit Breakers: Circuit breakers for control circuits shall be single pole miniature type and meet the requirements of UL 489. The miniature circuit breakers shall be din railed mounted in the control panels and shall have a trip curve of D.

Industrial Control Relays: Industrial control relays shall be multi-contact magnetic machine tool relays with contacts rated at 10 amperes or 20 amperes, 600 volts on a continuous basis. The contact rating shall be selected to coordinate with the rating of the protection device on the wiring diagrams. Each control relay shall be equipped with surge suppression.

Industrial Safety Control Relays: Industrial control safety relays shall be multi-contact magnetic machine tool relays with contacts rated at 10 amperes, 600 volts on a continuous basis. Relays shall feature mechanically linked double break contacts on each pole and shall be specifically designed for safety applications. Tamper resistant covers shall be provided on each relay. Each safety control relay shall be equipped with surge suppression.

Timing Relays: Time-delay relays shall be of the electro-pneumatic or electronic type providing time delay intervals as required with a linear timing range in the ratio of 1:10. Each timing relay shall be provided with a timing head calibrated in linear increments. The number and type of poles shall be as shown in the Plans.

Control Switches, Key Operated Switches, Selector Switches and Push-buttons: Control switches, key operated switches, selector switches and push-buttons on the control desk and panels shall be heavy-duty NEMA type, 30mm diameter base, oil-tight contact blocks operated by glove handle (pistol grip) selector knobs, selector knobs, or push-buttons as indicated in the Plans. All switches and pushbuttons shall be equipped with escutcheon plates as shown on the plans. Contacts shall be fine silver, capable of interrupting 6 amperes at 120 volts AC and of continuously carrying 10 amperes. Key operated switches shall be wired and configured such that the key can only be removed in the off position.

Emergency Stop Push-button: Buttons on the control desk shall be heavy-duty, 30mm diameter base, 2.25 inch diameter mushroom head, oil-tight contact blocks operated by pushing in and pulling out the button mushroom head as indicated in the Plans. The Emergency Stop button shall illuminate when the button mushroom head is depressed to clearly indicate the emergency stop button has been activated. Pulling out the button mushroom head shall deactivate the emergency stop condition. The pushbutton shall be equipped with an escutcheon plate as shown on the plans. Contacts shall be fine silver, capable of interrupting 6 amperes at 120 volts AC and of continuously carrying 10 amperes. The quantity of contacts shall be as shown on the plans. The push-button shall be equipped with surge suppression.

Indicating Lights: Indicating lights shall be heavy-duty NEMA type, 30mm diameter base, oil-tight sockets provided with LED lamps rated 120 volts AC. All lenses shall be glass, with color and escutcheon plates as shown in the Plans.

Terminal Blocks: All terminations for conductors of Size No. 8 AWG and smaller shall made using modular, DIN rail mounted, corrosion resistant, feed through clamp type screw connection terminal blocks with vibration proof pressure plates. Terminal blocks shall be designed to be used with insulated wire ferrule terminal connectors. Ground terminals shall be provided where required and shall clamp the system ground with the enclosure. All paint shall be removed in the section where the ground terminal is installed. Terminal blocks shall have a minimum rating of 600 Volts, 32 amperes and shall be provided with jumper connectors where required to connect circuits and reduce wiring. Conducting parts shall be nickel plated copper and insulating material shall be flame retardant thermo plastic. Corrosion resistant marking strips shall be provided for conductor identification. At least ten- percent spare terminals shall be provided. Where specified terminal blocks shall include surge suppression and/or overcurrent protection. The size and type for all terminal blocks shall be similar. Trip indication shall be included. Terminal blocks shall be provided with factory printed labels for each connection point which correspond to the as-built drawings. The labels shall be installed on the top and bottom of each terminal block.

Wire Ferrules Connectors: Shall be seamless, heavy-duty insulated wire ferrules terminal lugs. Terminal lugs shall be installed per lug manufacturer recommendations using the proper tools approved by the manufacturer.

Fork Tongue Terminal Connectors: Shall be seamless, heavy-duty compression locking fork tongue terminals manufactured from pure electrolytic copper tubing. Terminals shall be tin plated and provided with a double-thick flanged or locking fork tongue and insulation grip. Terminals and compression tools shall be as approved by the Engineer.

Nameplates Plates: Nameplates shall be made of laminated phenolic plastic with white front and back and black core and shall be not less than 3/32 inches thick. All electrical equipment shall be provided with a nameplate. The lettering shall be etched through the front layer to show black engraved letters on a white background. Lettering shall be not less than one-quarter inch high, unless otherwise detailed in the Plans. Nameplates shall be securely fastened to the equipment with a waterproof epoxy.

Receptacles: All receptacles located in the control panels and enclosures shall be 15-ampere, 125-volt, three-wire, grounding type, polarized, ground fault current interrupting (GFCI) duplex convenience outlets. Each receptacle shall be din rail mounted.

Uninterruptable Power Supply (UPS): A UPS shall be installed in each PLC enclosure. The UPS shall be either din rail mounted or floor mount units and shall include line filtering and surge suppression. Each unit shall be rated 800 VA minimum for an input voltage of 120VAC. The UPS shall be provided with relay contacts for low battery and UPS shutdown.

PROGRAMMABLE LOGIC CONTROLLER (PLC) PRODUCT REQUIREMENTS

A programmable logic controller (PLC) shall be furnished, installed and programmed in the HPU control panel as paid for under the item "Mechanical Work for Ft Fisher/Southport Ferry Ramps." Requirements for the PLC system are listed below.

The programmable logic controller (PLC) shall be an Allen Bradley (AB) ControlLogix brand PLC with components, hardware and remote input/output drops. No substitutions shall be accepted. The PLC shall be of modular construction, provide high-speed peer-to-peer networking, and be programmable with ladder logic.

The PLC shall be provided with the following features:
1.5M of battery backed static RAM.
1.5M of Nonvolatile RAM.
Ethernet communication

Each PLC rack shall be as shown on the plans. Each input and output shall be equipped with cage clamp removable terminal blocks wiring arms, oversized housings, and covers. The contractor shall provide terminal blocks as needed.

Each PLC chassis shall be provided with the same manufacturer power supplies. All parts shall be as shown on the plans.

The number of input and output modules required and shown on the plans and shall be integral to the PLC system. Where additional modules are required separate expansion modules shall be provided. PLC rack shall be furnished and installed with a maximum of eight (8) modules. All racks shall communicate via Ethernet/IP with the PLC system and shall utilize fiber optic cabling for long runs to each remote rack. Communication adapters shall be included with each rack rated for 10/100 Mbps and shall use a DLR topology as a redundant communication network.

Where required extender cables shall be provided to split a single rack to meet space requirements.

The Contractor shall furnish and install a UPS with internal noise filter for all PLC power supplies to protect the PLC equipment and controls. The noise filter shall be a series connected high frequency noise filter with transient protection. It shall offer hard wired connection to all critical loads and rated for an industrial environment and equipment. It shall reduce mode transient to +/- 2 volts, have a surge capacity of 45,000 amps, provide transient protection in all modes (line to neutral, line to ground, and neutral to ground), have an LED power indication, and be UL approved. The 120VAC MCOV shall be rated 150 VRMS. The line frequency response time shall be less than 0.5 nano-seconds. The operating temperature shall be –40°C to 45°C at full load. The unit shall be capable of protecting against a peak surge current of 15,000 amps in all modes.

PLC SOFTWARE AND COMPUTER

A new laptop computer compatible with the new PLC shall be as paid for under the item "Mechanical Work for Ft Fisher/Southport Ferry Ramps." Requirements for the laptop computer are listed below.

Furnish and install a semi-rugged, outdoor, environmentally protected laptop computer with specified software, suitable for programming the PLC, HMI display screen and flux vector drive systems. The computer shall be the latest commercially available unit Panasonic ToughBook 54 or approved equal.

