



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J. ERIC BOYETTE
SECRETARY

April 11, 2022

Addendum No. 1

RE: Contract # C204498

WBS # 35494.3.1

STATE FUNDED

Beaufort & Martin Counties (R-2511)

US-17 FROM WASHINGTON BYPASS NORTH OF NC-171 TO MULTI-LANES
SOUTH OF WILLIAMSTON.

April 19, 2022 Letting

To Whom It May Concern:

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

The following revisions have been made to the Roadway plans.

Sheet No.	Revision
2A-4	“Detail for Paved Driveways” station ranges revised.

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

The following revisions have been made to the Structure (Bridges) plans.

Sheet No.	Revision
TSH, SL-1 to SL-25, SR-1 to SR-25, Standard Notes	Bridge plan sheets resealed with new date.
SL-4	Total Bill of Material updated, PZ27 Galvanized Steel Sheet Piles 7,185 SF revised to 7,185 SF of 18” Galvanized Steel Sheet Piles to match estimate. General Notes updated. Wetlands added to Location Sketch.

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
CONTRACT STANDARDS AND DEVELOPMENT
1591 MAIL SERVICE CENTER
RALEIGH, NC 27699-1591

Telephone: (919) 707-6900
Fax: (919) 250-4127
Customer Service: 1-877-368-4968

Location:
1020 BIRCH RIDGE DR.
RALEIGH, NC 27610

Website: www.ncdot.gov

Sheet No.	Revision
SR-4	<p>Total Bill of Material updated, PZ27 Galvanized Steel Sheet Piles 7,017 SF revised to 7,017 SF of 18" Galvanized Steel Sheet Piles to match estimate.</p> <p>Unclassified Structure Excavation at Sta. 155+56.00 -L- quantity added to Total Bill of Material to match estimate.</p> <p>General Notes updated.</p> <p>Temporary shoring added to Location Sketch.</p>
Standard Notes	Replaces SR-26 in existing Bridge plans. Insert Standard Notes between Bridge Plans and Culvert Plans. Standard Notes sheet applies to all Structure Plans (Bridges and Culverts).

Please void the above listed Sheets in your plans and staple the revised Sheets thereto. Replace SR-26 with Standard Notes plan sheet after revised SR-25.

The following revisions have been made to the Structure (Culverts) plans.

Sheet No.	Revision
CU 47-1 to CU 47-7, CU 48-1 to CU 48-7, CU 49-1 to CU 49-9	Culvert plan sheets resealed with new date.
CU_47-1	<p>General Notes updated.</p> <p>"Class I Rip Rap (Typ.)" note on Location Sketch revised to "Class I Rip Rap (Typ.) (Roadway Detail and Pay Item)".</p> <p>"Removal of Existing Structure----Lump Sum" quantity added to Stage 1 Structure Quantities to match estimate.</p> <p>Temporary shoring added to Location Sketch.</p> <p>Extra line style removed by the Existing R/W text on Location Sketch.</p>
CU 48-1	<p>General Notes updated.</p> <p>"Class I Rip Rap (Typ.)" note on Location Sketch revised to "Class I Rip Rap (Typ.) (Roadway Detail and Pay Item)".</p> <p>"Removal of Existing Structure----Lump Sum" quantity added to Stage 1 Structure Quantities to match estimate.</p>

Sheet No.	Revision
CU 49-1	General Notes updated. “Class I Rip Rap with Geotextile Fabric (Typ.)” note on Location Sketch revised to “Class I Rip Rap with Geotextile Fabric (Typ.) (Roadway Detail and Pay Item)”. “Removal of Existing Structure----Lump Sum” quantity added to Stage 1 Structure Quantities to match estimate. Wetlands added to Location Sketch.
CU 47-8, CU 48-8, CU 49-10 (DELETED)	Sheets removed. See Standard Notes sheet in Bridge Plans.

Please void the above listed Sheets in your plans and staple the revised Sheets thereto. Remove deleted sheets CU 47-8, CU 48-8, and CU 49-10 from original plans.

The following revisions have been made to the proposal.

Page No.	Revision
Proposal Cover	Note added that reads “Includes Addendum No. 1 Dated 4-11-2022”.
Table of Contents	Project Special Provision entitled DELAY IN RIGHT OF ENTRY revised. Project Special Provision entitled STEEL PRICE ADJUSTMENT added. Page numbers updated.
G-6 to G-35	Project Special Provision entitled DELAY IN RIGHT OF ENTRY revised.
G-35	Project Special Provision entitled STEEL PRICE ADJUSTMENT added.
G-36 to G-46 (NEW)	Project Special Provision entitled STEEL PRICE ADJUSTMENT added.
ST-1 to ST-20 ST-21 (New)	The Unit Project Special Provision entitled STRUCTURES & CULVERTS revised. “Falsework and Framework” provision updated. “Submittal of Working Drawings” provision updated.

Please void the above listed existing Pages in your proposal and staple the revised Pages thereto. Staple New Pages G-36 to G-46 after revised G-35 in your proposal. Staple New Page ST-21 after revised ST-20 in your proposal.

On the item sheets the following pay item revisions have been made:

<u>Item</u>	<u>Description</u>	<u>Old Quantity</u>	<u>New Quantity</u>
0277-8056000000-N-402	REMOVAL OF EXISTING STRUCTURE AT STATION 69+25.50 -L-	NEW ITEM	1 LS
0278-8056000000-N-402	REMOVAL OF EXISTING STRUCTURE AT STATION 315+50 -L-	NEW ITEM	1 LS
0279-8056000000-N-402	REMOVAL OF EXISTING STRUCTURE AT STATION 345+79.00 -L-	NEW ITEM	1 LS
0280-8056000000-N-402	REMOVAL OF EXISTING STRUCTURE AT STATION 365+81.00 -L-	NEW ITEM	1 LS

The Contractor's bid must include these pay item revisions.

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

The contract will be prepared accordingly.

Sincerely,

DocuSigned by:

 F81B6038A47A442...

Ronald E. Davenport, Jr., PE
 State Contract Officer

RED/cms

Attachments

cc: Mr. Lamar Sylvester, PE
Mr. Sterling Baker, PE
Mr. Jeff Cabaniss, PE
Mr. Boyd Tharrington, PE
Mr. Jon Weathersbee, PE
Mr. Ken Kennedy, PE
Project File (2)

Mr. Forrest Dungan, PE
Ms. Jaci Kincaid
Mr. Kyle Kempf
Ms. Lori Strickland
Mr. Mike Gwyn
Ms. Penny Higgins

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

PROPOSAL

INCLUDES ADDENDUM No. 1 DATED 4-11-2022

DATE AND TIME OF BID OPENING: **APRIL 19, 2022 AT 2:00 PM**

CONTRACT ID C204498

WBS 35494.3.1

FEDERAL-AID NO. STATE FUNDED

COUNTY BEAUFORT, MARTIN

T.I.P. NO. R-2511

MILES 10.625

ROUTE NO. US 17

LOCATION US-17 FROM WASHINGTON BYPASS NORTH OF NC-171 TO MULTI-LANES
SOUTH OF WILLIAMSTON.

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

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. NOT WITHSTANDING THESE LIMITATIONS ON BIDDING, THE BIDDER WHO IS AWARDED ANY PROJECT SHALL COMPLY WITH CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA FOR LICENSING REQUIREMENTS WITHIN 60 CALENDAR DAYS OF BID OPENING, REGARDLESS OF FUNDING SOURCES.

BIDS WILL BE RECEIVED AS SHOWN BELOW:

THIS IS A ROADWAY & STRUCTURE PROPOSAL

5% BID BOND OR BID DEPOSIT REQUIRED

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PROPOSAL ITEM SHEET

ITEM SHEET(S) (TAN SHEETS)

applicable section of the *2018 Standard Specifications*. All work required for initial vegetation planting shall be performed as a part of the work necessary for the completion and acceptance of the Intermediate Contract Time (ICT). Between the time of ICT and Final Project acceptance, or otherwise referred to as the vegetation establishment period, the Department will be responsible for preparing the required National Pollutant Discharge Elimination System (NPDES) inspection records.

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

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

CONSTRUCTION MORATORIUM:

(1-19-16)

SP1 G18C

No tree cutting will be allowed when **temperature is 40 degrees or less.**

DELAY IN RIGHT OF ENTRY:

(7-1-95) (Rev. 7-15-14)

108

SP1 G22

The Contractor will not be allowed right of entry to the following parcel(s) prior to the listed date(s) unless otherwise permitted by the Engineer.

<u>Parcel No.</u>	<u>Property Owner</u>	<u>Date</u>
175A	Jody Griffin	8-15-22
178	Hugh Kennedy	4-30-22
182	Lee Leavelle	4-28-22

MAJOR CONTRACT ITEMS:

(2-19-02)

104

SP1 G28

The following listed items are the major contract items for this contract (see Article 104-5 of the *2018 Standard Specifications*):

Line #	Description
10	Borrow Excavation
61	Aggregate Base Course
66	Asphalt Conc Intermediate Course, Type I19.0C
68	Asphalt Conc Surface Course, Type S9.5C

SPECIALTY ITEMS:

(7-1-95)(Rev. 7-20-21)

108-6

SP1 G37

Items listed below will be the specialty items for this contract (see Article 108-6 of the 2018 Standard Specifications).

Line #	Description
94-104	Guardrail
105-107	Fencing
113-121	Signing
140-144, 156-157	Long-Life Pavement Markings
145	Removable Tape
158-159	Permanent Pavement Markers
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196-238	Erosion Control
239	Reforestation
240-253	Signals/ITS System

FUEL PRICE ADJUSTMENT:

(11-15-05) (Rev. 7-20-21)

109-8

SP1 G43

Revise the 2018 Standard Specifications as follows:

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

The base index price for DIESEL #2 FUEL is \$ **2.7923** per gallon. Where any of the following are included as pay items in the contract, they will be eligible for fuel price adjustment.

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

Description	Units	Fuel Usage Factor Diesel
Unclassified Excavation	Gal/CY	0.29
Borrow Excavation	Gal/CY	0.29
Class IV Subgrade Stabilization	Gal/Ton	0.55
Aggregate Base Course	Gal/Ton	0.55
Sub-Ballast	Gal/Ton	0.55
Asphalt Concrete Base Course, Type _____	Gal/Ton	0.90 or 2.90
Asphalt Concrete Intermediate Course, Type _____	Gal/Ton	0.90 or 2.90
Asphalt Concrete Surface Course, Type _____	Gal/Ton	0.90 or 2.90
Open-Graded Asphalt Friction Course	Gal/Ton	0.90 or 2.90
Permeable Asphalt Drainage Course, Type _____	Gal/Ton	0.90 or 2.90
Sand Asphalt Surface Course, Type _____	Gal/Ton	0.90 or 2.90
Aggregate for Cement Treated Base Course	Gal/Ton	0.55
Portland Cement for Cement Treated Base Course	Gal/Ton	0.55
____ " Portland Cement Concrete Pavement	Gal/SY	0.245
Concrete Shoulders Adjacent to ____ " Pavement	Gal/SY	0.245

For the asphalt items noted in the chart as eligible for fuel adjustments, the bidder may include the *Fuel Usage Factor Adjustment Form* with their bid submission if they elect to use the fuel usage factor. The *Fuel Usage Factor Adjustment Form* is found at the following link:

<https://connect.ncdot.gov/letting/LetCentral/Fuel%20Usage%20Factor%20Adjustment%20Form.pdf>

Select either 2.90 Gal/Ton fuel factor or 0.90 Gal/Ton fuel factor for each asphalt line item on the *Fuel Usage Factor Adjustment Form*. The selected fuel factor for each asphalt item will remain in effect for the duration of the contract.

Failure to complete the *Fuel Usage Factor Adjustment Form* will result in using 2.90 gallons per ton as the Fuel Usage Factor for Diesel for the asphalt items noted above. The contractor will not be permitted to change the Fuel Usage Factor after the bids are submitted.

PAYOUT SCHEDULE:

(1-19-10) (Rev. 1-17-12)

108

SP1 G57

Submit an Anticipated Monthly Payout Schedule prior to beginning construction. The Anticipated Monthly Payout Schedule will be used by the Department to monitor funding levels for this project. Include a monthly percentage breakdown (in terms of the total contract amount) of the work anticipated to be completed. The schedule should begin with the date the Contractor plans to begin construction and end with the anticipated completion date. Submit updates of the Anticipated Monthly Payout Schedule on March 15, June 15, September 15, and December 15 of each calendar year until project acceptance. Submit the original Anticipated Monthly Payout Schedule and all subsequent updates to the Resident Engineer with a copy to the State Construction Engineer at 1 South Wilmington Street, 1543 Mail Service Center, Raleigh, NC 27699-1543.

SCHEDULE OF ESTIMATED COMPLETION PROGRESS:

(7-15-08) (Rev. 5-13-19)

108-2

SP1 G58

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

	<u>Fiscal Year</u>	<u>Progress (% of Dollar Value)</u>
2023	(7/01/22 - 6/30/23)	31% of Total Amount Bid
2024	(7/01/23 - 6/30/24)	28% of Total Amount Bid
2025	(7/01/24 - 6/30/25)	25% of Total Amount Bid
2026	(7/01/25 - 6/30/26)	15% of Total Amount Bid
2027	(7/01/26 - 6/30/27)	1% of Total Amount Bid

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

MINORITY BUSINESS ENTERPRISE AND WOMEN BUSINESS ENTERPRISE:

(10-16-07)(Rev. 8-17-21)

102-15(J)

SP1 G66

Description

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

Definitions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Forms and Websites Referenced in this Provision

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

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

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

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

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

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

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

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

Subcontractor Quote Comparison Sheet - Spreadsheet for showing all subcontractor quotes in the work areas where MBEs and WBEs quoted on the project. This sheet is submitted with good faith effort packages.

<http://connect.ncdot.gov/business/SmallBusiness/Documents/DBE%20Subcontractor%20Quote%20Comparison%20Example.xls>

Combined MBE/WBE Goal

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

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

(A) Minority Business Enterprises **3.0 %**

- (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 **4.0 %**

- (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 goal.

MBE/WBE prime contractors shall also follow Sections A and B listed under *Listing of MBE/WBE Subcontractor* 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 State Contractor Utilization Engineer or at DBE@ncdot.gov no later than 10:00 a.m. of the sixth calendar day following opening of bids, unless the sixth day falls on an official state holiday. In that situation, it is due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day.

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

Banking MBE/WBE Credit

If the bid of the lowest responsive bidder exceeds \$500,000 and 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.

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

Note: Where the information submitted includes repetitious solicitation letters, it will be acceptable to submit a representative letter along with a distribution list of the firms that were solicited. Documentation of 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 contract 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 State Prequalification Engineer will notify the contractor verbally and in writing of non-good faith. A contractor may appeal a determination of non-good faith made by the Goal Compliance Committee. If a contractor wishes to appeal the determination made by the Committee, they shall provide written notification to the State Prequalification Engineer or at DBE@ncdot.gov. The appeal shall be made within 2 business days of notification of the determination of non-good faith.

Counting 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 true 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).
- (3) Exception: If the MBE/WBE's ineligibility is caused solely by its having exceeded the size standard during the performance of the contract, 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 and overall goal.

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/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 work on future DOT 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 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.

CONTRACTOR'S LICENSE REQUIREMENTS:

(7-1-95)

102-14

SP1 G88

If the successful bidder does not hold the proper license to perform any plumbing, heating, air conditioning, or electrical work in this contract, he will be required to sublet such work to a contractor properly licensed in accordance with *Article 2 of Chapter 87 of the General Statutes* (licensing of heating, plumbing, and air conditioning contractors) and *Article 4 of Chapter 87 of the General Statutes* (licensing of electrical contractors).