It shall meet the minimum requirements of Intel® Core™ i5-6300U vPro™ Processor, 2.4GHz with Turbo Boost up to 3.0GHz, and Intel Smart Cache 3MB. The RAM memory shall be 8GB SDRAM (DDR3L-1600MHz), and equipped with a shock-mounted flex-connect hard drive with quick-release, 500GB. The unit shall be wi-fi and Bluetooth enabled. The unit shall be equipped with all ports and connectors required for the PLC software and the Drive software to utilize the programming software and connect to the equipment. The unit shall be an intelligent terminal, functioning both as a PLC/vector drive programming and data monitoring terminal. It shall permit PLC programming, including loading, editing, and monitoring ladder diagram programs in memory by entering through the keyboard and monitoring on the display. PLC program instructions shall be in ladder logic.

The following software applications are required to be loaded onto the computer and made fully operational by the Contractor.

Windows operating system. Contractor shall verify all software can operate properly on the operating system and coordinate with the software vendors and the operating platform requirements to select the proper software version.
Factory PLC Processor and Network Communication Software.
PLC Processor Programming

The Contractor shall demonstrate operation and use of the software as part of the personnel training as specified in Section Operation & Maintenance Manuals, Training and As-Built Documentation.

CONTROL PANELS

Control panels shall be furnished and as paid for under the item "Mechanical Work for Ft Fisher/Southport Ferry Ramps." Requirements for the control panel system are listed below. Under this item, the contractor shall install the control panels and supports as shown on the plans and make all required terminations.

New control panels where indicated on the plans shall be enclosed in wall/support mount cabinets that shall be furnished and installed as shown on the plans.

All new circuit breakers, switches, contactors, starters, relays, PLC equipment, and other apparatus for control of the ramp shall be mounted on these enclosed panels.

All new equipment in each control cabinet shall be mounted on sheet-steel back plates, and each device shall be front-connected, front-wired, and removable from the front. The equipment in all cabinets shall be arranged for ease of access and for safety and convenience of operation. Special care shall be taken to obtain a systematic and neat arrangement of the equipment. Each device shall be suitably named and plainly marked by a laminated nameplate mounted near the device on the panel. Each nameplate shall show an approved descriptive title for the apparatus, together with the device designation appearing on the schematic wiring diagrams.

Each new control cabinet shall be rated NEMA 4X stainless steel and shall be reinforced with steel angles or channels so as to provide a rigid structure. The control cabinets shall be provided with hinged doors on the front of each panel section. Door panels shall be gasketed and shall be provided with three-point, vault-type latches. All hardware shall be corrosion resistant.

Each panel shall be provided with suitable interior light fixtures and a duplex receptacle. Thermostatically controlled strip heaters shall be provided in each cabinet to prevent build-up of excess moisture. The strip heater shall be rated for 120 VAC. Each cabinet shall also include an enclosure AC unit.

Each control panel enclosure shall be sized as shown on the plans. The length of each assembly shall be such as to permit mounting in the available space. If the final cabinet dimensions, as established by the manufacturer, should necessitate rearrangement or modification of the equipment in order to fit in the available space, such rearrangement or modifications shall be made and at no extra cost to NCDOT. The final arrangement of all equipment shall be subject to the approval of the Engineer.

The new control panel enclosures, back plates, and all metal reinforcing shall be painted inside with two coats and outside with three coats, consisting of one coat of primer followed by one coat of gray or white enamel on the inside surfaces and two coats of gray enamel outside. The finish exterior coat shall be ANSI 61 light gray enamel.

All contactors, relays, and other devices shall be of required current carrying and interrupting capacity. All apparatus shall be of substantial construction and shall conform to the requirements of NEMA Standards Publications ICS 1 and 2, latest revision, for industrial control devices.

All wiring installed within the control cabinets shall be flame-retardant, ethylene-propylene insulated, switchboard wire, Type SIS. Conductors shall be stranded copper not smaller than No. 14 American Wire Gauge (AWG), except conductors connecting directly from PLC I/O to terminal blocks can be minimum No. 16 AWG.

For each assembled control panel, all outgoing wire, No. 8 AWG or smaller, shall be connected to terminal blocks installed in the cabinet. The control panels shall also provide sufficient extra terminals to allow connection of all wires coming from limit switches and other devices that go on to the field devices and other locations as required, even though these wires do not connect to apparatus on the control panels.

Spare terminals totaling at least ten (10) percent of those actually used shall be provided. Each terminal shall be identified per wire number shown on the Contractor's schematic wiring diagrams.

All panel wiring shall be arranged systematically so that circuits can be readily traced. The wiring shall be installed in a network of troughs consisting of horizontal and vertical sections securely bolted to the panels. The troughs shall be fabricated from heavy duty Noryl plastic shaped into a channel cross-section. After installation of the wiring, an insulated, flanged cover shall be fitted over the open side of each trough section.

WARNING BEACON

A warning beacon shall be provided on the top of the emergency stop enclosure as shown on the plans to indicate float mode operation or when an alarm is active.

The beacon shall be an LED type single-high status indicator and capable of producing amber, green or red in any one of four flash patterns and operate at 120VAC.

Each unit shall be mounted on top of a stainless steel enclosure and rated NEMA 4X and rated for hazardous locations. The fixture with lamps shall be approved equal to the model USIX as manufactured by Federal Signal.

PROXIMITY SENSORS

Proximity limit switches hall be furnished and installed as shown on the plans for the upper, middle and lower positions each ramp hydraulic cylinder (12 total not including spares).

The proximity limit switches shall be inductive type, barrel type, stainless steel and rated NEMA 4X. Each limit switch shall be provided with mounting brackets, hardware,

terminal boxes, cord sets and supports as shown on the plans and required for proper operation. The sensing range shall be a minimum of 20mm (0.784") unless otherwise noted.

The sensors shall close its normally open contact at the locations shown on the mechanical plans. The positions the sensors close shall be field adjusted during startup and commissioning. Each unit shall include a LED indicating light and associated CPE rubber cord set with length as required to avoid splicing other than in the terminal box shown on the plans. Each unit shall be 120VAC and connected as a PLC input.

Each proximity sensor shall be provided with a resistor as required by the manufacturer for proper operation with the approved PLC system.

Proximity limit switches shall be approved equal to the Turk NI20-G30-ADZ30X2-B3131 with matching cord set KB-3T* (* denotes required length in meters) unless otherwise noted on the plans.

WARNING GATES

Housing and Assembly: The warning gate operating mechanism and main control components shall be contained in a weatherproof housing. The housing shall be constructed of .188", hot dip galvanized after fabrication. Exterior surfaces shall be painted aluminum. All fasteners shall be corrosion resistant. Arm shaft openings shall incorporate O-ring seals. The front and rear access doors shall be mounted on full cross bronze straps. Hinges shall be of the slip-off type and shall have stainless steel pins. Door handles, two per door, shall use a vise action to compress a neoprene bulb-type gasket to seal the door openings. The contractor shall arrange and fabricate the warning gate for routine maintenance access from the back of each gate. The gate shall be fixed to the existing foundation, using the existing anchor bolts. The gate housing base shall be provided with four 1.00" holes on a 20 1/4" square pattern. The mounting holes in standard base shall be slotted to allow for a 19 1/2" x 20 1/4" mounting pattern to accommodate the existing bolt patterns. The warning arm shall pivot in the vertical plane via a mechanical 4-bar linkage. The linkage shall utilize cranks keyed to the main arm shaft and transmission shaft and an adjustable connecting rod between a pair of self-aligning spherical rod ends. The connecting rod shall be of 1" diameter AISI 4150. The linkage shall be driven by a fully enclosed, double reduction, worm gear speed reducer. Gear ratio used shall produce an operation time of 11 seconds. The velocity of the arm shall follow a sinusoidal pattern to provide smooth operation. The arm shall begin and end its full motion path with zero velocity and accelerate smoothly to maximum velocity at mid-travel. An internal heater with thermostat shall be furnished and installed in the housing, sized by the manufacturer to prevent condensation inside the gate.

Arm Lights and Flashers: New warning gate arm lights shall be mounted on the arm of each gate. Each light shall be high impact plastic double-faced with lenses units. Each light assembly shall be mounted to warning gate arm using an aluminum adapter plate. The lights shall be interconnected with four-conductor plus ground portable cord using watertight connectors at the fixtures. A 120 volt, 100,000-hour LED lamp shall be installed in each

fixture. The lights shall be connected so that adjacent units flash alternately while the headlamp burns steady through a 120 volt flasher. The flasher shall contain two alternating circuits, and one steady circuit and shall be rated for 10 amperes. Fuses for the warning lights and flasher shall be midget cartridge fuses, rated for 250 volt and sized based on the load.

Gate Arms: Each warning gate shall be furnished with a new gate arm. The arms shall have a length to match the existing arms, which shall open through an angle of 90 degrees from the horizontal to the vertical. The gate arm shall be 4" (102mm) square, 6005-T5 aluminum extruded tubing with 3" square end section of high-strength UV-resistant fiberglass or 3" square extruded aluminum. Front and rear arm surfaces shall be covered with alternating red and white high intensity reflective sheeting. Stripes shall be 16" wide, and vertical according to MUTCD. Remaining exposed surfaces shall be painted white. The connection to the new gate arm shall be a shear pin type connection as recommended by the manufacturer. Each gate arm shall be adequately braced transverse to its motion to resist wind loads and to reduce whipping and shall be guyed to prevent sagging. Each assembled gate arm shall be designed for a 75 miles-per-hour wind load. A bumper rod with compression spring shall be provided near the end of each gate arm to stop the travel at the closed position without undue shock.

Disconnect Switch: A new disconnect switch shall be furnished and installed in each warning gate housing. The switches shall be capable of disconnecting motor and brake incoming power, heating power and provide a status signal to the PLC system indicating when the unit if off. The mechanism shall utilize a rotary switch or lever and the status of the switch shall be easily identifiable from the face of the unit. Motor disconnect switches shall have a minimum rating of 10 amperes and include 3 poles and auxiliary contacts as shown on the plans in a common disconnect switch enclosure.

Door Switch: New safety interlock limit switches shall be installed on each access door to the warning gate housings with one normally open and one normally closed contacts. Opening of a housing door shall disable the electrical motor and controls, and cancel any warning gate operation and group operation, as specified in this Special Provision. The limit switches shall be metallic, watertight units rated NEMA 4X and rated for 10A at 120 volts and have a side rotary arm to engage the door and associated strike plate when the unit is mounted in the horizontal position. The arm and body shall be outdoor rated with corrosion resistant hardware.

Motor Starters and Magnetic Contactors: Motor starters shall be mounted inside the gate and include circuit breaker, reversing contactor and overload. The continuous current rating of contactors and starters shall be adequate for the connected loads. Reversing contactors shall be electrically and mechanically interlocked.

Local Controls: Each gate shall include a separate pendent or door mounted pilot devices to operate the gate locally from the gate housing. The control switches and Pushbuttons shall be NEMA 4X heavy-duty, oil-tight contact blocks operated by selector knobs, or push-buttons as indicated in the Plans. Contacts shall be fine silver, capable of interrupting 6

amperes at 120 volts AC and of continuously carrying 10 amperes. Pilot devices shall be approved equal to the 800T series as manufactured by Allen Bradley.

GROUNDING

Grounding of the new electrical circuits and equipment shall meet the requirements of Article 250 of the NEC.

Metallic grounding bushings are to be used on all metallic conduits and fittings, and shall be bonded to the equipment grounding conductor(s). Equipment grounding conductors shall be pulled in all conduit runs, both metallic and non-metallic. These conductors are to be sized in accordance with Article 250 of the NEC or as shown on the plans, and are to be bare copper or color coded green, in accordance with the NEC.

All equipment and devices are to be bonded to the equipment grounds including all panelboards, all shore power receptacles, all messenger cable, junction boxes, motor starters, cabinets, and troughs. All conduit and feeder schedules listing conduit size and circuit conductors do not include the equipment grounding conductors, but these are to be furnished in these runs as detailed above.

CONDUIT AND FITTINGS

All new conduits and fittings as shown on the plans shall be as noted herein. Where installed encased in dirt or through concrete the conduit shall be PVC non-metallic conduit. All other conduit shall be rigid galvanized steel conduit.

In general, conduits shall not be less than ¾ inches in diameter. Sections of conduit shall be connected to each other with screw couplings made up so that the ends of both conduits will butt squarely against each other inside of the coupling.

Flexible conduit where required shall be liquid tight steel conduit conforming to the requirements of UL 360. Fitting and connectors used in conjunction with flexible conduit shall also be steel liquid tight fitting with hot dipped galvanized finish when used with rigid conduit.

Unless otherwise noted the conduit supports shall consist of stainless U-bolts attached to stainless steel supports connected to the steel members, surrounding structure or concrete. All references to galvanized steel conduit and limit switch supports as shown in the plans shall be hot dipped galvanized after fabrication, field cuts will not be permitted. All U-bolts and bracket hangers shall be provided with medium-series lock washers and hexagonal nuts.

Conduit expansion fittings shall be shall be provided with flexible bonding jumpers to maintain the electrical continuity across the joints. The fittings shall permit a total conduit movement of 4 or 8 inches as may be required.

Conduit expansion/deflection fittings shall permit a movement of ¾ inch from the normal in any direction. Flexible bonding jumpers shall be required to maintain bonding integrity whenever expansion fittings are required.

Install drain/breather fittings in all enclosures and conduit systems. Fittings shall be fabricated of stainless steel and shall be capable of passing 25 cc of water per minute.

Conduit hubs shall be provided with a ground bushing to connect the equipment ground conductors and enclosure ground lugs.

Conduit tags for new and existing conduit shall be 1/8" thick flexible acrylic white nametag with black lettering. Each tag shall be a minimum of 1 ¼" x 3 ¾" with space for three lines of text. Engraving shall include the conduit reference number which can be referred back to the as-built documents, conduit size, wire size and quantity. Conduit tags shall be connected to each end of conduit with two plastic ties.

BOXES

Direct buried pull boxes shall be constructed of polymer concrete and reinforced by a heavy-weave fiberglass. The boxes shall be furnished in two sections. The top section is to be stacked on a box extension with solid base. All conduit entrances are to be made in the box extension unless permission is obtained from the Resident Engineer. All conduit entrances are to be cut with a conduit trade size carbide tipped hole saw for each conduit size. No other method of cutting will be permitted. A steel cover is to be provided and the cover and box are to be installed in accordance with the manufacturer's instructions to achieve an H-20 load rating. Two ¾" holes are to be drilled in the bottom of each box extension to allow water to drain into the sand bedding below the box.

No splices of conductors in the pull boxes will be permitted without the approval of the Resident Engineer with the exception of the equipment grounding conductors that are to be bonded together at each pull box.

Splices in junction and terminal boxes shall be made on corrosion resistant terminal strips. Terminal strips shall be provided printed labels identifying the wire alphanumeric tag for the wire terminated on the strip to allow for coordination and identification of the wiring.

Terminal blocks for wires No. 10 AWG and smaller shall be modular, DIN rail mounted, corrosion resistant, tubular screw clamp type with vibration proof pressure plates. Conducting parts shall be nickel plated copper and insulating material shall be flame retardant thermo plastic. Corrosion resistant marking strips shall be provided for conductor identification. At least ten-percent spare terminals shall be provided.