RESTRICTIONS ON ITS EQUIPMENT AND SERVICES:

(11-17-20)

SP01 G090

All telecommunications, video or other ITS equipment or services installed or utilized on this project must be in conformance with UNIFORM ADMINISTRATIVE REQUIREMENTS, COST PRINCIPLES, AND AUDIT REQUIREMENTS FOR FEDERAL AWARDS **2 CFR, § 200.216** **Prohibition on certain telecommunications and video surveillance services or equipment.**

USE OF UNMANNED AIRCRAFT SYSTEM (UAS):

(8-20-19)

SP1 G092

The Contractor shall adhere to all Federal, State and Local regulations and guidelines for the use of Unmanned Aircraft Systems (UAS). This includes but is not limited to US 14 CFR Part 107 *Small UAS Rule*, NC GS 15A-300.2 *Regulation of launch and recovery sites*, NC GS 63-95 *Training required for the operation of unmanned aircraft systems*, NC GS 63-96 *Permit required for commercial operation of unmanned aircraft system*, and NCDOT UAS Policy. The required operator certifications include possessing a current Federal Aviation Administration (FAA) Remote Pilot Certificate, a NC UAS Operator Permit as well as operating a UAS registered with the FAA.

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

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

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

EQUIPMENT IDLING GUIDELINES:

(1-19-21)

107

SP1 G096

Exercise reduced fuel consumption and reduced equipment emissions during the construction of all work associated with this contract. Employees engaged in the construction of this project

should turn off vehicles when stopped for more than thirty (30) minutes and off-highway equipment should idle no longer than fifteen (15) consecutive minutes.

These guidelines for turning off vehicles and equipment when idling do not apply to:

1. Idling when queuing.
2. Idling to verify the vehicle is in safe operating condition.
3. Idling for testing, servicing, repairing or diagnostic purposes.
4. Idling necessary to accomplish work for which the vehicle was designed (such as operating a crane, mixing concrete, etc.).
5. Idling required to bring the machine system to operating temperature.
6. Emergency vehicles, utility company, construction, and maintenance vehicles where the engines must run to perform needed work.
7. Idling to ensure safe operation of the vehicle.
8. Idling when the propulsion engine is providing auxiliary power for other than heating or air conditioning. (such as hydraulic systems for pavers)
9. When specific traffic, safety, or emergency situations arise.
10. If the ambient temperature is less than 32 degrees Fahrenheit. Limited idling to provide for the safety of vehicle occupants (e.g. to run the heater).
11. If the ambient temperature is greater than 90 degrees Fahrenheit. Limited idling to provide for the safety of vehicle occupants of off-highway equipment (e.g. to run the air conditioning) no more than 30 minutes.
12. Diesel powered vehicles may idle for up to 30 minutes to minimize restart problems.

Any vehicle, truck, or equipment in which the primary source of fuel is natural gas or electricity is exempt from the idling limitations set forth in this special provision.

SUBSURFACE INFORMATION:

(7-1-95)

450

SP1 G112 C

Subsurface information is available on the roadway and structure portions of this project.

PORTABLE CONCRETE BARRIER - (Partial Payments for Materials):

(7-1-95) (Rev. 8-16-11)

1170-4

SP1 G121

When so authorized by the Engineer, partial materials payments will be made up to 95 percent of the delivered cost of portable concrete barrier, provided that these materials have been delivered on the project and stored in an acceptable manner, and further provided the documents listed in Subarticle 109-5(C) of the *2018 Standard Specifications* have been furnished to the Engineer.

The provisions of Subarticle 109-5(B) of the *2018 Standard Specifications* will apply to the portable concrete barrier.

MAINTENANCE OF THE PROJECT:

(11-20-07) (Rev. 1-17-12)

104-10

SP1 G125

Revise the *2018 Standard Specifications* as follows:

Page 1-39, Article 104-10 Maintenance of the Project, line 25, add the following after the first sentence of the first paragraph:

All guardrail/guiderail within the project limits shall be included in this maintenance.

Page 1-39, Article 104-10 Maintenance of the Project, line 30, add the following as the last sentence of the first paragraph:

The Contractor shall perform weekly inspections of guardrail and guiderail and shall report damages to the Engineer on the same day of the weekly inspection. *Where damaged guardrail or guiderail is repaired or replaced as a result of maintaining the project in accordance with this article, such repair or replacement shall be performed within 7 consecutive calendar days of such inspection report.*

Page 1-39, Article 104-10 Maintenance of the Project, lines 42-44, replace the last sentence of the last paragraph with the following:

The Contractor will not be directly compensated for any maintenance operations necessary, except for maintenance of guardrail/guiderail, as this work will be considered incidental to the work covered by the various contract items. The provisions of Article 104-7, Extra Work, and Article 104-8, Compensation and Record Keeping will apply to authorized maintenance of guardrail/guiderail. Performance of weekly inspections of guardrail/guiderail, and the damage reports required as described above, will be considered to be an incidental part of the work being paid for by the various contract items.

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*.

R-5810 (Martin County) is located adjacent to the northern end of this project and is anticipated for a June 17, 2025 letting.

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”

TWELVE MONTH GUARANTEE:

(7-15-03)

108

SP1 G145

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

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

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

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

OUTSOURCING OUTSIDE THE USA:

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

SP1 G150

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

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

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

EROSION AND SEDIMENT CONTROL/STORMWATER CERTIFICATION:

(1-16-07) (Rev 12-15-20)

105-16, 225-2, 16

SP1 G180

General

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

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

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

Roles and Responsibilities

- (A) *Certified Erosion and Sediment Control/Stormwater Supervisor* - The Certified Supervisor shall be Level II and responsible for ensuring the erosion and sediment control/stormwater plan is adequately implemented and maintained on the project and for conducting the quality control program. The Certified Supervisor shall be on the project within 24 hours notice from initial exposure of an erodible surface to the project's final acceptance. Perform the following duties:
- (1) Manage Operations - Coordinate and schedule the work of subcontractors so that erosion and sediment control/stormwater measures are fully executed for each operation and in a timely manner over the duration of the contract.
 - (a) Oversee the work of subcontractors so that appropriate erosion and sediment control/stormwater preventive measures are conformed to at each stage of the work.
 - (b) Prepare the required National Pollutant Discharge Elimination System (NPDES) Inspection Record and submit to the Engineer.
 - (c) Attend all weekly or monthly construction meetings to discuss the findings of the NPDES inspection and other related issues.
 - (d) Implement the erosion and sediment control/stormwater site plans requested.
 - (e) Provide any needed erosion and sediment control/stormwater practices for the Contractor's temporary work not shown on the plans, such as, but not limited to work platforms, temporary construction, pumping operations, plant and storage yards, and cofferdams.
 - (f) Acquire applicable permits and comply with requirements for borrow pits, dewatering, and any temporary work conducted by the Contractor in jurisdictional areas.
 - (g) Conduct all erosion and sediment control/stormwater work in a timely and workmanlike manner.
 - (h) Fully perform and install erosion and sediment control/stormwater work prior to any suspension of the work.
 - (i) Coordinate with Department, Federal, State and Local Regulatory agencies on resolution of erosion and sediment control/stormwater issues due to the Contractor's operations.
 - (j) Ensure that proper cleanup occurs from vehicle tracking on paved surfaces or any location where sediment leaves the Right-of-Way.
 - (k) Have available a set of erosion and sediment control/stormwater plans that are initialed and include the installation date of Best Management Practices. These practices shall include temporary and permanent groundcover and be properly updated to reflect necessary plan and field changes for use and review by Department personnel as well as regulatory agencies.
 - (2) Requirements set forth under the NPDES Permit - The Department's NPDES Stormwater permit (NCS000250) outlines certain objectives and management measures pertaining to construction activities. The permit references *NCG010000, General Permit to Discharge Stormwater* under the NPDES, and states that the

Department shall incorporate the applicable requirements into its delegated Erosion and Sediment Control Program for construction activities disturbing one or more acres of land. The Department further incorporates these requirements on all contracted bridge and culvert work at jurisdictional waters, regardless of size. Some of the requirements are, but are not limited to:

- (a) Control project site waste to prevent contamination of surface or ground waters of the state, i.e. from equipment operation/maintenance, construction materials, concrete washout, chemicals, litter, fuels, lubricants, coolants, hydraulic fluids, any other petroleum products, and sanitary waste.
 - (b) Inspect erosion and sediment control/stormwater devices and stormwater discharge outfalls at least once every 7 calendar days and within 24 hours after a rainfall event equal to or greater than 1.0 inch that occurs within a 24 hour period. Additional monitoring may be required at the discretion of Division of Water Resources personnel if the receiving stream is 303(d) listed for turbidity and the project has had documented problems managing turbidity.
 - (c) Maintain an onsite rain gauge or use the Department's Multi-Sensor Precipitation Estimate website to maintain a daily record of rainfall amounts and dates.
 - (d) Maintain erosion and sediment control/stormwater inspection records for review by Department and Regulatory personnel upon request.
 - (e) Implement approved reclamation plans on all borrow pits, waste sites and staging areas.
 - (f) Maintain a log of turbidity test results as outlined in the Department's Procedure for Monitoring Borrow Pit Discharge.
 - (g) Provide secondary containment for bulk storage of liquid materials.
 - (h) Provide training for employees concerning general erosion and sediment control/stormwater awareness, the Department's NPDES Stormwater Permit NCS000250 requirements, and the applicable requirements of the *General Permit, NCG010000*.
 - (i) Report violations of the NPDES permit to the Engineer immediately who will notify the Division of Water Quality Regional Office within 24 hours of becoming aware of the violation.
- (3) Quality Control Program - Maintain a quality control program to control erosion, prevent sedimentation and follow provisions/conditions of permits. The quality control program shall:
- (a) Follow permit requirements related to the Contractor and subcontractors' construction activities.
 - (b) Ensure that all operators and subcontractors on site have the proper erosion and sediment control/stormwater certification.
 - (c) Notify the Engineer when the required certified erosion and sediment control/stormwater personnel are not available on the job site when needed.
 - (d) Conduct the inspections required by the NPDES permit.
 - (e) Take corrective actions in the proper timeframe as required by the NPDES permit for problem areas identified during the NPDES inspections.

- (f) Incorporate erosion control into the work in a timely manner and stabilize disturbed areas with mulch/seed or vegetative cover on a section-by-section basis.
 - (g) Use flocculants approved by state regulatory authorities where appropriate and where required for turbidity and sedimentation reduction.
 - (h) Ensure proper installation and maintenance of temporary erosion and sediment control devices.
 - (i) Remove temporary erosion or sediment control devices when they are no longer necessary as agreed upon by the Engineer.
 - (j) The Contractor's quality control and inspection procedures shall be subject to review by the Engineer. Maintain NPDES inspection records and make records available at all times for verification by the Engineer.
- (B) *Certified Foreman* - At least one Certified Foreman shall be onsite for each type of work listed herein during the respective construction activities to control erosion, prevent sedimentation and follow permit provisions:
- (1) Foreman in charge of grading activities
 - (2) Foreman in charge of bridge or culvert construction over jurisdictional areas
 - (3) Foreman in charge of utility activities

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

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

- (C) *Certified Installers* - Provide at least one onsite, Level I Certified Installer for each of the following erosion and sediment control/stormwater crew:
- (1) Seeding and Mulching
 - (2) Temporary Seeding
 - (3) Temporary Mulching
 - (4) Sodding
 - (5) Silt fence or other perimeter erosion/sediment control device installations
 - (6) Erosion control blanket installation
 - (7) Hydraulic tackifier installation
 - (8) Turbidity curtain installation
 - (9) Rock ditch check/sediment dam installation
 - (10) Ditch liner/matting installation
 - (11) Inlet protection
 - (12) Riprap placement
 - (13) Stormwater BMP installations (such as but not limited to level spreaders, retention/detention devices)
 - (14) Pipe installations within jurisdictional areas

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

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

Preconstruction Meeting

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

Ethical Responsibility

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

Revocation or Suspension of Certification

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

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

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

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

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

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

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

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

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

Measurement and Payment

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

PROCEDURE FOR MONITORING BORROW PIT DISCHARGE:

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

105-16, 230, 801

SP1 G181

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

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

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

- (D) Notify DWQ within 24 hours of any stream turbidity standard exceedances that are not brought into compliance.

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

The discharge shall be closely monitored when water from the dewatering activities is introduced into jurisdictional wetlands. Any time visible sedimentation (deposition of sediment) on the wetland surface is observed, the dewatering activity will be suspended until turbidity levels in the stilling basin can be reduced to a level where sediment deposition does not occur. Staining of wetland surfaces from suspended clay particles, occurring after evaporation or infiltration, does not constitute sedimentation. No activities shall occur in wetlands that adversely affect the functioning of a wetland. Visible sedimentation will be considered an indication of possible adverse impacts on wetland use.

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

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

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

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

STEEL PRICE ADJUSTMENT:

(4-19-22)

SP1 G47

Description and Purpose

Steel price adjustments will be made to the payments due the Contractor for items as defined herein that are permanently incorporated into the work, when the price of raw steel mill products utilized on the contract have fluctuated. The Department will adjust monthly progress payments up or down as appropriate for cost changes in steel according to this provision.

Eligible Items

The list of eligible bid items for steel price adjustment can be found on the Departments website at the following address:

<https://connect.ncdot.gov/letting/LetCentral/Eligible%20Bid%20Items%20for%20Steel%20Price%20Adjustment.xlsx>

Nuts, bolts, anchor bolts, rebar chairs, connecting bands and other miscellaneous hardware associated with these items shall not be included in the price adjustment.

Adjustments will only be made for fluctuations in the cost of the steel used in the above products as specified in the Product Relationship Table below. The producing mill is defined as the source of steel product before any fabrication has occurred (e.g., coil, plate, rebar, hot rolled shapes, etc.). No adjustment will be made for changes in the cost of fabrication, coating, shipping, storage, etc.

No steel price adjustments will be made for any products manufactured from steel having an adjustment date, as defined by the Product Relationship Table below, prior to the letting date.

Bid Submittal Requirements

The successful bidder, within 14 calendar days after the notice of award is received by him, shall provide the completed Form SPA-1 to the Department. Form SPA-1 can be found on the Departments website at the following address:

<https://connect.ncdot.gov/letting/LetCentral/Form%20SPA-1.xlsm>

The Contractor shall provide Form SPA-1 listing the Contract Line Number, (with corresponding Item Number, Item Description, and Category) for the steel products they wish to have an

adjustment calculated. Only the contract items corresponding to the list of eligible item numbers for steel price adjustment may be entered on Form SPA-1. The Contractor may choose to have steel price adjustment applied to any, all, or none of the eligible items. However, the Contractor's selection of items for steel price adjustment or non-selection (non-participation) may not be changed once Form SPA-1 has been received by the Department. Items the Bidder chooses for steel price adjustment must be designated by writing the word "Yes" in the column titled "Option" by each Pay Item chosen for adjustment. The Bidder's designations on Form SPA-1 must be written in ink or typed and signed by the Bidder to be considered complete. Items not properly designated, designated with "No", or left blank on the Bidder's Form SPA-1 will automatically be removed from consideration for adjustment. No steel items will be eligible for steel price adjustment on this Project if the Bidder fails to return Form SPA-1 in accordance with this provision.

Establishing the Base Price

The Department will use a blend of monthly average prices as reported from the Fastmarkets platform to calculate the monthly adjustment indices (BI and MI). This data is typically available on the first day of the month for the preceding month. The indices will be calculated by the Department for the different categories found on the Product Relationship Table below. For item numbers that include multiple types of steel products, the category listed for that item number will be used for adjusting each steel component.