Power terminal blocks for wires No. 8 AWG and larger shall be included in each terminal box as required for such conductors. Each terminal shall be a one-piece power distribution block of molded phenolic compound and shall conform to the requirements specified herein elsewhere. A cover of insulating material shall be provided for each block.

Terminal boxes shall be furnished under the item "Mechanical Work for Ft Fisher/Southport Ferry Ramps" but installed under this item. Requirements shall be as specified herein.

All junction and terminal boxes unless otherwise noted shall be NEMA 4X, 14-gauge, type 316 stainless steel enclosures with hinged, 14-gauge, stainless steel doors supported by a continuous stainless steel hinge with removable pin. Seams shall be continuously welded and ground smooth. Each enclosure shall be provided with stainless steel fast operating

door clamp assemblies and oil-resistant gasket to insure a watertight seal. All boxes and enclosures shall be provided with a nameplate.

Surface mounted boxes shall be provided with external mounting lugs. No box shall be drilled for more conduits or cables than actually enter it. No conduits shall enter the top of an enclosure. All conduit and flexible cable entries shall be bottom entry. Boxes shall be provided with one-half inch combination drain and breather fittings. Fitting shall not affect the NEMA-4X enclosure rating of the enclosure.

Terminal boxes shall be of sufficient size to provide ample room for the terminal blocks and interior wiring, and for the installation of conduit terminations and multi-conductor cable fittings. Interior panels shall be provided for mounting the terminal blocks. Terminal blocks shall be provided in each terminal box for the connection of all conductors including spare conductors entering the box plus at least ten percent spare terminals.

The interior of all boxes shall be provided with insulated supports from which bundled cables may be supported.

Flexible cable SOOW cords shall be provided watertight fittings to enter junction and/or terminal boxes. The fittings will be strain relief type and provide support to the flexible cables. Furnish and install a separate stainless steel wire mesh Kellem grip to support the cables where the enclosure strain relief fittings is feasible or does not provide the cables adequate support. All wire mesh grips and hardware shall be stainless steel and field located to support the flexible cable.

NAMEPLATES

Nameplates shall be made of laminated phenolic plastic with white front and back and black core and shall be not less than 3/32 inches thick. All electrical equipment shall be provided with a nameplate. The lettering shall be etched through the front layer to show black engraved letters on a white background. Lettering shall be not less than one-quarter inch high, unless otherwise detailed in the Plans. Nameplates shall be securely fastened to the equipment with a waterproof epoxy.

Each switch, enclosure, panel, and terminal box shall be provided a nameplate to identify the panel. The nameplate shall have the name of the equipment written out, the alpha-numeric identifier for the equipment, and the highest voltage rating of the equipment.

Each shore terminal box, lift bent terminal box, HPU motor controller enclosure, disconnect switch, and manual transfer switch nameplate shall identify that the panel is powered from multiple sources.

HARDWARE

All hardware, mounting bolts, nuts, washers and other detail parts used for fastening conduit clamps, conduit supports, mounting plates, preformed channels, brackets and other electrical equipment shall be of 316 stainless steel conforming to the requirements of ASTM A593, Type 316. Bolt heads and nuts shall be hexagonal, and shall be provided with

medium series lock washers. Bolts smaller than ½ inch in diameter shall not be used except as may be necessary to fit the mounting holes in small limit switches, boxes and similar standard devices.

316 Stainless steel supports, brackets, boxes and other equipment mounted on concrete surfaces shall be provided with a full neoprene gasket not less than 1/8-inch thick, between the equipment and the surface of the concrete.

All threaded rod for the electrical equipment supports shall be one-half inch, 316 stainless steel, threaded rod.

Anchors for fastening equipment or brackets to concrete surfaces shall be epoxy resin bonded anchors.

WIRE AND CABLE

All wire for this project shall be copper with type XHHW insulation rated 600 volts. All wire shall be UL listed and labeled, and catalog cuts are to be submitted for approval for all sizes and types.

Control wiring shall be at minimum #14 AWG stranded, except as noted on the drawings. The motor wiring conductors shall be at minimum #8 AWG, except as noted on the drawings. All terminations shall use a NEC approved method for terminating stranded conductors.

Flexible cable SOOW cords shall be supported with nylon cable clamps with stainless steel fittings. The clamps shall be secured with screws or stainless steel hose clamp. Support and locate cord to prevent accidental damage. Provide supports every 4 feet for the cords as the routing and geometry allows.

Wire tags for marking the conductors shall be provided on each wire. Each wire tag shall be permanently, mechanically printed with the wire number. No hand written tags shall be allowed. The tags shall be used to identify the terminal strips in each terminal box to coordinate and identify the wiring terminals.

MESSENGER SYSTEM

Furnish the new messenger cable and copperweld cable rings for each ferry ramp. The messenger cable shall be AFL Copperweld Type M Guy Strand, Catalog Number CCS16M, 0.386 inch nominal diameter or an approved equal.

A messenger system is to be installed from the proposed electrical panel support post to the ferry ramp lift structure as shown on the plans at each of the ramp locations. The messenger is to be terminated at a ¾" hot dipped galvanized eye bolt at each end. The eye bolt end at the shore proposed electrical panel support post is to be a stainless steel through bolt. The eye bolt at the diagonal pile is to be through bolted. The messenger cable is to be terminated at the eye bolts using a reliable 3/8" strand vise.

The messenger cable and cable rings shall be provided and paid for under the Generic Structure Item (Electrical System). Installation of the messenger cable, cable rings, and eye bolts to support the 2 inch non-metallic flexible conduit shall be paid for under the Generic Structure Item (Electrical System). The cable rings shall be located on 2 foot centers along the messenger cable.

PUSH-BUTTON STATION HYDRAULIC RAMP CONTROL

Push-button stations shall be furnished under the item "Mechanical Work for Ft Fisher/Southport Ferry Ramps" but installed under this item. Push-button stations shall meet the requirements listed below.

A pushbutton station with a LED pilot light is to be furnished in a non-metallic enclosure rated NEMA 4X as shown on the plans. It is to be furnished with a stainless steel hanger bracket with 3/4" threaded conduit hub in the top. A corrosion resistant liquid tight cord grip with mesh shall be installed in the threaded conduit hub.

Furnish push button units rated NEMA 4X. The top two push buttons shall consist of one normally open-momentary contact and one normally closed-momentary contact complete with a legend plate labeled "PUMP", "START", and "STOP". The next two push buttons shall consist of two interlocked normally open-momentary contact units complete with a legend plate labeled "RAMP", "UP", and "DOWN". To enhance the NEMA 4X rating of the push buttons, weather proof boots are to be installed over the push button operators. They are to be of the following colors and are to be installed with the factory furnished tool:

START	Black Boot
STOP	Red Boot
UP	Black Boot
DOWN	Black Boot
Gate UP	Black Boot
Gate DOWN	Black Boot

The upper mounting blank is to contain a 120 VAC green NEMA 4X pilot light. Pushbutton enclosure to be Square "D" #9001 SKYP-4 with SKRU-1 and SKRU-10 push buttons with SKN-299 legend plates specially marked as indicated above and with a green LED pilot light with a green lens.

The push-button station shall be connected to a separately mounted NEMA 4X SS enclosure using an SOOW cord set. The separate enclosure shall include an alarm indicator, emergency stop push-button and a strobe beacon indicating when the ramp is in float mode.

FERRY HYDRAULIC SYSTEM TRANSFER SWITCH

A manual transfer switch shall be provided for powering each new ramp HPU from ferry vessel power during commercial power outages and back-up generator outages, for a total of two manual transfer switches. The manual transfer switch shall be a four pole double throw safety switch, rated 200 amps at 240 volts, in a NEMA 4X, stainless steel enclosure. The switch shall be equipped with three positions, one position connected to shore power,

one position connected to ferry power and another position for off. The switch shall be lockable in the off position. The switch shall be designed to break the first load before connection to the second load in order to ensure that the two services shall not be connected simultaneously. The new transfer switch shall be mounted as shown on the plans. The enclosures shall be provided with a nameplate as specified herein.

No switch shall be drilled for more conduits or cables than actually enter it. No conduits shall enter the top of an enclosure. All conduit entries shall be bottom entry. Switches shall be provided with one-half inch combination drain and breather fittings. Fittings shall not affect the NEMA-4X enclosure rating of the enclosure.

The manual transfer switch shall be connected to a separately mounted disconnect switch where ferry power (backup power for ramp operation) will be connected through a separate cable. The disconnect switches and cable shall be specified herein.

DISCONNECT SWITCHES AND FERRY POWER RECEPTACLES

Furnish and install a disconnect switch for Ferry power supply to each ramp and another to supply the Ferry with power when docked (only Southport) for a total of three switches. Each switch shall be non-fusible, three phase, heavy duty safety switches in watertight and dust tight NEMA-4X stainless steel enclosures with a lockable handle. The switches shall be rated for 200 amps. The disconnect switch shall open each ungrounded conductor; shall be single throw, and clearly visible when in the 'off' position with the door open.

No switch shall be drilled for more conduits or cables than actually enter it. No conduits shall enter the top of an enclosure. All conduit entries shall be bottom entry. Switches shall be provided with one-half inch combination drain and breather fittings. Fittings shall not affect the NEMA-4X enclosure rating of the enclosure.

Furnish and install 240VAC, three phase, marine grade, wet location rated power receptacles with water tight enclosures as part of the disconnect switch enclosure or include a separately mounted enclosure. The receptacle shall be identical to existing receptacles and be rated for 200A @ 240VAC. One shall be provided on each disconnect switch, for a total of three receptacles.

The new receptacles and disconnect switches shall be located on the ferry ramp as shown on the plans with supports, the exact location on the brackets shall be field located to allow access from the ramp and with-in the reach of the ferry cable for the plug fitting. Include a cord set of sufficient length to reach the Ferry from the ramp when plugged in.

LIGHT FIXTURES

Furnish and install one overhead bent lift light on each ferry ramp, for a total of two lights. Each light shall be outdoor rated, weatherproof, and fully gasketed. Each light shall have an internal fuse and a photo-electric sensor to control the unit. It shall detect the illumination level and turn the light on when the outside illumination level drops below an adjustable setting. The light shall be equipped with an LED style light and provide illumination

equivalent to a 150W High Pressure Sodium (HPS) fixture. The cobra head light shall mount to a two inch stainless steel pipe. Each light shall be rated to operate at 120VAC.

Furnish and install two service light fixtures on Southport only at the locations shown on the plans. Each light shall be outdoor rated, weatherproof, and fully gasketed. Each light shall have an internal fuse and a photo-electric sensor to control the unit. It shall detect the illumination level and turn the light on when the outside illumination level drops below an adjustable setting. The light shall be equipped with an LED style light and provide illumination equivalent to a 250W Metal Halide fixture. The light shall be mount to a support or pole as specified on the plans or otherwise required by the existing conditions. Each light shall be rated to operate at 120VAC.

VOLTAGE AND ARC FLASH WARNING LABELS

Furnish and install warning labels to identify the equipment or panel operating voltage and arc flash warnings. The arc flash warning shall be in accordance with NEC 110.16.

SPARE PARTS

Spare parts shall be furnished by the Contractor as required in the Special Provisions. Spare parts shall be packaged in corrugated cardboard boxes of sufficient thickness for shipping and handling the part contained within. A laminated label identifying the part manufacturer, model or catalog number, description and quantity shall be affixed to each box. The Contractor shall provide a typewritten directory of all spare parts furnished under this Contract. Spare parts shall be delivered to location identified by NCDOT, prior to scheduling final acceptance testing. The Contractor shall stack the material where directed by the Engineer. The Contractor shall contact the Engineer at least five working days prior to scheduled delivery to confirm delivery arrangements.

Minimum spare parts shall include the following:

3 fuses of each size and type installed
Two single pole control circuit breakers for each type and size installed.
One complete assembled relay or contactor for every five installed, with a minimum of one.
Two indicating lamps
Two lens caps of each color installed
Two switches of each type installed
Two pushbuttons of each type installed
Two spare PLC cards for each type furnished including, I/O, power supply and communication cards.
One spare PLC processor
One spare filter/UPS
One spare power supply
One spare lamp for light fixtures
Four proximity sensors with cord sets

TECHNICAL MANUALS (O&M MANUALS)

Maintenance Manuals shall contain descriptive material, catalog cuts with non-pertinent data blocked out, as-built drawings, spare parts list, troubleshooting techniques and any and all information necessary for successful maintenance of the ferry ramp functional systems and each piece of equipment furnished by the Contractor. Ramp functional systems shall be understood to include all operating equipment, electrical service equipment, electrical and control systems, and all other equipment for which periodic maintenance and operation is desirable. Subsequent to acceptance of the ramp by NCDOT following successful completion of testing, errata or addenda to the manuals should address any revisions required.

Operations Manuals shall contain written descriptions of the functional systems of the ramp, step-by-step operating instructions for each of these systems and any and all information and directions required for their successful operation. Subsequent to the break-in period, errata or addenda to the manuals should address any revisions required.

All printed matter, data, drawings, diagrams, etc., shall be accurate, distinct and clearly and easily legible. Illustrations shall be clear; and printed matter, including dimensions and lettering on drawings, shall be legible. If reduced drawings are incorporated to manuals, the original lines and letters shall be darkened as necessary to retain their legibility after reduction. Larger drawings may be folded into manuals to page size.

Operating and maintenance manuals shall be bound in heavy-duty nickel-plated three-hole binders with three trigger positions: lock, unlock and open. Binder shall have metal hinges. Locking mechanism shall allow sheets to lie flat (i.e. channel lock). Covers shall be stiff heavy-duty plastic or other approved material.

The printed material shall be bound into each manual between rigid covers. The manuals shall be approximately 9 inches by 12 inches to contain the drawings without excessive folding so that they may be easily opened. The books shall be neatly entitled with a descriptive title, the name of the project, the location, year of installation, the name of the manufacturer, the engineering firm and the Contractor. Copies of drawings shall be in black on white background and shall be legible. The arrangements of the books, the method of binding, material to be included, and the text shall all be submitted to and approved by the Engineer.

Paper used in these manuals shall be 20-pound, punched paper, water resistant, and acid free of a quality suitable for archival use. Paper shall have 5/16-inch minimum diameter holes, reinforced with plastic or cloth at the standard three (3)-hole spacing. The paper shall be standard 8½”x11”, or, in the case of larger foldout diagrams and illustrations, folded to approximately 8½”x11” size. No paper or other material shall extend beyond the manual covers.

In additional, the approved manuals shall be scanned into PDF files, which will then be placed on a thumb drive and handed over to the NCDOT after final acceptance by the Engineer

CONSTRUCTION METHODS

GENERAL

In the event of conflicts between components shown in the Plans and existing openings, structural members and/or components of other existing systems and equipment having

fixed locations, the Contractor shall consult the Engineer. The Engineer's decision shall govern.

Special attention is called to the fact that this structure moves and that allowances for clearance, snagging of cables and amount of displacement shall be considered. All interference with new and existing structural elements caused by the Contractor's operations shall be corrected by the Contractor at no additional expense to the Contracting Agency.

Any temporary or permanent modifications to the ramps which the Contractor deems necessary in order to perform the work shown on the Plans or in the Special Provisions, or as a result of any substitutions or departures from the Contract Documents shall be submitted to the Engineer for approval.

PLC SYSTEM PROGRAMMING

The ramp sequence of operations and performance specification for the PLC programming are in the Mechanical/Hydraulic Special Provisions. The hydraulic system vendor shall be fully responsible to generate a complete operating system and develop the PLC program and alarm messages in accordance with the Special Provisions, the Plans and the testing and commissioning requirements of this Special Provision.