The bidding index for Category 1 Steel items is \$50.50 per hundredweight.
The bidding index for Category 2 Steel items is \$86.16 per hundredweight.
The bidding index for Category 3 Steel items is \$68.60 per hundredweight.
The bidding index for Category 4 Steel items is \$55.78 per hundredweight.
The bidding index for Category 5 Steel items is \$62.81 per hundredweight.
The bidding index for Category 6 Steel items is \$90.16 per hundredweight.
The bidding index for Category 7 Steel items is \$56.30 per hundredweight.

The bidding index represents a selling price of steel based on Fastmarkets data for the month of February 2022.

MI = Monthly Index. – in Dollars (\$) per hundredweight (CWT). Use the adjustment indices from the month the steel was shipped from the producing mill, received on the project, or member cast as defined in the Product Relationship Table.

BI = Bidding Index. - in Dollars (\$) per hundredweight (CWT). Use the adjustment indices as listed in the proposal.

<i>Product Relationship Table</i>			
<i>Steel Product (Title)</i>	BI, MI*	Adjustment Date for MI	Category
Reinforcing Steel, Bridge Deck, and SIP Forms	Based on one or more Fastmarkets indices	Delivery Date from Producing Mill	1
Structural Steel and Encasement Pipe	Based on one or more Fastmarkets indices	Delivery Date from Producing Mill	2
Steel H-Piles, Soldier Pile Walls	Based on one or more Fastmarkets indices	Delivery Date from Producing Mill	3
Guardrail and Pipe Piles Items	Based on one or more Fastmarkets indices	Material Received Date**	4
Fence Items	Based on one or more Fastmarkets indices	Material Received Date**	5
Overhead Sign Assembly, Signal Poles, High Mount Standards	Based on one or more Fastmarkets indices	Material Received Date**	6
Prestressed Concrete Members	Based on one or more Fastmarkets indices	Cast Date of Member	7
* BI and MI are in converted units of Dollars per Hundredweight (\$/CWT)			
** Material Received Date is defined as the date the materials are received on the project site. If a material prepayment is made for a Category 4-6 item, the Adjustment Date to be used will be the date of the prepayment request instead of the Materials Received Date.			

Submit documentation to the Engineer for all items listed in the Contract for which the Contractor is requesting a steel price adjustment.

Submittal Requirements

The items in categories 1,2, and 3, shall be specifically stored, labeled, or tagged, recognizable by color marking, and identifiable by Project for inspection and audit verification immediately upon arrival at the fabricator.

Furnish the following documentation for all steel products to be incorporated into the work and documented on Form SPA-2, found on the Departments website at the following address:

<https://connect.ncdot.gov/projects/construction/Construction%20Forms/Form%20SPA-2.xlsx>

Submit all documentation to the Engineer prior to incorporation of the steel into the completed work. The Department will withhold progress payments for the affected contract line item if the documentation is not provided and at the discretion of the Engineer the work is allowed to proceed. Progress payments will be made upon receipt of the delinquent documentation.

Step 1 (Form SPA -2)

Utilizing Form SPA-2, submit separate documentation packages for each line item from Form SPA-1 for which the Contractor opted for a steel price adjustment. For line items with multiple components of steel, each component should be listed separately. Label each SPA-2 documentation package with a unique number as described below.

- a. Documentation package number: (Insert the contract line-item) - (Insert sequential package number beginning with "1").
Example: 412 - 1,
 412 - 2,
 424 - 1,
 424 - 2,
 424 - 3, etc.
- b. The steel product quantity in pounds
 - i. The following sources should be used, in declining order of precedence, to determine the weight of steel/iron, based on the Engineers decision:
 1. Department established weights of steel/iron by contract pay item per pay unit;
 2. Approved Shop Drawings;
 3. Verified Shipping Documents;
 4. Contract Plans;
 5. Standard Drawing Sheets;
 6. Industry Standards (i.e., AISC Manual of Steel Construction, AWWA Standards, etc.); and
 7. Manufacture's data.
 - ii. Any item requiring approved shop drawings shall have the weights of steel calculated and shown on the shop drawings or submitted and certified separately by the fabricator.
- c. The date the steel product, subject to adjustment, was shipped from the producing mill (Categories 1-3), received on the project (Categories 4-6), or casting date (Category 7).

Step 2 (Monthly Calculator Spreadsheet)

For each month, upon the incorporation of the steel product into the work, provide the Engineer the following:

- 1) Completed NCDOT Steel Price Adjustment Calculator Spreadsheet, summarizing all the steel submittal packages (Form SPA-2) actually incorporated into the completed work in the given month.
 - a. Contract Number
 - b. Bidding Index Reference Month
 - c. Contract Completion Date or Revised Completion Date
 - d. County, Route, and Project TIP information
 - e. Item Number
 - f. Line-Item Description
 - g. Submittal Number from Form SPA-2
 - h. Adjustment date
 - i. Pounds of Steel
- 2) An affidavit signed by the Contractor stating the documentation provided in the NCDOT Steel Price Adjustment Calculator Spreadsheet is true and accurate.

Price Adjustment Conditions

Download the Monthly Steel Adjustment Spreadsheet with the most current reference data from the Department's website each month at the following address:

<https://connect.ncdot.gov/projects/construction/Construction%20Forms/Form%20SPA-3%20NCDOT%20Steel%20Price%20Adjustment%20Calculator.xlsx>

If the monthly Fastmarkets data is not available, the data for the most recent immediately preceding month will be used as the basis for adjustment.

Price Adjustment Calculations

The price adjustment will be determined by comparing the percentage of change in index value listed in the proposal (BI) to the monthly index value (MI). (See included sample examples). Weights and date of shipment must be documented as required herein. The final price adjustment dollar value will be determined by multiplying this percentage increase or decrease in the index by the represented quantity of steel incorporated into the work, and the established bidding index (BI) subject to the limitations herein.

Price increase/decrease will be computed as follows:

$$\text{SPA} = ((\text{MI} / \text{BI}) - 1) * \text{BI} * (\text{Q} / 100)$$

Where;

SPA = Steel price adjustment in dollars

MI = Monthly Shipping Index. – in Dollars (\$) per hundredweight (CWT). Use the adjustment indices from the month the steel was shipped from the producing mill, received on the project, or member cast as defined in the Product Relationship Table.

BI = Bidding Index. - in Dollars (\$) per hundredweight (CWT). Use the adjustment indices as listed in the proposal.

Q = Quantity of steel, product, pounds actually incorporated into the work as documented by the Contractor, or Design Build Team and verified by the Engineer.

Calculations for price adjustment shall be shown separate from the monthly progress estimate and will not be included in the total cost of work for determination of progress or for extension of Contract time in accordance with Subarticle 108-10(B)(1).

Any apparent attempt to unbalance bids in favor of items subject to price adjustment may result in rejection of the bid proposal.

Adjustments will be paid or charged to the Contractor only. Any Contractor receiving an adjustment under this provision shall distribute the proper proportional part of such adjustments to the subcontractor who performed the applicable work.

Delays to the work caused by steel shortages may be justification for a Contract time extension but will not constitute grounds for claims for standby equipment, extended office overhead, or other costs associated with such delays.

If an increase in the steel material price is anticipated to exceed 50% of the original quoted price, the contractor must notify the Department within 7 days prior to purchasing the material. Upon receipt of such notification, the Department will direct the Contractor to either (1) proceed with the work or (2) suspend the work and explore the use of alternate options.

If the decrease in the steel material exceeds 50% of the original quoted price, the contractor may submit to the Department additional market index information specific to the item in question to dispute the decrease. The Department will review this information and determine if the decrease is warranted.

When the steel product adjustment date, as defined in the Product Relationship Table, is after the approved contract completion date, the steel price adjustments will be based on the lesser value of either the MI for the month of the approved contract completion date or the MI for the actual adjustment date.

If the price adjustment is based on estimated material quantities for that time, and a revision to the total material quantity is made in a subsequent or final estimate, an appropriate adjustment will be made to the price adjustment previously calculated. The adjustment will be based on the same indices used to calculate the price adjustment which is being revised. If the adjustment date of the revised material quantity cannot be determined, the adjustment for the quantity in question, will be based on the indices utilized to calculate the steel price adjustment for the last initial documentation package submission, for the steel product subject to adjustment, that was incorporated into the particular item of work, for which quantities are being finalized.

Example: Structural steel for a particular bridge was provided for in three different shipments with each having a different mill shipping date. The quantity of structural steel actually used for the bridge was calculated and a steel price adjustment was made in a progress payment. At the conclusion of the work an error was found in the plans of the final quantity of structural steel used for the bridge. The quantity to be adjusted cannot be directly related to any one of the three mill shipping dates. The steel price adjustment for the quantity in question would be calculated using the indices that were utilized to calculate the steel price adjustment for the quantity of structural steel represented by the last initial structural steel documentation package submission. The package used will be the one with the greatest sequential number.

Extra Work/Force Account:

When steel products, as specified herein, are added to the contract as extra work, in accordance with the provisions of Article 104-7 or 104-3, the Engineer will determine and specify in the supplemental agreement, the need for application of steel price adjustments on a case-by-case basis. No steel price adjustments will be made for any products manufactured from steel having an adjustment date prior to the supplemental agreement execution date. Price adjustments will be made as provided herein, except the Bidding Index will be based on the month in which the supplemental agreement pricing was executed.

For work performed on force account basis, reimbursement of actual material costs, along with the specified overhead and profit markup, will be considered to include full compensation for the current cost of steel and no steel price adjustments will be made.

Examples Form SPA-2
Steel Price Adjustment Submission Form

Contract Number C203394 Bid Reference Month January 2019

Submittal Date 8/31/2019

Contract Line Item 237

Line Item Description APPROX....LBS Structural Steel

Sequential Submittal Number 2

Supplier	Description of material	Location information	Quantity in lbs.	Adjustment Date
XYZ mill	Structural Steel	Structure 3, Spans A-C	1,200,000	May 4, 2020
ABC distributing	Various channel & angle shapes	Structure 3 Spans A-C	35,000	July 14, 2020
		Total Pounds of Steel	1,235,000	

Note: Attach the following supporting documentation to this form.

- Bill of Lading to support the shipping dates
- Supporting information for weight documentation (e.g., Pay item reference, Shop drawings, shipping documents, Standards Sheets, industry standards, or manufacturer's data)

By providing this data under my signature, I attest to the accuracy of and validity of the data on this form and certify that no deliberate misrepresentation in any manner has occurred.

Printed Name _____ Signature _____

Examples Form SPA-2**Steel Price Adjustment Submission Form**Contract Number C203394 Bid Reference Month January 2019Submittal Date August 31, 2019Contract Line Item 237Line Item Description SUPPORT, OVRHD SIGN STR -DFEB – STA 36+00Sequential Submittal
Number 2

Supplier	Description of material	Location information	Quantity in lbs.	Adjustment Date
XYZ mill	Tubular Steel (Vertical legs)	<u>-DFEB – STA 36+00</u>	12000	December 11, 2021
PDQ Mill	4" Tubular steel (Horizontal legs)	<u>-DFEB – STA 36+00</u>	5900	December 11, 2021
ABC distributing	Various channel & angle shapes (see quote)	<u>-DFEB – STA 36+00</u>	1300	December 11, 2021
	Catwalk assembly	<u>-DFEB – STA 36+00</u>	2000	December 11, 2021
Nucor	Flat plate	<u>-DFEB – STA 36+00</u>	650	December 11, 2021
		Total Pounds of Steel	21,850	

Note: Attach the following supporting documentation to this form.

- Bill of Lading to support the shipping dates
- Supporting information for weight documentation (e.g., Pay item reference, Shop drawings, shipping documents, Standards Sheets, industry standards, or manufacturer's data)

By providing this data under my signature, I attest to the accuracy of and validity of the data on this form and certify that no deliberate misrepresentation in any manner has occurred.

Printed Name

Signature

Price Adjustment Sample Calculation (increase)

Project bid on September 17, 2019

Line Item 635 "Structural Steel" has a plan quantity of 2,717,000 lbs.

Bidding Index for Structural Steel (Category 2) in the proposal was \$36.12/CWT = BI

450,000 lbs. of Structural Steel for Structure 2 at Station 44+08.60 were shipped to fabricator from the producing mill in same month, May 2021.

Monthly Index for Structural Steel (Category 2) for May 2021 was \$64.89/CWT = MI

The Steel Price Adjustment formula is as follows:

$$\text{SPA} = ((\text{MI} / \text{BI}) - 1) * \text{BI} * (\text{Q} / 100)$$

Where; SPA = Steel price adjustment in dollars

BI = Bidding Index – in dollars (\$) per hundredweight (CWT). Use the adjustment indices as listed in the proposal.

MI = Mill Shipping Index – in dollars (\$) per hundredweight (CWT). Use the adjustment indices from the month the steel was shipped from the producing mill, received on the project, or member cast as defined in the Product Relationship Table.

Q = Quantity of steel product, in pounds (lbs.) actually incorporated into the work as documented by the Contractor, or Design Build Team and verified by the Engineer.

$$\text{BI} = \$36.12 / \text{CWT}$$

$$\text{MI} = \$64.89 / \text{CWT}$$

$$\% \text{ change} = ((\text{MI} / \text{BI}) - 1) = (\$64.89 / \$36.12 - 1) = (1.79651 - 1) = 0.79651162791$$

$$\text{Q} = 450,000 \text{ lbs.}$$

$$\text{SPA} = 0.79651162791 \times \$36.12 \times (450,000 / 100)$$

$$\text{SPA} = 0.79651162791 * \$36.12 * 4,500$$

$$\text{SPA} = \$129,465 \text{ pay adjustment to Contractor for Structural Steel (Structure 2 at Station 44+08.60)}$$

Price Adjustment Sample Calculation (decrease)

Project bid on December 18, 2018

Line Item 635 Structural Steel has a plan quantity of 2,717,000 lbs.

Bidding Index for Structural Steel (Category 2) in the proposal was \$46.72/CWT = BI

600,000 lbs. of Structural Steel for Structure 1 at Station 22+57.68 were shipped to fabricator from the producing mill in same month, August 2020.

Monthly Index for Structural Steel (Category 2) for August 2020 was \$27.03/CWT = MI

The Steel Price Adjustment formula is as follows:

$$\text{SPA} = ((\text{MI} / \text{BI}) - 1) * \text{BI} * (\text{Q} / 100)$$

Where; SPA = Steel price adjustment in dollars

BI = Bidding Index – in dollars (\$) per hundredweight (CWT). Use the adjustment indices as listed in the proposal.

MI = Mill Shipping Index – in dollars (\$) per hundredweight (CWT). Use the adjustment indices from the month the steel was shipped from the producing mill, received on the project, or member cast as defined in the Product Relationship Table.

Q = Quantity of steel product, in pounds (lbs.) actually incorporated into the work as documented by the Contractor, or Design Build Team and verified by the Engineer.

$$\text{BI} = \$46.72 / \text{CWT}$$

$$\text{MI} = \$27.03 / \text{CWT}$$

$$\% \text{ change} = ((\text{MI} / \text{BI}) - 1) = (\$27.03 / \$46.72 - 1) = (0.57855 - 1) = -0.421446917808$$

$$\text{Q} = 600,000 \text{ lbs.}$$

$$\text{SPA} = -0.421446917808 * \$46.72 * (600,000 / 100)$$

$$\text{SPA} = -0.421446917808 * \$46.72 * 6,000$$

$$\text{SPA} = \$ 118,140.00 \text{ Credit to the Department for Structural Steel (Structure 1 at Station 22+57.68)}$$

Price Adjustment Sample Calculation (increase)

Project bid on July 16, 2020

Line Item 614 Reinforced Concrete Deck Slab has a plan quantity of 241974 lbs.