The Software Programming, Sequence of Operation, Other PLC Functions, and Alarm functions shall be as specified herein and under the special provisions for "Mechanical Work for Ft Fisher/Southport Ferry Ramps."

All logic and wiring shown on the plans
The testing requirements specified herein.
Allowing for specific requirements of the Allen-Bradley PLC as supplied, the program ladder logic shall follow the Special Provisions as closely as possible.

The hydraulic system vendor shall furnish a laptop computer, interconnection cables, power supplies, software and PLC programming to accomplish the specified operation of the ferry ramp and its auxiliaries. Software for the PLC and laptop computer shall be loaded and coordinated by the Contractor to achieve the correct designed operation of all software.

The hydraulic system vendor shall be fully responsible for developing the PLC, and desktop computer software and software programming to accomplish the specified operation of the ferry ramp and its associated equipment. The Contractor shall assume software debugging will occur in the shop as well as in the field during start-up and subsequent testing. No additional payment shall be made for software debugging due to logic changes made in the field.

The PLC program shall be in accordance with the following items:

The ladder logic shall be easy to understand and troubleshoot.
The ladder logic shall be fully documented, including rung comments and address comments.

The ladder logic shall be written with regards to the operational sequence of the ferry ramp, containing separate sections for each of the major equipment areas such as gates, wedges, etc.

From the Operator's standpoint, the ferry ramp shall operate as before in terms of sequence of operation.

The ladder logic shall not utilize or contain the following flaws:

i. Latched coils: PLC logic shall be based upon real world conditions and reset when required. When the PLC loses power, and then power is returned, the PLC will determine the position of the ramp and other electrical equipment, but not expect the ramp to be in the exact same position. If any equipment was operated manually, the PLC program will determine the new position of the equipment and operate normally.
ii. Unnecessary internal coils: PLC logic shall be as simplified as possible and not use multiple relays for a single function. The intent of this is to make the program easy to troubleshoot and understand.
iii. Improper bypass logic: When the bypass switch is utilized the bypass will bypass only the required interlocks. The intent of this item is to provide programming that will utilize the bypasses and only bypasses the correct interlock, but does not remain active in the logic or bypass other interlocks in the program.
iv. Loss of alarms: PLC logic shall be written to record and store the alarms.
v. Switch and Push button time delays: PLC logic shall not add time delays to switches and pushbuttons.
vi. Problems transferring between automatic and manual modes of operation: PLC logic shall allow simple transfer from automatic and manual modes without generating unnecessary alarms for causing failures in the program. The intent of this item is to provide programming that transfers between manual and automatic mode without problems or inaccurate alarms.
vii. Faulty timing logic: The intent of this item is to provide programming that does not have internal timers to determine when problems occur or provide inaccurate alarms.

All timer settings shown in the sequence of operation shall be clearly documented in the program. They shall be adjusted to match the selected equipment and adjusted during shop and field testing for proper operation.

Modify and add alarm messages and associated alarm ladder logic as required.

The PLC shall communicate information through the Ethernet connections with multiple pieces of equipment, such as drives and overload relays. The information shall be identified as an Ethernet input into the PLC.

Contractor shall submit a fully documents and cross-referenced copy of the new PLC program for review and approval.

In the event of CPU failure, all outputs shall turn off.

CLEANING AND PAINTING

All equipment, whether exposed to the weather or not shall be covered to protect it from water, dust and dirt.

After installing, all metal finishes shall be cleaned and polished, cleaned of all dirt, rust, cement, plaster, grease and paint.

Scratched surfaces shall be refinished with paint matching the original finish.

EQUIPMENT IDENTIFICATION

Furnish and install identifying engraved nameplates on all equipment, including pull boxes, to clearly indicate the use, area served, circuit identification, voltage, and equipment ratings.

HANGERS AND SUPPORTS

Furnish and install hangers, brackets, suspension rods and supplementary steel to support equipment. Hangers and supports shall be 316 stainless steel or hot-dipped galvanized after fabrication and/or drilling.

FIELD TESTING

Final acceptance testing shall be performed by the Contractor in the presence of the Engineer. Ten working days' notice shall be provided to the Engineer for the final acceptance testing. Each ramp shall be tested a minimum of 10 deficiency-free full raise and lower cycles and approved by the Engineer Any deficiency found shall be remedied by the Contractor to the satisfaction of the Engineer and the testing shall restart until 10 deficiency-free full raise and lower cycles can be achieved.

The Contractor shall perform field testing of all equipment. The testing shall be coordinated with the mechanical equipment field testing. The equipment to be tested shall include: pushbutton ramp control, emergency stop push-button panel, alarm panel, control panel, panelboards, ferry receptacle, transfer switch including backup and normal power operation, ramp light, hydraulic power unit, and all associated electrical equipment.

The Contractor shall perform field testing of all equipment. The testing shall be coordinated with the mechanical equipment field testing. The equipment to be tested shall include: pushbutton ramp control, emergency stop push-button panel, alarm panel, control panel, panelboards, ferry receptacle, transfer switch including backup and normal power operation, ramp light, hydraulic power unit, and all associated electrical equipment.

INSTALLATION & CONSTRUCTION SEQUENCING

The rehabilitation of the ramp machinery and replacement of the electrical systems will result in periods when the ramp is inoperable. The Contractor shall minimize any outages when the ferry is in operation by use of the temporary operating system if required by NCDOT. The Contractor shall schedule the work and provide the necessary equipment and personnel to minimize the disruptions to the roadway and waterway users. The Contractor shall be responsible for insuring that all necessary materials and equipment are properly fabricated, tested and on site prior to beginning any roadway lane closure or outages.

TECHNICAL MANUALS

The following are suggested tables of contents for each of the manuals. They are not intended to be complete tables of contents and the Contractor shall include all information which may be helpful in maintaining the ferry ramp functional systems, in the case of the Maintenance Manual, or in operating the ramp functional systems, in the case of the Operating Manual.

The tables of contents are given here are in general terms and include information and material on items provided under mechanical and electrical pay items. This is done intentionally to call attention to the need for coordination between the Contractor and all mechanical and electrical sub-contractors in the preparation of these manuals.

Maintenance Manual – Suggested Table of Contents:

Description of all ramp functional systems and sub-systems.
Layout of all ramp functional systems and sub-systems.
Listing of any warnings, cautions, or safety issues or procedures that must be followed as a part of any maintenance work, either specific or general.
Listings of all parts suppliers' local representatives, including suppliers' and representatives' names, addresses, telephone and fax numbers, and websites, if any. The names, addresses, telephone and e-mail, and websites of the Contractor, all subcontractors installing any of the ramp functional systems or subsystems, and the Engineer shall also be provided.
Listing of all spare parts and components provided by the Contractor.
Preventative maintenance procedures, including the frequency at which the various procedures should be done.
Lubrication schedule charts and diagrams.
Maintenance testing and procedure equipment lists.
Troubleshooting procedures and checklists.
Repair procedures and repair procedure equipment lists, including suggested procedures for installation and removal of machinery, electrical and control items.
Description of the proper theoretical approach to installing and aligning machinery and installing and testing electrical and control systems.

As-Built Drawings

Conduit and electrical equipment layout and installation drawings, including mounting details.
Control desk, motor control panels and drive panel layouts and wiring diagrams.
Schematic-wiring diagrams
Certified Drawings
Manufacturers' brochures, literature and composite schedule of apparatus, including any suggested installation, alignment, maintenance, troubleshooting and repair procedures.
Any and all other material or information which in the opinion of the Engineer may be desirable to include in order to assist in maintaining the ramp functional systems and sub-system.

Operating Manual – Suggested Table of Contents:

Description of all ramp functional systems and sub-systems.
Description of functional relationships between ramp functional systems and sub-systems.
Listing of any warnings, cautions, or safety issues or procedures that must be followed as a part of any ramp functional system or sub-system operation, either specific or general.
Theory of operation, detailed operating instructions, which shall cover in full the step-by-step sequence of normal operation of the movable ramp functional systems, all precautions required for the correct and safe operation of all ramp functional systems, adjustment instructions, and operational limits and restrictions.
A similar description for the use of any bypass switches, noting all precautions for their correct and safe operation.
Description of control, which shall describe in full the functions of all protective devices, limit switches, contactors, relays, and all other equipment used in all ramp functional systems, in connection with each step in the operating sequence. Wire and apparatus numbers appearing on the wiring diagrams shall be used in this description for identifying the various devices and circuits.
Block diagrams illustrating the sequencing and operation of and functional relationships between all ramp functional systems and sub-systems.
Any and all other material or information which in the opinion of the Engineer may be desirable to include in order to assist in the operation the ramp functional systems and sub-systems.

A preliminary submittal of the technical manuals shall include, two copies of sample formats and outlines of contents in draft form 90 days prior to final inspection, acceptance tests, or return of ramp operation to the Department, showing proposed methods of binding, methods of printing and reproduction.

A draft submittal of the technical manuals shall include two copies of completed manuals in final form 30 days prior to the final inspection, acceptance tests or return of ramp operation to the Department. At the Engineers discretion, additional submittals of the draft technical manuals may be required as a result of inaccurate information or omitted information.

A final submittal of seven (7) copies of approved manuals and (1) electronic copy in pdf format ten days after final inspection and acceptance tests. One of the seven copies shall become the property of the Engineer; the remaining copies shall become the property of the Department. The final submittal of technical manuals shall only be made once the draft version as noted about has been review and approved.

Training

After submission of copies of the manuals in their final form and prior to the return of ramp operation to NCDOT, the Contractor shall provide instruction and training for NCDOT Maintenance Personnel for a period of 5 days.

The instructors shall be skilled persons competent to operate the ramp and be completely familiar with the operating equipment of the ramp. They shall be able to make any adjustments required to the electrical and mechanical equipment.

During the 5-day training period specified above, the instructor(s) shall be in attendance at the ramp during ramp opening and maintenance procedures.

Included in the 5-day training and instruction period, there shall be an on-site training of NCDOT electricians, maintenance workers, and other personnel as indicated by the Department on subjects such as troubleshooting, repair of electronic motor controls, circuit logic, maintenance and adjustment of all electrical equipment and hardware, and other items required for full ramp operation and maintenance. Two 8-hour sessions shall be devoted to hardware and maintenance related topics. In addition, one 8-hour sessions shall be devoted to software requirements.

Instruction pertaining to hardware and maintenance shall be offered on two separate occasions to allow ferry ramp personnel to coordinate the course with their normal activities. The Contractor shall furnish all necessary instruction sheets, student training aids, books, paper, and booklets to supplement training. The Contractor shall submit to NCDOT, a minimum of 2 weeks prior to training session, an outline of topics to be covered and training material for review. It shall also be the Contractor's responsibility to coordinate with NCDOT the location where training sessions will be held. Supplying of visual aid equipment and other miscellaneous items required for training shall be the responsibility of the Contractor.

MEASUREMENT AND PAYMENT

Electrical Work for Southport/Ft. Fisher Ferry Ramps will not be measured for payment. All costs associated with furnishing and installing materials, labor, tools and incidentals necessary to complete the work required herein shall be bid as part of the lump sum contract prices for *Ramp Electrical System* for structure numbers 090209 and 640050.

Payment will be made under:

Pay Item	**Pay Unit**
Generic Ferry Item (Ramp Electrical System for Structure)	Lump Sum

STANDARD SPECIAL PROVISION

AVAILABILITY OF FUNDS – TERMINATION OF CONTRACTS:

(5-20-08) Z-2

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

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

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

BIDS OVER LIMIT:

(08-01-16) SPD 01-400

In accordance with GS 136-28.1(b), if the total bid amount of the contract exceeds $5.0 million, the bid will not be considered for award.

DIVISION LET CONTRACT PREQUALIFICATION:

(07-01-14)(12-1-16) SPD 01-410

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

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

SAFETY VESTS:

All Contractors' personnel, all subcontractors and their personnel, and any material suppliers and their personnel must wear an OSHA approved reflective vest or outer garment at all times while on the project.

CONTRACTOR CLAIM SUBMITTAL FORM:

(2-12-14) 104-3 SPD 01-440

If the Contractor elects to file a written claim or requests an extension of contract time, it shall be submitted on the *Contractor Claim Submittal Form (CCSF)* available through the Construction Unit or at https://connect.ncdot.gov/projects/construction/Pages/Construction-Resources.aspx as Form CCSF under Construction Forms.

Any claims for additional compensation and/or extensions of the completion date shall be submitted to the Division Engineer in writing, with detailed justification, prior to submitting the final invoice payment. Once an invoice is received and accepted that is marked as "Final", the Contractor shall be barred from recovery.

DRIVEWAYS AND PRIVATE PROPERTY:

The Contractor shall maintain access to driveways for all residents and property owners throughout the life of the project. The Contractor shall not perform work for private citizens or agencies in conjunction with this project or within the project limits of this contract.

COOPERATION WITH STATE FORCES:

The Contractor must cooperate with State forces working within the limits of this project as directed by the Engineer.

ERRATA

(10-16-18) (Rev.1-15-19) Z-4

Revise the *2018 Standard Specifications* as follows:

Division 6

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

Division 7

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

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

Division 10

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

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

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

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

Division 17

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

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

Directional Drill (1)(1.25″) Linear Foot

PLANT AND PEST QUARANTINES:

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

(3-18-03) (Rev. 12-20-16) Z-04a

Within Quarantined Area

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

Originating in a Quarantined County

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

Contact

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

Regulated Articles Include

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

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

MINIMUM WAGES:
(7-21-09) Z-5

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

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

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

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

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

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

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

TITLE VI AND NONDISCRIMINATION:
(6-28-77)(Rev 6/19/2018) Z-6

Revise the *2018 Standard Specifications* as follows:

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

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

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

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

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

(a) Compliance with Regulations

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

(b) Nondiscrimination

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

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

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

(d) Information and Reports

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

(e) Sanctions for Noncompliance:

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

(i) Withholding payments to the contractor under the contract until the contractor complies; and/or

(ii) Cancelling, terminating, or suspending a contract, in whole or in part.

(f) Incorporation of Provisions

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

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

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

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

1. Post NCDOT's Notice of Nondiscrimination and the Contractor's own Equal Employment Opportunity (EEO) Policy in conspicuous locations accessible to all employees, applicants and subcontractors on the jobsite.

2. Physically incorporate the required Title VI clauses into all subcontracts on federally-assisted and state-funded NCDOT projects, and ensure inclusion by subcontractors into all lower-tier subcontracts.

3. Required Solicitation Language. The Contractor shall include the following notification in all solicitations for bids and requests for work or material, regardless of funding source:

"The North Carolina Department of Transportation, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 US.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in

consideration for an award. In accordance with other related nondiscrimination authorities, bidders and contractors will also not be discriminated against on the grounds of sex, age, disability, low-income level, creed/religion, or limited English proficiency in consideration for an award."

4. Physically incorporate the FHWA-1273, in its entirety, into all subcontracts and subsequent lower tier subcontracts on Federal-aid highway construction contracts only.
5. Provide language assistance services (i.e., written translation and oral interpretation), free of charge, to LEP employees and applicants. Contact NCDOT OCR for further assistance, if needed.
6. For assistance with these Title VI requirements, contact the NCDOT Title VI Nondiscrimination Program at 1-800-522-0453.