Bidding Index Reference Month was May 2020. Bidding Index for Reinforced Concrete Deck Slab (Category 1) in the proposal was \$29.21/CWT = BI

51,621 lbs. of reinforcing steel and 52,311 lbs. of epoxy coated reinforcing steel for Structure 2 at Station 107+45.55 -L- was shipped to fabricator from the producing mill in same month, May 2021.

Monthly Index for Reinforced Concrete Deck Slab (Category 1) for May 2021 was \$43.13/CWT = MI

The Steel Price Adjustment formula is as follows:

$$\text{SPA} = ((\text{MI} / \text{BI}) - 1) * \text{BI} * (\text{Q} / 100)$$

Where; SPA = Steel price adjustment in dollars

BI = Bidding Index – in dollars (\$) per hundredweight (CWT). Use the adjustment indices as listed in the proposal.

MI = Mill Shipping Index – in dollars (\$) per hundredweight (CWT). Use the adjustment indices from the month the steel was shipped from the producing mill, received on the project, or member cast as defined in the Product Relationship Table.

Q = Quantity of steel product, in pounds (lbs.) actually incorporated into the work as documented by the Contractor, or Design Build Team and verified by the Engineer.

$$\text{BI} = \$29.21 / \text{CWT}$$

$$\text{MI} = \$43.13 / \text{CWT}$$

$$\% \text{ change} = ((\text{MI} / \text{BI}) - 1) = (\$43.13 / \$29.21 - 1) = (1.47655 - 1) = 0.47654912701$$

$$\text{Q} = 103932 \text{ lbs.}$$

$$\text{SPA} = 0.47654912701 * \$29.21 * (103,932 / 100)$$

$$\text{SPA} = 0.47654912701 * \$29.21 * 1,039.32$$

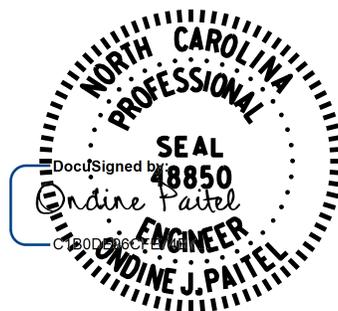
SPA = \$14,467.33 Pay Adjustment to Contractor for Reinforced Concrete Deck Slab (Category 1) at Station 107+45.55 -L-

Project Special Provisions

Structures & Culverts

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3/3/2022

PROJECT SPECIAL
PROVISIONS STRUCTURE

STEEL REINFORCED ELASTOMERIC BEARINGS

(6-22-16)

The 2018 Standard Specifications shall be revised as follows:

In **Section 1079-2(A) – Elastomeric Bearings** add the following after the second paragraph:

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

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

FALSEWORK AND FORMWORK

(2-14-22)

DESCRIPTION

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

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

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

MATERIALS

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

DESIGN REQUIREMENTS**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.

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

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MBT	63	51	12	2000	50
MBT	72	55	12	1700	48

Overhang width is measured from the centerline of the girder to the edge of the deck slab. For Type II, III & IV prestressed concrete girders (PCG), 45-degree cast-in-place half hangers and rods must have a minimum safe working load of 6,000 lbs.

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

For links slabs, the tops of girders directly beneath the link slab shall be free of overhang falsework attachments or other hardware. Submit calculations and working drawings for overhang falsework in the link slab region.

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

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

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

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

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

Note on the working drawings any anchorages, connectors, inserts, steel sleeves or other such devices used as part of the falsework or formwork that remains in the permanent structure. If the plan notes indicate that the structure contains the necessary corrosion

protection required for a Corrosive Site, epoxy coat, galvanize or metalize these devices. Electroplating will not be allowed. Any coating required by the Engineer will be considered incidental to the various pay items requiring temporary works.

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

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

Time of Removal

The following requirements replace those of Article 3.4.8.2.

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

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

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

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

Edgecombe	80	Onslow	100		
Forsyth	70	Orange	70		

Review and Approval

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

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

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

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

CONSTRUCTION REQUIREMENTS

All requirements of Section 420 of the Standard Specifications apply.

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

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

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.

Foundations

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

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

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

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

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

REMOVAL

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

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

METHOD OF MEASUREMENT

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

BASIS OF PAYMENT

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

SUBMITTAL OF WORKING DRAWINGS**(2-14-22)****GENERAL**

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

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

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

ADDRESSES AND CONTACTS

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

Via Email: SMU-wdr@ncdot.gov (do not cc SMU Working Drawings staff)

Via US mail:

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

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

Via other delivery service:

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

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

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

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

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Via Email: EastGeotechnicalSubmittal@ncdot.gov

Via US mail:

Mr. David Hering, L.G., P. E.
Assistant State Geotechnical
Engineer – Eastern Region
North Carolina Department
of Transportation
Geotechnical Engineering Unit
Eastern Regional Office
1570 Mail Service Center
Raleigh, NC 27699-1570

Via other delivery service:

Mr. David Hering, L.G., P. E.
Assistant State Geotechnical
Engineer – Eastern Region
North Carolina Department
of Transportation
Geotechnical Engineering Unit
Eastern Regional Office
3301 Jones Sausage Road, Suite 100
Garner, NC 27529

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

Via Email: WestGeotechnicalSubmittal@ncdot.gov

Via US mail or other delivery service:

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

The status of the review of structure-related submittals sent to the Structures Management Unit can be viewed from the Unit’s website, via the “[Drawing Submittal Status](#)” link. The status of the review of geotechnical-related submittals sent to the Geotechnical Engineering Unit can be viewed from the Unit’s website, via the “[Geotechnical Construction Submittals](#)” link.

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

Primary Structures Contact: James Bolden (919) 707 – 6408
jlbolden@ncdot.gov

Secondary Structures Contacts: Emmanuel Omile (919) 707 – 6451
eomile@ncdot.gov

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Madonna Rorie (919) 707 – 6508

mrorie@ncdot.gov

Eastern Regional Geotechnical Contact (Divisions 1-7):

David Hering (919) 662 – 4710

dthering@ncdot.gov

Western Regional Geotechnical Contact (Divisions 8-14):

Eric Williams (704) 455 – 8902

ewilliams3@ncdot.gov

SUBMITTAL COPIES

Furnish one complete copy of each submittal, including all attachments, to the Engineer. At the same time, submit a copy of the same complete submittal directly to the Structures Management Unit and/or the Geotechnical Engineering Unit as specified in the tables below.

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

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

STRUCTURE SUBMITTALS

Submittal	Submittal Required by Structures Management Unit?	Submittal Required by Geotechnical Engineering Unit?	Contract Reference Requiring Submittal ¹
Arch Culvert Falsework	Y	N	Plan Note, SN Sheet & “Falsework and Formwork”

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Box Culvert Falsework ⁷	Y	N	Plan Note, SN Sheet & “Falsework and Formwork”
Cofferdams	Y	Y	Article 410-4
Foam Joint Seals ⁶	Y	N	“Foam Joint Seals”
Expansion Joint Seals (hold down plate type with base angle)	Y	N	“Expansion Joint Seals”
Expansion Joint Seals (modular)	Y	N	“Modular Expansion Joint Seals”
Expansion Joint Seals (strip seals)	Y	N	“Strip Seal Expansion Joints”
Falsework & Forms ² (substructure)	Y	N	Article 420-3 & “Falsework and Formwork”
Falsework & Forms (superstructure)	Y	N	Article 420-3 & “Falsework and Formwork”
Girder Erection over Railroad	Y	N	Railroad Provisions
Maintenance and Protection of Traffic Beneath Proposed Structure	Y	N	“Maintenance and Protection of Traffic Beneath Proposed Structure at Station ___”
Metal Bridge Railing	Y	N	Plan Note
Metal Stay-in-Place Forms	Y	N	Article 420-3
Metalwork for Elastomeric Bearings ^{4,5}	Y	N	Article 1072-8
Miscellaneous Metalwork ^{4,5}	Y	N	Article 1072-8
Disc Bearings ⁴	Y	N	“Disc Bearings”
Overhead and Digital Message Signs (DMS) (metalwork and foundations)	Y	N	Applicable Provisions
Placement of Equipment on Structures (cranes, etc.)	Y	N	Article 420-20
Prestressed Concrete Box Beam (detensioning sequences) ³	Y	N	Article 1078-11

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Precast Concrete Box Culverts	Y	N	“Optional Precast Reinforced Concrete Box Culvert at Station ____”
Prestressed Concrete Cored Slab (detensioning sequences) ³	Y	N	Article 1078-11
Prestressed Concrete Deck Panels	Y	N	Article 420-3
Prestressed Concrete Girder (strand elongation and detensioning sequences)	Y	N	Articles 1078-8 and 1078-11
Removal of Existing Structure over Railroad	Y	N	Railroad Provisions
<hr/>			
Revised Bridge Deck Plans (adaptation to prestressed deck panels)	Y	N	Article 420-3
Revised Bridge Deck Plans (adaptation to modular expansion joint seals)	Y	N	“Modular Expansion Joint Seals”
Sound Barrier Wall (precast items)	Y	N	Article 1077-2 & “Sound Barrier Wall”
Sound Barrier Wall Steel Fabrication Plans ⁵	Y	N	Article 1072-8 & “Sound Barrier Wall”
Structural Steel ⁴	Y	N	Article 1072-8
Temporary Detour Structures	Y	Y	Article 400-3 & “Construction, Maintenance and Removal of Temporary Structure at Station ____”
TFE Expansion Bearings ⁴	Y	N	Article 1072-8

FOOTNOTES

- References are provided to help locate the part of the contract where the submittals are required. References in quotes refer to the provision by that name. Articles refer to the *Standard Specifications*.
- Submittals for these items are necessary only when required by a note on plans.

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3. Submittals for these items may not be required. A list of pre-approved sequences is available from the producer or the Materials & Tests Unit.
4. The fabricator may submit these items directly to the Structures Management Unit.
5. The two sets of preliminary submittals required by Article 1072-8 of the *Standard Specifications* are not required for these items.
6. Submittals for Fabrication Drawings are not required. Submittals for Catalogue Cuts of Proposed Material are required. See Section 5.A of the referenced provision.
7. Submittals are necessary only when the top slab thickness is 18” or greater.

GEOTECHNICAL SUBMITTALS

Submittal	Submittals Required by Geotechnical Engineering Unit	Submittals Required by Structures Management Unit	Contract Reference Requiring Submittal ¹
Drilled Pier Construction Plans ²	Y	N	Subarticle 411-3(A)
Crosshole Sonic Logging (CSL) Reports ²	Y	N	Subarticle 411-5(A)(2)
Pile Driving Equipment Data Forms ^{2,3}	Y	N	Subarticle 450-3(D)(2)
Pile Driving Analyzer (PDA) Reports ²	Y	N	Subarticle 450-3(F)(3)
Retaining Walls ⁴	Y; drawings and calculations	Y; drawings	Applicable Provisions
Temporary Shoring ⁴	Y; drawings and calculations	Y; drawings	“Temporary Shoring” & “Temporary Soil Nail Walls”

FOOTNOTES

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

CRANE SAFETY

(6-20-19)

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

Submit all items listed below to the Engineer prior to beginning crane operations. Changes in personnel or equipment must be reported to the Engineer and all applicable items listed below must be updated and submitted prior to continuing with crane operations.

CRANE SAFETY SUBMITTAL LIST

- A. **Competent Person:** Provide the name and qualifications of the “Competent Person” responsible for crane safety and lifting operations. The named competent person will have the responsibility and authority to stop any work activity due to safety concerns.
- B. **Riggers:** Provide the qualifications and experience of the persons responsible for rigging operations. Qualifications and experience should include, but not be limited to, weight calculations, center of gravity determinations, selection and inspection of sling and rigging equipment, and safe rigging practices.
- C. **Crane Inspections:** Inspection records for all cranes shall be current and readily accessible for review upon request.
- D. **Certifications:** Crane operators shall be certified by the National Commission for the Certification of Crane Operators (NCCCO) or the National Center for

Construction Education and Research (NCCER). Other approved nationally accredited programs will be considered upon request. In addition, crane operators shall have a current CDL medical card. Submit a list of crane operator(s) and include current certification for each type of crane operated (small hydraulic, large hydraulic, small lattice, large lattice) and medical evaluations for each operator.

GROUT FOR STRUCTURES

(12-1-17)

1.0 DESCRIPTION

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

2.0 MATERIAL REQUIREMENTS

Unless otherwise noted on the plans, use a Type 3 Grout in accordance with Section 1003 of the Standard Specifications.

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

Construction loading and traffic loading shall not be allowed until the 3 day compressive strength is achieved.

3.0 SAMPLING AND PLACEMENT

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

4.0 BASIS OF PAYMENT

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

**ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND
RENOVATION ACTIVITIES****(12-30-15)****1.0 INSPECTION FOR ASBESTOS CONTAINING MATERIAL**

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

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

ACM was found
 ACM was not found

2.0 REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIAL

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

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

3.0 DEMOLITION NOTIFICATION

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

HHCU. Reference the North Carolina Administrative Code, Chapter 10A, Subchapter 41C, Article .0605 for directives on revision submissions.

Contact Information

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

4.0 SPECIAL CONSIDERATIONS

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

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

Buncombe County

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

Forsyth County

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

Mecklenburg County

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

5.0 ADDITIONAL INFORMATION

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

<https://epi.dph.ncdhhs.gov/asbestos/ahmp.html>

6.0 BASIS OF PAYMENT

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

THERMAL SPRAYED COATINGS (METALLIZATION)**(12-1-2017)****DESCRIPTION**

Apply a thermal sprayed coating (TSC) and sealer to metal surfaces in accordance with the Thermal Sprayed Coatings (Metallization) Program and as specified herein when called for on the plans or by other Special Provisions. Use only Arc Sprayed application methods to apply TSC. The Engineer must approve other methods of application.

The Thermal Sprayed Coatings (Metallization) Program is available on the Materials and Tests Unit website.

QUALIFICATIONS

Only use NCDOT approved TSC Contractors meeting the requirements outlined in the Thermal Sprayed Coatings (Metallization) Program.

MATERIALS

Use only materials meeting the requirements of Section 7 of the Thermal Sprayed Coatings (Metallization) Program.

SURFACE PREPARATION AND TSC APPLICATION

Surface preparation of TSC surfaces shall meet the requirements of Section 8 of the Thermal Sprayed Coatings (Metallization) Program. Apply TSC with the alloy to the thickness specified on the plans or as required by Thermal Sprayed Coatings (Metallization) Program.

INSPECTION AND TESTING

The TSC Contractor must conduct inspections and tests listed in the Thermal Sprayed Coatings (Metallization) Program.

REPAIRS

Perform all shop repairs in accordance with the procedures outlined in the Thermal Sprayed Coatings (Metallization) Program.

Repairs associated with field welding shall be made by removing the existing metallizing by blast or power tool cleaning. Affected areas shall be addressed as follows:

- For Marine Environments, incorporate a minimum surface preparation in accordance with SSPC SP-11 (Power Tool Cleaning to Bare Metal) and require an approved epoxy mastic coating applied in accordance with the manufacturer's recommendation. Apply a minimum of two (2) coats at a rate of 5-7 (WFT) per coat to the affected area.
- For Non-Marine Environments, incorporate a minimum surface preparation in accordance with SSPC SP-11 (Power Tool Cleaning to Bare Metal) and require an approved organic zinc-rich coating applied in accordance with the manufacturer's recommendation. Apply a minimum of two (2) coats at a rate of 5-7 (WFT) per coat to the affected area.
 1. Minor localized areas less than or equal to 0.1 ft² with exposed substrate shall be repaired as outlined above for marine and non-marine environments.
 2. Large localized areas greater than 0.1 ft² with exposed substrate shall require the Contractor to submit a detailed repair procedure to the Engineer for review and approval.
- Repair methods for areas where the substrate has not been exposed shall be mutually agreed upon between the Contractor and TSC Contractor as approved by the Engineer.

TWELVE MONTH OBSERVATION PERIOD

All TSC materials applied under the Thermal Sprayed Coatings (Metallization) Program shall be evaluated twelve (12) months after project acceptance for defective materials and workmanship.

BASIS OF PAYMENT

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

18" GALVANIZED STEEL SHEET PILES**(SPECIAL)**

The 2018 Standard Specifications shall be revised as follows:

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Replace the first paragraph of Section **1084-2 – STEEL SHEET PILES** with the following:

Steel sheet piles detailed for permanent applications shall be hot rolled and meet ASTM A572 or ASTM A690 unless otherwise required by the plans. Steel sheet piles shall be coated as required by the plans. Galvanized sheet piles shall be coated in accordance with Section 1076. Complete all work in accordance with the contract plans and Section 452 of the Standard Specifications except measurement and payment for the steel sheet piles will be as described below.

Sheet piles will be measured and paid as the actual number of square feet of sheet piles completed and accepted. In determining this quantity, the sheet pile length used in the computation is the sheet pile length shown on the plans. The sheet pile heights are measured as the difference between the top elevation as shown on the plans and the bottom of the steel sheet piles.

Payment will be made under:

18” Galvanized Steel Sheet Piles Sq. Ft.

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
ROADWAY ITEMS						
0001	0000100000-N	800	MOBILIZATION	Lump Sum	L.S.	
0002	0000400000-N	801	CONSTRUCTION SURVEYING	Lump Sum	L.S.	
0003	0000700000-N	SP	FIELD OFFICE	Lump Sum	L.S.	
0004	0001000000-E	200	CLEARING & GRUBBING .. ACRE(S)	Lump Sum	L.S.	
0005	0008000000-E	200	SUPPLEMENTARY CLEARING & GRUB- BING	3 ACR		
0006	0022000000-E	225	UNCLASSIFIED EXCAVATION	70,350 CY		
0007	0028000000-N	SP	TYPE I STANDARD APPROACH FILL STATION ***** (156+55.00 -L- LT)	Lump Sum	L.S.	
0008	0028000000-N	SP	TYPE I STANDARD APPROACH FILL STATION ***** (156+55.00 -L- RT)	Lump Sum	L.S.	
0009	0036000000-E	225	UNDERCUT EXCAVATION	36,326 CY		
0010	0106000000-E	230	BORROW EXCAVATION	1,557,620 CY		
0011	0127000000-N	235	EMBANKMENT SETTLEMENT GAUGES	10 EA		
0012	0134000000-E	240	DRAINAGE DITCH EXCAVATION	143,430 CY		
0013	0156000000-E	250	REMOVAL OF EXISTING ASPHALT PAVEMENT	42,440 SY		
0014	0177000000-E	250	BREAKING OF EXISTING ASPHALT PAVEMENT	136,010 SY		
0015	0192000000-N	260	PROOF ROLLING	107 HR		
0016	0194000000-E	265	SELECT GRANULAR MATERIAL, CLASS III	66,000 CY		
0017	0196000000-E	270	GEOTEXTILE FOR SOIL STABILIZA- TION	75,400 SY		
0018	0199000000-E	SP	TEMPORARY SHORING	10,003 SF		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0019	0222000000-E	SP	GEOTEXTILE FOR ROCK EMBANKMENTS	500 SY		
0020	0318000000-E	300	FOUNDATION CONDITIONING MATERIAL, MINOR STRUCTURES	5,770 TON		
0021	0320000000-E	300	FOUNDATION CONDITIONING GEOTEXTILE	33,700 SY		
0022	0335200000-E	305	15" DRAINAGE PIPE	1,076 LF		
0023	0335300000-E	305	18" DRAINAGE PIPE	188 LF		
0024	0335400000-E	305	24" DRAINAGE PIPE	324 LF		
0025	0335500000-E	305	30" DRAINAGE PIPE	180 LF		
0026	0335600000-E	305	36" DRAINAGE PIPE	44 LF		
0027	0335700000-E	305	42" DRAINAGE PIPE	108 LF		
0028	0335800000-E	305	48" DRAINAGE PIPE	28 LF		
0029	0342000000-E	310	*** SIDE DRAIN PIPE (30")	128 LF		
0030	0342000000-E	310	*** SIDE DRAIN PIPE (36")	76 LF		
0031	0343000000-E	310	15" SIDE DRAIN PIPE	3,808 LF		
0032	0344000000-E	310	18" SIDE DRAIN PIPE	1,652 LF		
0033	0345000000-E	310	24" SIDE DRAIN PIPE	1,388 LF		
0034	0366000000-E	310	15" RC PIPE CULVERTS, CLASS III	7,528 LF		
0035	0372000000-E	310	18" RC PIPE CULVERTS, CLASS III	364 LF		
0036	0378000000-E	310	24" RC PIPE CULVERTS, CLASS III	636 LF		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0037	0384000000-E	310	30" RC PIPE CULVERTS, CLASS III	1,404	LF	
0038	0390000000-E	310	36" RC PIPE CULVERTS, CLASS III	2,988	LF	
0039	0396000000-E	310	42" RC PIPE CULVERTS, CLASS III	1,084	LF	
0040	0402000000-E	310	48" RC PIPE CULVERTS, CLASS III	1,288	LF	
0041	0408000000-E	310	54" RC PIPE CULVERTS, CLASS III	352	LF	
0042	0420000000-E	310	66" RC PIPE CULVERTS, CLASS III	848	LF	
0043	0448000000-E	310	***** RC PIPE CULVERTS, CLASS IV (66")	180	LF	
0044	0448200000-E	310	15" RC PIPE CULVERTS, CLASS IV	5,676	LF	
0045	0448300000-E	310	18" RC PIPE CULVERTS, CLASS IV	180	LF	
0046	0448500000-E	310	30" RC PIPE CULVERTS, CLASS IV	276	LF	
0047	0448600000-E	310	36" RC PIPE CULVERTS, CLASS IV	188	LF	
0048	0973100000-E	330	*** WELDED STEEL PIPE, ***** THICK, GRADE B IN SOIL (36", 0.500")	166	LF	
0049	0973100000-E	330	*** WELDED STEEL PIPE, ***** THICK, GRADE B IN SOIL (54", 0.750")	92	LF	
0050	0973100000-E	330	*** WELDED STEEL PIPE, ***** THICK, GRADE B IN SOIL (66", 0.875")	92	LF	
0051	0973300000-E	330	*** WELDED STEEL PIPE, ***** THICK, GRADE B NOT IN SOIL (36", 0.500")	166	LF	
0052	0973300000-E	330	*** WELDED STEEL PIPE, ***** THICK, GRADE B NOT IN SOIL (54", 0.750")	92	LF	

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0053	0973300000-E	330	*** WELDED STEEL PIPE, **** THICK, GRADE B NOT IN SOIL (66", 0.875")	92 LF		
0054	0986000000-E	SP	GENERIC PIPE ITEM 15" CS SLOTTED DRAIN, 0.064" THICK	80 LF		
0055	0995000000-E	340	PIPE REMOVAL	11,593 LF		
0056	1011000000-N	500	FINE GRADING	Lump Sum	L.S.	
0057	1077000000-E	SP	#57 STONE	1,030 TON		
0058	1099500000-E	505	SHALLOW UNDERCUT	1,500 CY		
0059	1099700000-E	505	CLASS IV SUBGRADE STABILIZA- TION	2,860 TON		
0060	1111000000-E	SP	CLASS IV AGGREGATE STABILIZA- TION	1,000 TON		
0061	1121000000-E	520	AGGREGATE BASE COURSE	199,600 TON		
0062	1220000000-E	545	INCIDENTAL STONE BASE	3,000 TON		
0063	1275000000-E	600	PRIME COAT	462 GAL		
0064	1330000000-E	607	INCIDENTAL MILLING	1,450 SY		
0065	1491000000-E	610	ASPHALT CONC BASE COURSE, TYPE B25.0C	7,170 TON		
0066	1503000000-E	610	ASPHALT CONC INTERMEDIATE COURSE, TYPE 119.0C	97,560 TON		
0067	1519000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5B	2,310 TON		
0068	1523000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5C	81,600 TON		
0069	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	10,055 TON		
0070	1693000000-E	654	ASPHALT PLANT MIX, PAVEMENT REPAIR	750 TON		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0071	1840000000-E	665	MILLED RUMBLE STRIPS (ASPHALT CONCRETE)	212,640 LF		
0072	2022000000-E	815	SUBDRAIN EXCAVATION	1,344 CY		
0073	2026000000-E	815	GEOTEXTILE FOR SUBSURFACE DRAINS	4,000 SY		
0074	2036000000-E	815	SUBDRAIN COARSE AGGREGATE	672 CY		
0075	2044000000-E	815	6" PERFORATED SUBDRAIN PIPE	4,000 LF		
0076	2070000000-N	815	SUBDRAIN PIPE OUTLET	8 EA		
0077	2077000000-E	815	6" OUTLET PIPE	48 LF		
0078	2209000000-E	838	ENDWALLS	113 CY		
0079	2220000000-E	838	REINFORCED ENDWALLS	38.8 CY		
0080	2253000000-E	840	PIPE COLLARS	2,701 CY		
0081	2264000000-E	840	PIPE PLUGS	0.029 CY		
0082	2275000000-E	SP	FLOWABLE FILL	197 CY		
0083	2286000000-N	840	MASONRY DRAINAGE STRUCTURES	227 EA		
0084	2297000000-E	840	MASONRY DRAINAGE STRUCTURES	37.35 CY		
0085	2308000000-E	840	MASONRY DRAINAGE STRUCTURES	22.26 LF		
0086	2364000000-N	840	FRAME WITH TWO GRATES, STD 840.16	96 EA		
0087	2364200000-N	840	FRAME WITH TWO GRATES, STD 840.20	5 EA		
0088	2365000000-N	840	FRAME WITH TWO GRATES, STD 840.22	122 EA		
0089	2396000000-N	840	FRAME WITH COVER, STD 840.54	1 EA		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0090	2451000000-N	852	CONCRETE TRANSITIONAL SECTION FOR DROP INLET	93 EA		
0091	2556000000-E	846	SHOULDER BERM GUTTER	194 LF		
0092	2612000000-E	848	6" CONCRETE DRIVEWAY	430 SY		
0093	2655000000-E	852	5" MONOLITHIC CONCRETE ISLANDS (KEYED IN)	10,470 SY		
0094	3030000000-E	862	STEEL BEAM GUARDRAIL	3,637.5 LF		
0095	3045000000-E	862	STEEL BEAM GUARDRAIL, SHOP CURVED	150 LF		
0096	3195000000-N	862	GUARDRAIL END UNITS, TYPE AT-1	3 EA		
0097	3210000000-N	862	GUARDRAIL END UNITS, TYPE CAT-1	9 EA		
0098	3287000000-N	SP	GUARDRAIL END UNITS, TYPE TL-3	11 EA		
0099	3288000000-N	SP	GUARDRAIL END UNITS, TYPE TL-2	1 EA		
0100	3317000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE B-77	4 EA		
0101	3360000000-E	863	REMOVE EXISTING GUARDRAIL	590 LF		
0102	3380000000-E	862	TEMPORARY STEEL BEAM GUARDRAIL	3,025 LF		
0103	3387000000-N	SP	TEMPORARY GUARDRAIL ANCHOR UNITS, TYPE ***** (B-77)	3 EA		
0104	3389150000-N	SP	TEMPORARY GUARDRAIL END UNITS, TYPE ***** (TL-3)	11 EA		
0105	3503000000-E	866	WOVEN WIRE FENCE, 47" FABRIC	96,111 LF		
0106	3509000000-E	866	4" TIMBER FENCE POSTS, 7'-6" LONG	5,919 EA		
0107	3515000000-E	866	5" TIMBER FENCE POSTS, 8'-0" LONG	1,645 EA		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0108	3628000000-E	876	RIP RAP, CLASS I	900 TON		
0109	3635000000-E	876	RIP RAP, CLASS II	2,160 TON		
0110	3642000000-E	876	RIP RAP, CLASS A	500 TON		
0111	3649000000-E	876	RIP RAP, CLASS B	1,500 TON		
0112	3656000000-E	876	GEOTEXTILE FOR DRAINAGE	10,100 SY		
0113	4072000000-E	903	SUPPORTS, 3-LB STEEL U-CHANNEL	206 LF		
0114	4082000000-E	903	SUPPORTS, WOOD	3,868 LF		
0115	4096000000-N	904	SIGN ERECTION, TYPE D	16 EA		
0116	4102000000-N	904	SIGN ERECTION, TYPE E	149 EA		
0117	4108000000-N	904	SIGN ERECTION, TYPE F	54 EA		
0118	4116100000-N	904	SIGN ERECTION, RELOCATE TYPE **** (GROUND MOUNTED) (D)	3 EA		
0119	4116100000-N	904	SIGN ERECTION, RELOCATE TYPE **** (GROUND MOUNTED) (E)	3 EA		
0120	4141000000-N	907	DISPOSAL OF SUPPORT, WOOD	6 EA		
0121	4158000000-N	907	DISPOSAL OF SIGN SYSTEM, WOOD	91 EA		
0122	4400000000-E	1110	WORK ZONE SIGNS (STATIONARY)	4,689 SF		
0123	4405000000-E	1110	WORK ZONE SIGNS (PORTABLE)	472 SF		
0124	4410000000-E	1110	WORK ZONE SIGNS (BARRICADE MOUNTED)	730 SF		
0125	4415000000-N	1115	FLASHING ARROW BOARD	4 EA		
0126	4420000000-N	1120	PORTABLE CHANGEABLE MESSAGE SIGN	3 EA		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0127	4430000000-N	1130	DRUMS	1,035	EA	
0128	4435000000-N	1135	CONES	242	EA	
0129	4445000000-E	1145	BARRICADES (TYPE III)	520	LF	
0130	4455000000-N	1150	FLAGGER	2,400	DAY	
0131	4465000000-N	1160	TEMPORARY CRASH CUSHIONS	14	EA	
0132	4470000000-N	1160	REMOVE & RESET TEMPORARY CRASH CUSHION	29	EA	
0133	4480000000-N	1165	TMA	2	EA	
0134	4485000000-E	1170	PORTABLE CONCRETE BARRIER	4,360	LF	
0135	4490000000-E	1170	PORTABLE CONCRETE BARRIER (ANCHORED)	900	LF	
0136	4500000000-E	1170	REMOVE AND RESET PORTABLE CONCRETE BARRIER	10,520	LF	
0137	4510000000-N	1190	LAW ENFORCEMENT	100	HR	
0138	4516000000-N	1180	SKINNY DRUM	32	EA	
0139	4650000000-N	1251	TEMPORARY RAISED PAVEMENT MARKERS	2,581	EA	
0140	4685000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)	14,115	LF	
0141	4688000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (6", 90 MILS)	266,469	LF	
0142	4695000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)	115	LF	
0143	4700000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (12", 90 MILS)	24,424	LF	
0144	4725000000-E	1205	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)	148	EA	