(b) Subrecipients (e.g. cities, counties, LGAs, planning organizations) may be required to prepare and submit a Title VI Plan to NCDOT, including Title VI Assurances and/or agreements. Subrecipients must also ensure compliance by their contractors and subrecipients with Title VI. (23 CFR 200.9(b)(7))

(c) If reviewed or investigated by NCDOT, the contractor or subrecipient agrees to take affirmative action to correct any deficiencies found within a reasonable time period, not to exceed 90 calendar days, unless additional time is granted by NCDOT. (23 CFR 200.9(b)(15))

(d) The Contractor is responsible for notifying subcontractors of NCDOT's External Discrimination Complaints Process.

1. Applicability

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

2. Eligibility

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

3. Time Limits and Filing Options

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

   (i) The date of the alleged act of discrimination; or

   (ii) The date when the person(s) became aware of the alleged discrimination; or

   (iii) Where there has been a continuing course of conduct, the date on which that conduct was discontinued or the latest instance of the conduct.

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

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

4. Format for Complaints

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

5. Discrimination Complaint Form

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

6. Complaint Basis

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

TABLE 103-1
COMPLAINT BASIS

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

Disability	Physical or mental impairment, permanent or temporary, or perceived.	Blind, alcoholic, para-amputee, epileptic, diabetic, arthritic	Section 504 of the Rehabilitation Act of 1973; Americans with Disabilities Act of 1990
Religion (in the context of employment) *(Religion/ Creed in all aspects of any aviation or transit-related construction)*	An individual belonging to a religious group; or the perception, based on distinguishable characteristics that a person is a member of a religious group. In practice, actions taken as a result of the moral and ethical beliefs as to what is right and wrong, which are sincerely held with the strength of traditional religious views. ***Note:*** Does not have to be associated with a recognized religious group or church; if an individual sincerely holds to the belief, it is a protected religious practice.	Muslim, Christian, Sikh, Hindu, etc.	Title VII of the Civil Rights Act of 1964; 23 CFR 230; FHWA-1273 Required Contract Provisions. *(49 U.S.C. 5332(b);* *49 U.S.C. 47123)*

(3) **Pertinent Nondiscrimination Authorities**

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

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21.
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 et seq.), (prohibits discrimination on the basis of sex);
- Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 et seq.), as amended, (prohibits discrimination on the basis of disability) and 49 CFR Part 27;
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 et seq.), (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);

(g) The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);

(h) Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131-

12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;

(i) The Federal Aviation Administration's Nondiscrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);

(j) Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures Nondiscrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;

(k) Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of Limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);

(l) Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).

(m) Title VII of the Civil Rights Act of 1964 (42 U.S.C. § 2000e et seq., Pub. L. 88-352), (prohibits employment discrimination on the basis of race, color, religion, sex, or national origin).

(4) **Additional Title VI Assurances**

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

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

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

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

(HABENDUM CLAUSE)

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

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

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

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

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

1. The (grantee, lessee, permittee, etc. as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree [in the case of deeds and leases add "as a covenant running with the land"] that:

(i.) In the event facilities are constructed, maintained, or otherwise operated on the property described in this (deed, license, lease, permit, etc.) for a purpose for which a U.S. Department of Transportation activity, facility, or program is extended or for another purpose involving the provision of similar services or benefits, the (grantee, licensee, lessee, permittee, etc.) will maintain and operate such facilities and services in compliance with all requirements imposed by the Acts and Regulations (as may be amended) such that no person on the grounds of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities.

2. With respect to licenses, leases, permits, etc., in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will have the right to terminate the (lease, license, permit, etc.) and to enter, re-enter, and repossess said lands and facilities thereon, and hold the same as if the (lease, license, permit, etc.) had never been made or issued. *

3. With respect to a deed, in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will have the right to enter or re-enter the lands and facilities thereon, and the above described lands and facilities will there upon revert to and vest in and become the absolute property of the NCDOT and its assigns. *

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

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

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

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

2. With respect to (licenses, leases, permits, etc.), in the event of breach of any of the above Non¬ discrimination covenants, the NCDOT will have the right to terminate the (license, permit, etc., as appropriate) and to enter or re-enter and repossess said land and the facilities thereon, and hold the same as if said (license, permit, etc., as appropriate) had never been made or issued. *

3. With respect to deeds, in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will there upon revert to and vest in and become the absolute property of the NCDOT and its assigns. *

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

ON-THE-JOB TRAINING:
(10-16-07) (Rev. 4-21-15) Z-10

Description

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

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

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

Minorities and Women

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

Assigning Training Goals

The Department, through the OJT Program Manager, will assign training goals for a calendar year based on the contractors' past three years' activity and the contractors' anticipated upcoming year's activity with the Department. At the beginning of each year, all contractors eligible will be contacted by the Department to determine the number of trainees that will be assigned for the upcoming calendar year. At that time the Contractor shall enter into an agreement with the Department to provide a self-imposed on-the-job training program for the calendar year. This agreement will include a specific number of annual training goals agreed to by both parties. The number of training assignments may range from 1 to 15 per contractor per calendar year. The Contractor shall sign an agreement to fulfill their annual goal for the year.\

Training Classifications

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

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

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

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

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

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

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

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

Records and Reports

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

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

Trainee Interviews

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

Trainee Wages

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

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

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

Achieving or Failing to Meet Training Goals

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

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

Measurement and Payment

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

County : Brunswick, New Hanover

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
			STRUCTURE ITEMS			
0001	0005000000-N	SP	GENERIC FERRY ITEM (APPROX. 23800 LBS. STRUCTURAL STEEL AT STA. 1+99.80)	Lump Sum	L.S.	
0002	0005000000-N	SP	GENERIC FERRY ITEM (APPROX. 23800 LBS. STRUCTURAL STEEL AT STA. 17+01.73)	Lump Sum	L.S.	
0003	0005000000-N	SP	GENERIC FERRY ITEM (CLEANING AND REPAINTING OF ST RUCTURE #090209)	Lump Sum	L.S.	
0004	0005000000-N	SP	GENERIC FERRY ITEM (CLEANING AND REPAINTING OF ST RUCTURE #640050)	Lump Sum	L.S.	
0005	0005000000-N	SP	GENERIC FERRY ITEM (MOBILIZATION)	Lump Sum	L.S.	
0006	0005000000-N	SP	GENERIC FERRY ITEM (PAINTING CONTAINMENT FOR STRU CTURE #090209)	Lump Sum	L.S.	
0007	0005000000-N	SP	GENERIC FERRY ITEM (PAINTING CONTAINMENT FOR STRU CTURE #640050)	Lump Sum	L.S.	
0008	0005000000-N	SP	GENERIC FERRY ITEM (POLLUTION CONTROL FOR STRUCTU RE #090209)	Lump Sum	L.S.	
0009	0005000000-N	SP	GENERIC FERRY ITEM (POLLUTION CONTROL FOR STRUCTU RE #640050)	Lump Sum	L.S.	
0010	0005000000-N	SP	GENERIC FERRY ITEM (RAMP ELECTRICAL SYSTEM FOR ST RUCTURE)	Lump Sum	L.S.	
0011	0005000000-N	SP	GENERIC FERRY ITEM (RAMP HYDRAULIC SYSTEM FOR STR UCTURE)	Lump Sum	L.S.	

County : Brunswick, New Hanover

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0012	0005000000-N	SP	GENERIC FERRY ITEM (REMOVAL OF EXISTING STRUCTURES AT STATION 1+99.80)	Lump Sum	L.S.	
0013	0005000000-N	SP	GENERIC FERRY ITEM (REMOVAL OF EXISTING STRUCTURES AT STATION 17+01.73)	Lump Sum	L.S.	

1243/Feb21/Q13.0/D65000000/E13 **Total Amount Of Bid For Entire Project :**

Execution of Contract

Contract No: DA00432

Counties: Brunswick & New Hanover

ACCEPTED BY THE DEPARTMENT

_____

Contract Officer

_____

Date

Signature Sheet (Bid) - ACCEPTANCE SHEET