County : Beaufort, Martin

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0145	4775000000-E	1205	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (6") (IV)	720 LF		
0146	4810000000-E	1205	PAINT PAVEMENT MARKING LINES (4")	67,716 LF		
0147	4815000000-E	1205	PAINT PAVEMENT MARKING LINES (6")	1,285,211 LF		
0148	4825000000-E	1205	PAINT PAVEMENT MARKING LINES (12")	51,058 LF		
0149	4835000000-E	1205	PAINT PAVEMENT MARKING LINES (24")	2,466 LF		
0150	4845000000-N	1205	PAINT PAVEMENT MARKING SYMBOL	330 EA		
0151	4850000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (4")	9,636 LF		
0152	4855000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (6")	233,098 LF		
0153	4865000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (12")	918 LF		
0154	4870000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (24")	277 LF		
0155	4875000000-N	1205	REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS	19 EA		
0156	4890000000-E	SP	GENERIC PAVEMENT MARKING ITEM POLYUREA PAVEMENT MARKING LINES, 6", 20 MILS (STANDARD GLASS BEADS)	495 LF		
0157	4891000000-E	1205	GENERIC PAVEMENT MARKING ITEM THERMOPLASTIC PAVEMENT MARKING LINES (24", 90 MLS)	270 LF		
0158	4895000000-N	SP	GENERIC PAVEMENT MARKING ITEM NON-CAST IRON SNOWPLOWABLE PAVEMENT MARKER	3,587 EA		
0159	4900000000-N	1251	PERMANENT RAISED PAVEMENT MARKERS	5 EA		
0160	5325300000-E	1510	3" WATER LINE	2,700 LF		

County : Beaufort, Martin

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0161	5325400000-E	1510	4" WATER LINE	89 LF		
0162	5325600000-E	1510	6" WATER LINE	47,521 LF		
0163	5325800000-E	1510	8" WATER LINE	4,152 LF		
0164	5326000000-E	1510	10" WATER LINE	4,745 LF		
0165	5329000000-E	1510	DUCTILE IRON WATER PIPE FITTINGS	22,179 LB		
0166	5534000000-E	1515	*** VALVE (3")	5 EA		
0167	5540000000-E	1515	6" VALVE	47 EA		
0168	5546000000-E	1515	8" VALVE	4 EA		
0169	5552000000-E	1515	10" VALVE	2 EA		
0170	5571400000-E	1515	4" TAPPING SLEEVE & VALVE	1 EA		
0171	5571600000-E	1515	6" TAPPING SLEEVE & VALVE	3 EA		
0172	5571800000-E	1515	8" TAPPING SLEEVE & VALVE	1 EA		
0173	5572000000-E	1515	10" TAPPING SLEEVE & VALVE	2 EA		
0174	5643100000-E	1515	3/4" WATER METER	35 EA		
0175	5648000000-N	1515	RELOCATE WATER METER	41 EA		
0176	5666000000-N	1515	FIRE HYDRANT	12 EA		
0177	5673000000-E	1515	FIRE HYDRANT LEG	202 LF		
0178	5686500000-E	1515	WATER SERVICE LINE	6,765 LF		
0179	5798000000-E	1530	ABANDON *** UTILITY PIPE (3")	3,125 LF		
0180	5798000000-E	1530	ABANDON *** UTILITY PIPE (4")	105 LF		

County : Beaufort, Martin

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0181	5800000000-E	1530	ABANDON 6" UTILITY PIPE	44,233 LF		
0182	5801000000-E	1530	ABANDON 8" UTILITY PIPE	3,402 LF		
0183	5802000000-E	1530	ABANDON 10" UTILITY PIPE	4,391 LF		
0184	5815000000-N	1530	REMOVE WATER METER	35 EA		
0185	5815500000-N	1530	REMOVE FIRE HYDRANT	5 EA		
0186	5835000000-E	1540	*** ENCASEMENT PIPE (14")	726 LF		
0187	5835000000-E	1540	*** ENCASEMENT PIPE (8")	500 LF		
0188	5835700000-E	1540	16" ENCASEMENT PIPE	562 LF		
0189	5835900000-E	1540	20" ENCASEMENT PIPE	333 LF		
0190	5872500000-E	1550	BORE AND JACK OF *** (16")	562 LF		
0191	5872500000-E	1550	BORE AND JACK OF *** (20")	333 LF		
0192	5872600000-E	1550	DIRECTIONAL DRILLING OF *** (6")	1,766 LF		
0193	5882000000-N	SP	GENERIC UTILITY ITEM 2" POST HYDRANT	2 EA		
0194	5882000000-N	SP	GENERIC UTILITY ITEM WATER MAIN MARKER	22 EA		
0195	5882000000-N	SP	GENERIC UTILITY ITEM WATER VALVE MARKER	36 EA		
0196	6000000000-E	1605	TEMPORARY SILT FENCE	292,695 LF		
0197	6006000000-E	1610	STONE FOR EROSION CONTROL, CLASS A	4,715 TON		
0198	6009000000-E	1610	STONE FOR EROSION CONTROL, CLASS B	49,875 TON		

County : Beaufort, Martin

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0199	6012000000-E	1610	SEDIMENT CONTROL STONE	17,575	TON	
0200	6015000000-E	1615	TEMPORARY MULCHING	378	ACR	
0201	6018000000-E	1620	SEED FOR TEMPORARY SEEDING	14,300	LB	
0202	6021000000-E	1620	FERTILIZER FOR TEMPORARY SEED- ING	73	TON	
0203	6024000000-E	1622	TEMPORARY SLOPE DRAINS	6,060	LF	
0204	6029000000-E	SP	SAFETY FENCE	6,700	LF	
0205	6030000000-E	1630	SILT EXCAVATION	39,270	CY	
0206	6036000000-E	1631	MATTING FOR EROSION CONTROL	252,745	SY	
0207	6037000000-E	SP	COIR FIBER MAT	2,010	SY	
0208	6038000000-E	SP	PERMANENT SOIL REINFORCEMENT MAT	900	SY	
0209	6042000000-E	1632	1/4" HARDWARE CLOTH	6,520	LF	
0210	6043000000-E	SP	LOW PERMEABILITY GEOTEXTILE	1,430	SY	
0211	6045000000-E	SP	*** TEMPORARY PIPE (15")	242	LF	
0212	6045000000-E	SP	*** TEMPORARY PIPE (24")	810	LF	
0213	6045000000-E	SP	*** TEMPORARY PIPE (36")	130	LF	
0214	6045000000-E	SP	*** TEMPORARY PIPE (42")	420	LF	
0215	6045000000-E	SP	*** TEMPORARY PIPE (48")	670	LF	
0216	6048000000-E	SP	FLOATING TURBIDITY CURTAIN	90	SY	
0217	6069000000-E	1638	STILLING BASINS	290	CY	

County : Beaufort, Martin

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0218	6070000000-N	1639	SPECIAL STILLING BASINS	5 EA		
0219	6071012000-E	SP	COIR FIBER WATTLE	22,080 LF		
0220	6071014000-E	SP	COIR FIBER WATTLE BARRIER	7,687 LF		
0221	6071020000-E	SP	POLYACRYLAMIDE (PAM)	32,735 LB		
0222	6071030000-E	1640	COIR FIBER BAFFLE	7,675 LF		
0223	6071050000-E	SP	*** SKIMMER (1-1/2")	52 EA		
0224	6071050000-E	SP	*** SKIMMER (2")	9 EA		
0225	6071050000-E	SP	*** SKIMMER (2-1/2")	4 EA		
0226	6071050000-E	SP	*** SKIMMER (3")	1 EA		
0227	6071050000-E	SP	*** SKIMMER (4")	1 EA		
0228	6084000000-E	1660	SEEDING & MULCHING	249 ACR		
0229	6087000000-E	1660	MOWING	288 ACR		
0230	6090000000-E	1661	SEED FOR REPAIR SEEDING	3,800 LB		
0231	6093000000-E	1661	FERTILIZER FOR REPAIR SEEDING	12 TON		
0232	6096000000-E	1662	SEED FOR SUPPLEMENTAL SEEDING	6,100 LB		
0233	6108000000-E	1665	FERTILIZER TOPDRESSING	183 TON		
0234	6111000000-E	SP	IMPERVIOUS DIKE	355 LF		
0235	6114500000-N	1667	SPECIALIZED HAND MOWING	10 MHR		
0236	6117000000-N	SP	RESPONSE FOR EROSION CONTROL	150 EA		

County : Beaufort, Martin

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0237	6117500000-N	SP	CONCRETE WASHOUT STRUCTURE	15 EA		
0238	6120000000-E	SP	CULVERT DIVERSION CHANNEL	181 CY		
0239	6123000000-E	1670	REFORESTATION	0.1 ACR		
0240	7300000000-E	1715	UNPAVED TRENCHING (***** (2"))	110 LF		
0241	7301000000-E	1715	DIRECTIONAL DRILL (***** (2"))	90 LF		
0242	7324000000-N	1716	JUNCTION BOX (STANDARD SIZE)	3 EA		
0243	7980000000-N	SP	GENERIC SIGNAL ITEM 5/8" X 10' GROUNDING ELEC- TRODE	4 EA		
0244	7980000000-N	SP	GENERIC SIGNAL ITEM DMS ACCESS LADDER	1 EA		
0245	7980000000-N	SP	GENERIC SIGNAL ITEM DMS PEDESTAL STRUCTURE	1 EA		
0246	7980000000-N	SP	GENERIC SIGNAL ITEM DYNAMIC MESSAGE SIGN (TYPE-2C)	2 EA		
0247	7980000000-N	SP	GENERIC SIGNAL ITEM EQUIPMENT CABINET DISCONNECT	1 EA		
0248	7980000000-N	SP	GENERIC SIGNAL ITEM METER BASE/DISCONNECT COMBINA- TION PANEL	1 EA		
0249	7980000000-N	SP	GENERIC SIGNAL ITEM WOOD PEDESTAL	1 EA		
0250	7990000000-E	SP	GENERIC SIGNAL ITEM #4 SOLID BARE COPPER GROUNDING CONDUCTOR	40 LF		
0251	7990000000-E	SP	GENERIC SIGNAL ITEM 3-WIRE COPPER SERVICE ENTRANCE CONDUCTORS	30 LF		
0252	7990000000-E	SP	GENERIC SIGNAL ITEM 4-WIRE COPPER FEEDER CONDUCT- TORS	220 LF		

County : Beaufort, Martin

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0253	7992000000-E	SP	GENERIC SIGNAL ITEM OVERHEAD FOOTINGS	10 CY		

CULVERT ITEMS

0254	8126000000-N	414	CULVERT EXCAVATION, STA ***** (345+79.00 -L-)	Lump Sum	L.S.	
0255	8126000000-N	414	CULVERT EXCAVATION, STA ***** (365+81.00 -L-)	Lump Sum	L.S.	
0256	8126000000-N	414	CULVERT EXCAVATION, STA ***** (69+25.50 -L-)	Lump Sum	L.S.	
0257	8133000000-E	414	FOUNDATION CONDITIONING MATER- IAL, BOX CULVERT	980 TON		
0258	8196000000-E	420	CLASS A CONCRETE (CULVERT)	873.5 CY		
0259	8245000000-E	425	REINFORCING STEEL (CULVERT)	114,362 LB		
0277	8056000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (69+25.50 L-)	Lump Sum	L.S.	
0278	8056000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (315+50 -L)	Lump Sum	L.S.	
0279	8056000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (345+79.00 -L-)	Lump Sum	L.S.	
0280	8056000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (365+81.00 -L-)	Lump Sum	L.S.	

STRUCTURE ITEMS

0260	8035000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (156+55.00 -L- RT)	Lump Sum	L.S.	
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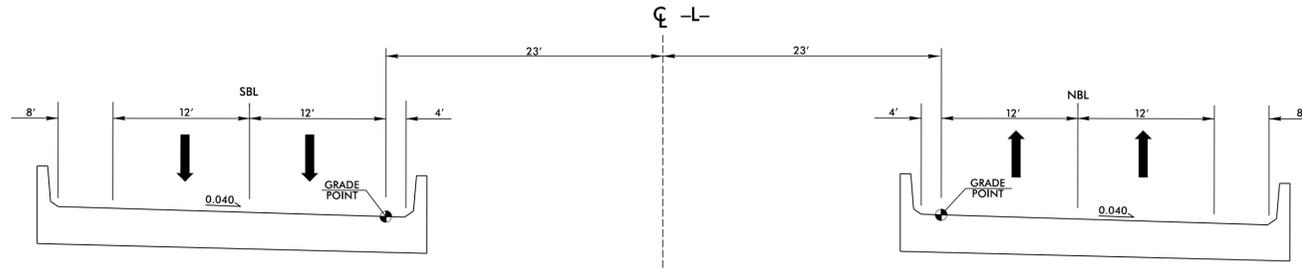
County : Beaufort, Martin

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0261	8065000000-N	SP	ASBESTOS ASSESSMENT	Lump Sum	L.S.	
0262	8112730000-N	450	PDA TESTING	2 EA		
0263	8121000000-N	412	UNCLASSIFIED STRUCTURE EXCAVATION AT STATION ***** (156+55.00 -L- RT)	Lump Sum	L.S.	
0264	8147000000-E	420	REINFORCED CONCRETE DECK SLAB	4,616 SF		
0265	8161000000-E	420	GROOVING BRIDGE FLOORS	7,147 SF		
0266	8182000000-E	420	CLASS A CONCRETE (BRIDGE)	184.8 CY		
0267	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (156+55.00 -L- LT)	Lump Sum	L.S.	
0268	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (156+55.00 -L- RT)	Lump Sum	L.S.	
0269	8217000000-E	425	REINFORCING STEEL (BRIDGE)	23,590 LB		
0270	8259000000-E	430	36" PRESTRESSED CONCRETE GIRDERS	577.79 LF		
0271	8328200000-E	450	PILE DRIVING EQUIPMENT SETUP FOR *** STEEL PILES (HP 12 X 53)	24 EA		
0272	8364000000-E	450	HP12X53 STEEL PILES	1,920 LF		
0273	8393000000-N	450	PILE REDRIVES	12 EA		
0274	8503000000-E	460	CONCRETE BARRIER RAIL	233.2 LF		
0275	8657000000-N	430	ELASTOMERIC BEARINGS	Lump Sum	L.S.	
0276	8892000000-E	SP	GENERIC STRUCTURE ITEM 18" GALVANIZED STEEL SHEET PILES	14,202 SF		

PAVEMENT SCHEDULE

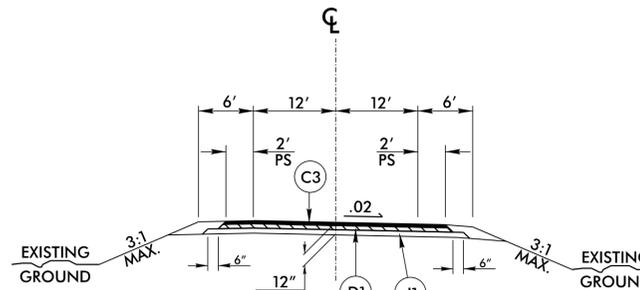
C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	D1	PROP. APPROX. 2.5" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.	J1	PROP. 8" AGGREGATE BASE COURSE.	U	EXISTING PAVEMENT.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 1.5" IN DEPTH.	D2	PROP. APPROX. 3.5" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 399 LBS. PER SQ. YD.	L1	CLASS IV SUBGRADE STABILIZATION	W	WEDGING
C3	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN ONE LAYER	D3	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2.5" IN DEPTH OR GREATER THAN 4" IN DEPTH.	N1	GEOTEXTILE FOR SOIL STABILIZATION		
C4	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	P	PRIME COAT.		
C5	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.	E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5.5" IN DEPTH.	T	EARTH MATERIAL.		

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



STRUCTURE TYPICAL SECTION NO.12 AT THE FOLLOWING LOCATIONS:

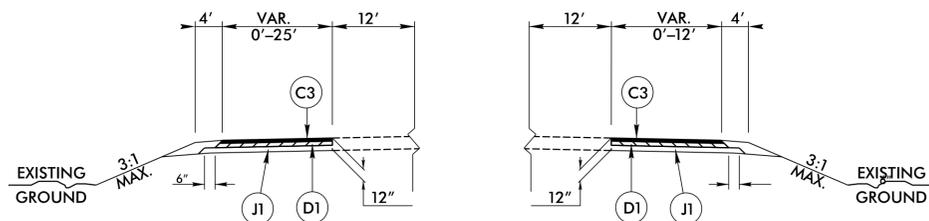
-L- STA. 156+21.18 TO STA. 156+89.29



TYPICAL SECTION NO. 13

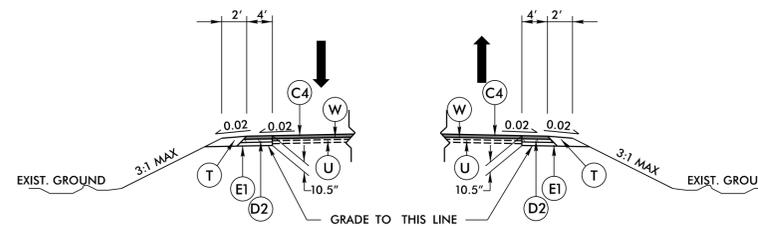
TYPICAL SECTION NO. 13

- TEMP1- STA. 10+00.00 TO STA. 20+91.99
- TEMP2- STA. 10+00.00 TO STA. 18+24.83
- TEMP3- STA. 10+00.00 TO STA. 25+78.32
- TEMP4- STA. 10+00.00 TO STA. 17+14.15
- TEMP5- STA. 10+00.00 TO STA. 21+65.63
- TEMP6- STA. 10+00.00 TO STA. 18+12.64
- TEMP7- STA. 10+00.00 TO STA. 19+57.57
- TEMP8- STA. 10+00.00 TO STA. 20+21.42
- TEMP9- STA. 10+00.00 TO STA. 19+29.69
- TEMP10- STA. 10+00.00 TO STA. 32+88.87
- TEMP12- STA. 10+00.00 TO STA. 20+88.42
- TEMP14- STA. 10+00.00 TO STA. 21+69.07
- TEMP15- STA. 10+00.00 TO STA. 19+44.83
- TEMP16- STA. 10+00.00 TO STA. 19+55.12
- TEMP17- STA. 10+00.00 TO STA. 21+47.93
- TEMP18- STA. 10+00.00 TO STA. 21+42.11
- TEMP19- STA. 10+00.00 TO STA. 21+98.64
- TEMP20- STA. 10+00.00 TO STA. 17+52.81



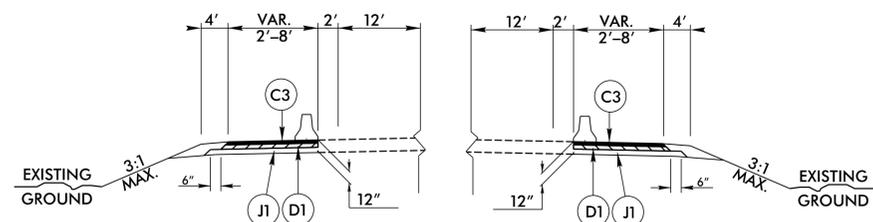
TEMPORARY WIDENING DETAIL

-L- RT STA. 36+60 TO STA. 52+26
-L- LT STA. 466+35 TO STA. 478+27



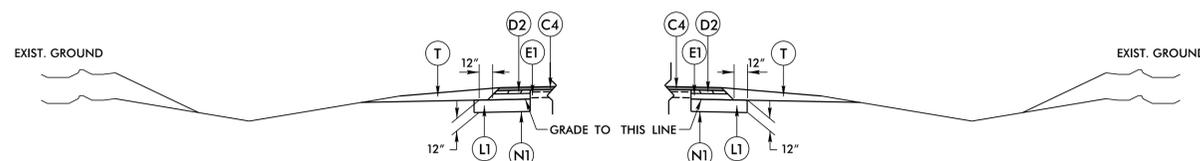
NARROW WIDENING DETAIL

TO BE USED IN CONJUNCTION WITH TYPICAL SECTION 13



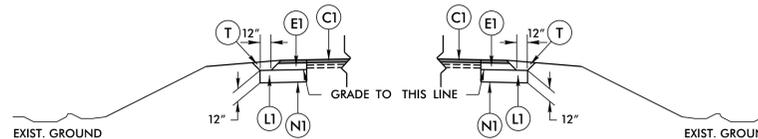
TEMPORARY WIDENING FOR BARRIER WALL DETAIL

-L- LT STA. 66+58 TO STA. 72+46
-L- RT STA. 226+74 TO STA. 232+31
-L- LT STA. 508+75 TO STA. 514+06



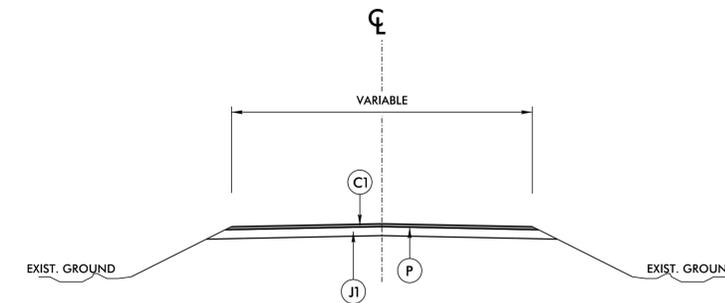
AGGREGATE SUBGRADE DETAIL 1

TO BE USED IN CONJUNCTION WITH TYPICAL SECTIONS AS DIRECTED BY THE RESIDENT ENGINEER AND AT STATIONS:
-L- STA. 7+75 TO STA. 13+00
-L- STA. 198+75 TO STA. 201+75
-L- STA. 334+25 TO STA. 335+25
-Y1- STA. 10+75 TO STA. 13+25



AGGREGATE SUBGRADE DETAIL 2

TO BE USED IN CONJUNCTION WITH TYPICAL SECTIONS AS DIRECTED BY THE RESIDENT ENGINEER AND AT STATIONS:
-Y3- STA. 10+75 TO STA. 13+25
-Y4- STA. 17+00 TO STA. 18+25
-Y5- STA. 12+00 TO STA. 13+25
-Y5- STA. 13+75 TO STA. 14+50
-Y5- STA. 16+50 TO STA. 18+40



DETAIL FOR PAVED DRIVEWAYS

-L- STA. 23+17 RT
-L- STA. 33+67 RT
-L- STA. 97+13 LT
-L- STA. 177+58 LT
-L- STA. 421+00 LT
-L- STA. 423+00 LT
-L- STA. 507+96 RT

PROJECT REFERENCE NO. R-2511	SHEET NO. 2A-4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER <i>[Signature]</i>	PAVEMENT ENGINEER <i>[Signature]</i>
SEAL COTT D. BLEVINS 3/22/2022	SEAL CLARK S. MORRISON 3/22/2022
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

09/08/19

TIP PROJECT: R-2511

CONTRACT: C204498

1/27/2022
RA Structures\R2511_SMU_TS.dgn
default

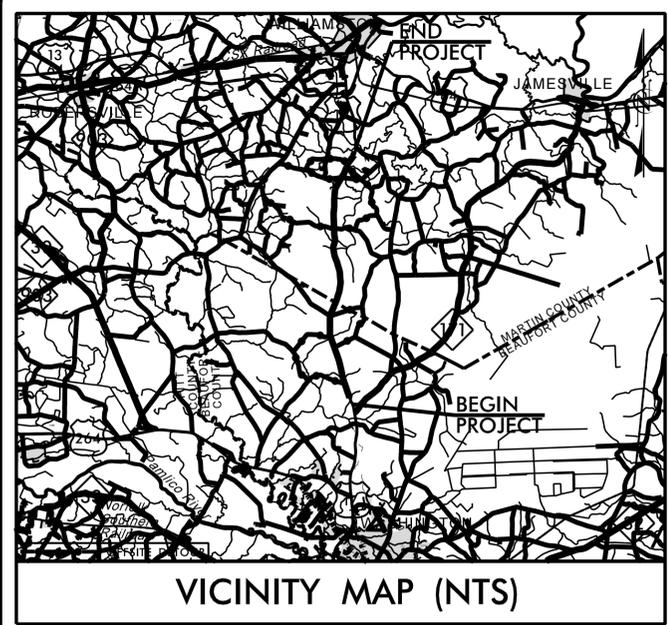
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BEAUFORT & MARTIN COUNTIES

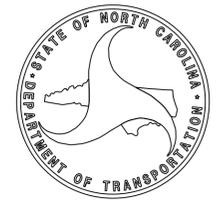
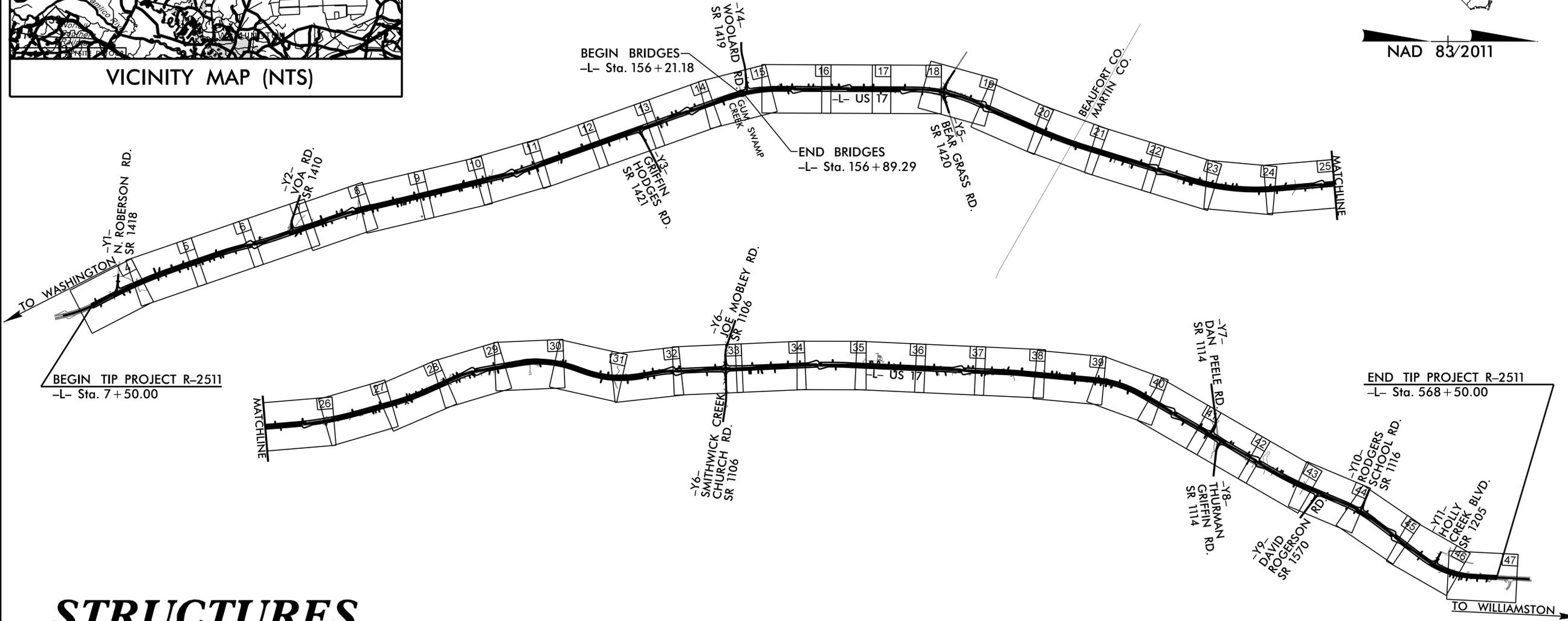
LOCATION: US 17 FROM NORTH OF NC 171 TO
EXISTING MULTI-LANES SOUTH OF WILLIAMSTON

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2511		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
35494.1.1	N/A	PE	
35494.2.1		R/W	
35494.3.1		CONST.	



NAD 83/2011



DESIGN DATA

ADT 2020 =	9,164
ADT 2040 =	14,284
K =	5%
D =	60%
T =	13% *
V =	60 MPH
* TTST =	8% DUAL 5%
FUNC CLASS =	RURAL ARTERIAL

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2511.....	10.612 miles
LENGTH STRUCTURE TIP PROJECT R-2511.....	0.013 miles
TOTAL LENGTH OF TIP PROJECT R-2511.....	10.625 miles

PLANS PREPARED BY:

RK&K
RUMMEL, KLEPPER & KAHL, LLP
8601 SIX FORKS ROAD, FORUM 1, SUITE 700
RALEIGH, NORTH CAROLINA 27615-3960
1-888-521-4455 OR 919-878-9560

FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
2018 STANDARD SPECIFICATIONS

LETTING DATE:
April 19, 2022

NCDOT CONTACT:

MICHAEL T. MERRITT, P.E.
PROJECT ENGINEER

ONDINE J. PAITEL, P.E.
PROJECT STRUCTURES ENGINEER

JOHN ABEL, JR.
PROJECT ENGINEER - DIVISION 1

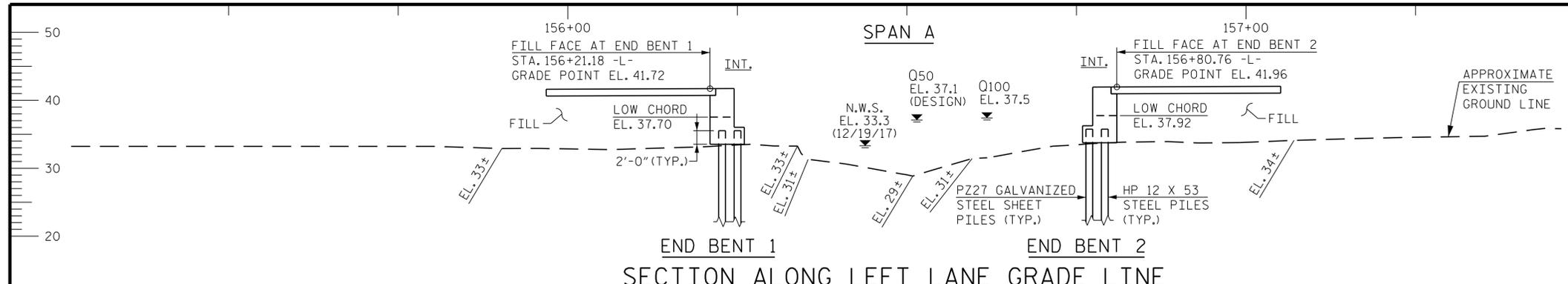
PLANS PREPARED BY:

RK&K
RUMMEL, KLEPPER & KAHL, LLP
8601 SIX FORKS ROAD, FORUM 1 SUITE 700
RALEIGH, NC 27615 (919) 878-9560
NC LICENSE NUMBER: F-0112



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1/27/2022



P.V.I. = 158+25.00 -L-
 EL. = 42.54
 V.C. = 180.00 FT.
 (+)0.4000% (-)0.3093%

-L- GRADE DATA

HYDRAULIC DATA

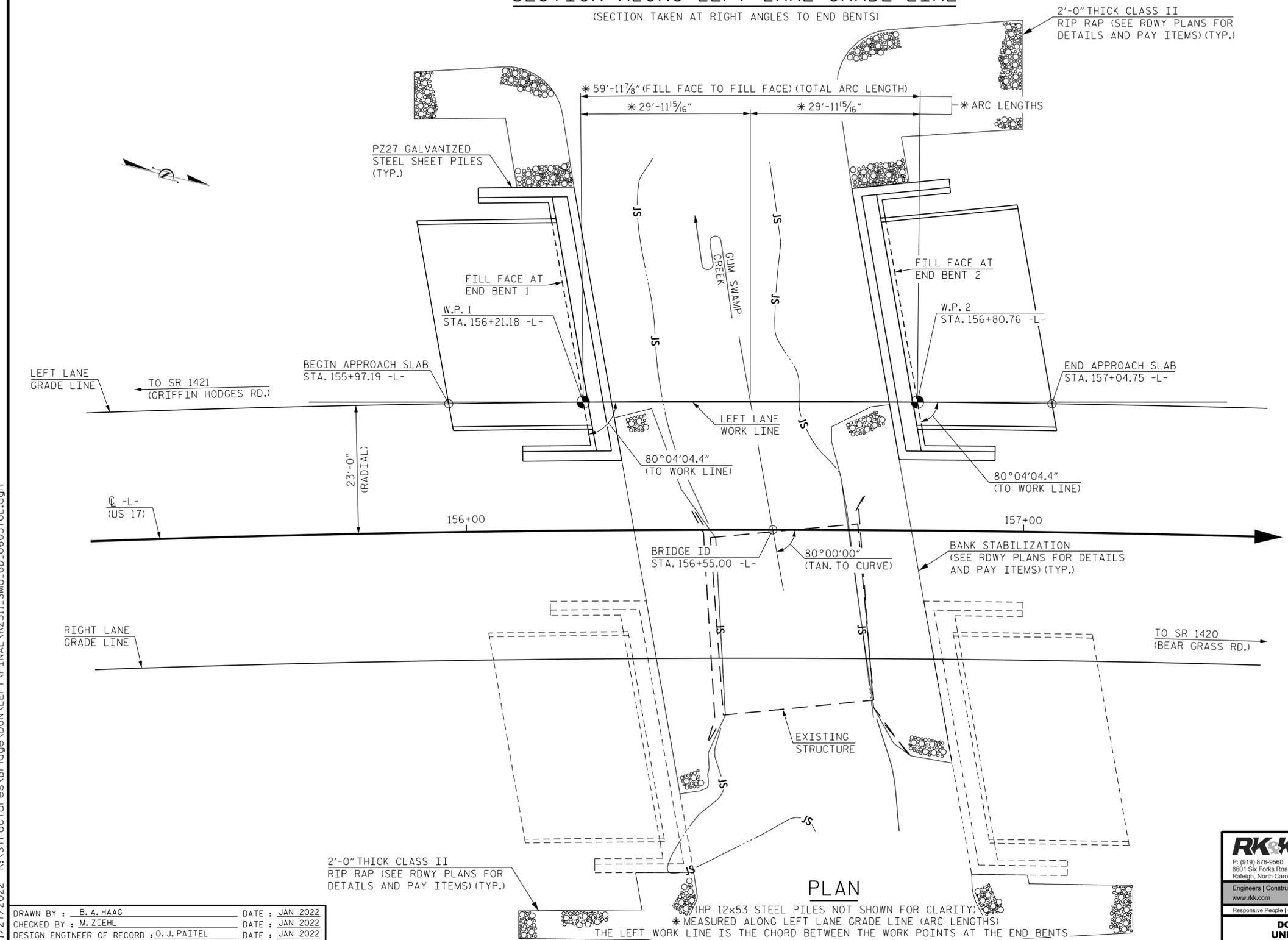
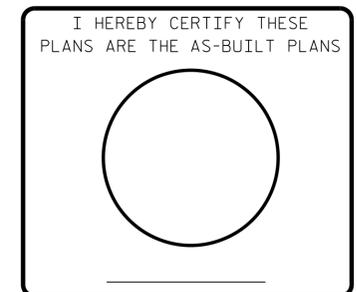
DESIGN DISCHARGE..... 1,165 C.F.S.
 FREQUENCY OF DESIGN FLOOD..... 50 YR.
 DESIGN HIGH WATER ELEVATION..... 37.1
 DRAINAGE AREA..... 3.86 SQ. MI.
 BASE DISCHARGE (Q100)..... 1,436 C.F.S.
 BASE HIGH WATER ELEVATION..... 37.5

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE..... 2,790 C.F.S.
 FREQUENCY OF OVERTOPPING FLOOD.... 500 YR.+
 OVERTOPPING FLOOD ELEVATION..... 41.0

HORIZONTAL CURVE DATA -L-

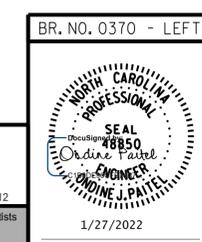
P.I. STA. 158+92.32
 $\Delta = 17^{\circ}05'49.9''$ (RT.)
 $D = 1^{\circ}41'06.6''$
 $L = 1,014.57'$
 $T = 511.08'$
 $R = 3,400.00'$



PROJECT NO. R-2511
BEAUFORT COUNTY
 STATION: 156+55.00 -L-

SHEET 1 OF 5 REPLACES BRIDGE NO. 0056

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 FOR BRIDGE ON US 17
 OVER GUM SWAMP BETWEEN
 SR 1421 AND SR 1420
LEFT LANE



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NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	

TOTAL SHEETS: 25

1/27/2022 R:\Structures\Bridges\GNN\LEFT\FINAL\R2511_SMU_GD_0603701.dgn
 DRAWN BY : B. A. HAAG DATE : JAN 2022
 CHECKED BY : M. ZIEHL DATE : JAN 2022
 DESIGN ENGINEER OF RECORD : O. J. PAITEL DATE : JAN 2022

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FOUNDATION NOTES:

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENTS 1 AND 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 98 TONS PER PILE.

DRIVE PILES AT END BENTS 1 AND 2 TO A REQUIRED DRIVING RESISTANCE OF 165 TONS PER PILE.

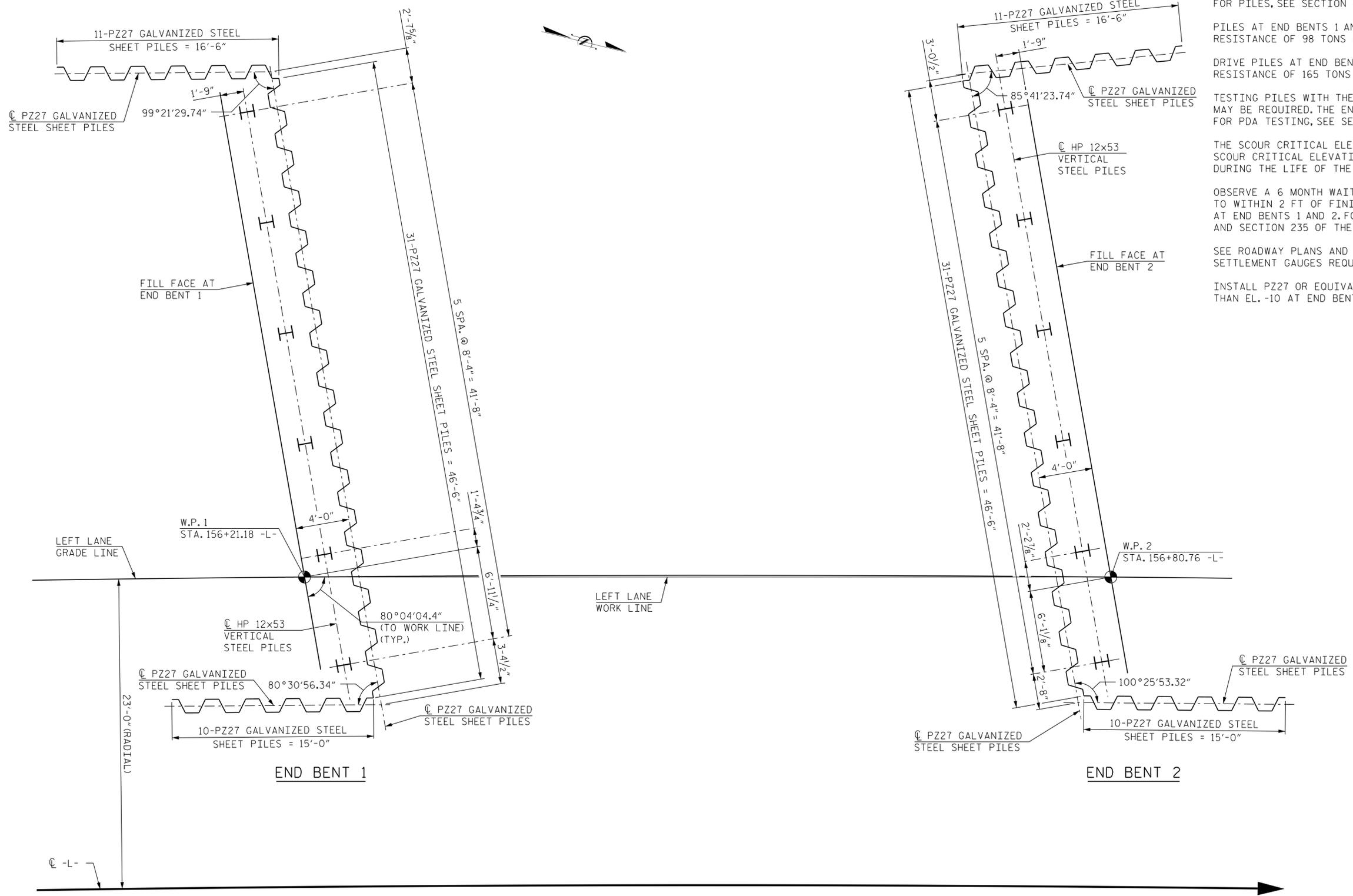
TESTING PILES WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

THE SCOUR CRITICAL ELEVATION FOR END BENTS 1 AND 2 IS ELEVATION 12. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

OBSERVE A 6 MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT TO WITHIN 2 FT OF FINISHED GRADE BEFORE BEGINNING END BENT CONSTRUCTION AT END BENTS 1 AND 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.

SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS FOR THE SETTLEMENT GAUGES REQUIRED AT END BENTS 1 AND 2.

INSTALL PZ27 OR EQUIVALENT SHEET PILE SECTION TO A TIP ELEVATION NO HIGHER THAN EL. -10 AT END BENTS 1 AND 2.



FOUNDATION LAYOUT

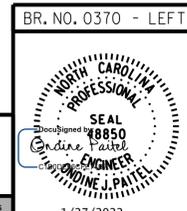
DIMENSIONS LOCATING PILES ARE SHOWN TO THE CENTERLINE OF PILES
THE LEFT WORK LINE IS THE CHORD BETWEEN THE WORK POINTS AT THE END BENTS

PROJECT NO. R-2511
BEAUFORT COUNTY
 STATION: 156+55.00 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 FOUNDATION LAYOUT

LEFT LANE



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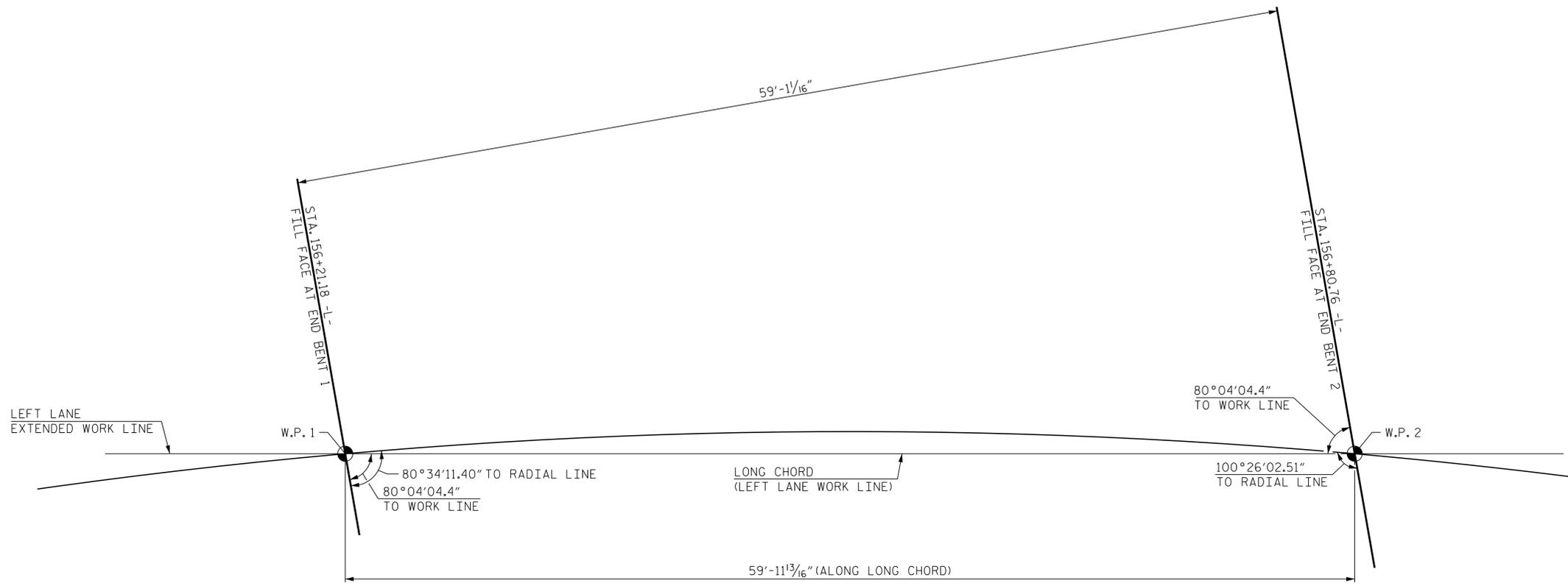
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NO.	BY:	DATE:	NO.	BY:	DATE:	SL-2
1			3			TOTAL SHEETS
2			4			25

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LONG CHORD LAYOUT
NOTE: END BENTS ARE PARALLEL.

PROJECT NO. R-2511
BEAUFORT COUNTY
 STATION: 156+55.00 -L-

SHEET 3 OF 5

BR. NO. 0370 - LEFT



STATE OF NORTH CAROLINA
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GENERAL DRAWING
LONG CHORD LAYOUT

LEFT LANE

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1			3		
2			4		
					SHEET NO. SL-3
					TOTAL SHEETS 25

TOTAL BILL OF MATERIAL

	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLAB	REINFORCING STEEL	36" PRESTRESSED CONCRETE GIRDERS	PILE DRIVING EQUIPMENT SETUP FOR HP 12 x 53 STEEL PILES	HP 12 x 53 STEEL PILES		PILES REDRIVES	ELASTOMERIC BEARINGS	CONCRETE BARRIER RAIL	18" GALVANIZED STEEL SHEET PILES
	EA.	SQ.FT.	SQ.FT.	CU.YDS.	LUMP SUM	LBS.	LIN.FT.	EA.	NO.	LIN.FT.	NO.	LUMP SUM	LIN.FT.	SQ.FT.
SUPERSTRUCTURE	-	2,308	3,591	-	LUMP SUM	-	288.83	-	-	-	-	LUMP SUM	116.6	-
END BENT 1	-	-	-	46.2	-	5,908	-	6	6	480	3	-	-	3,584
END BENT 2	-	-	-	46.1	-	5,914	-	6	6	480	3	-	-	3,601
TOTAL	1	2,308	3,591	92.3	LUMP SUM	11,822	288.83	12	12	960	6	LUMP SUM	116.6	7,185

GENERAL NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

THIS BRIDGE IS LOCATED IN THE SEISMIC ZONE 1.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SL-26.

FOR SUBMITAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

PRESTRESSED CONCRETE DECK PANELS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

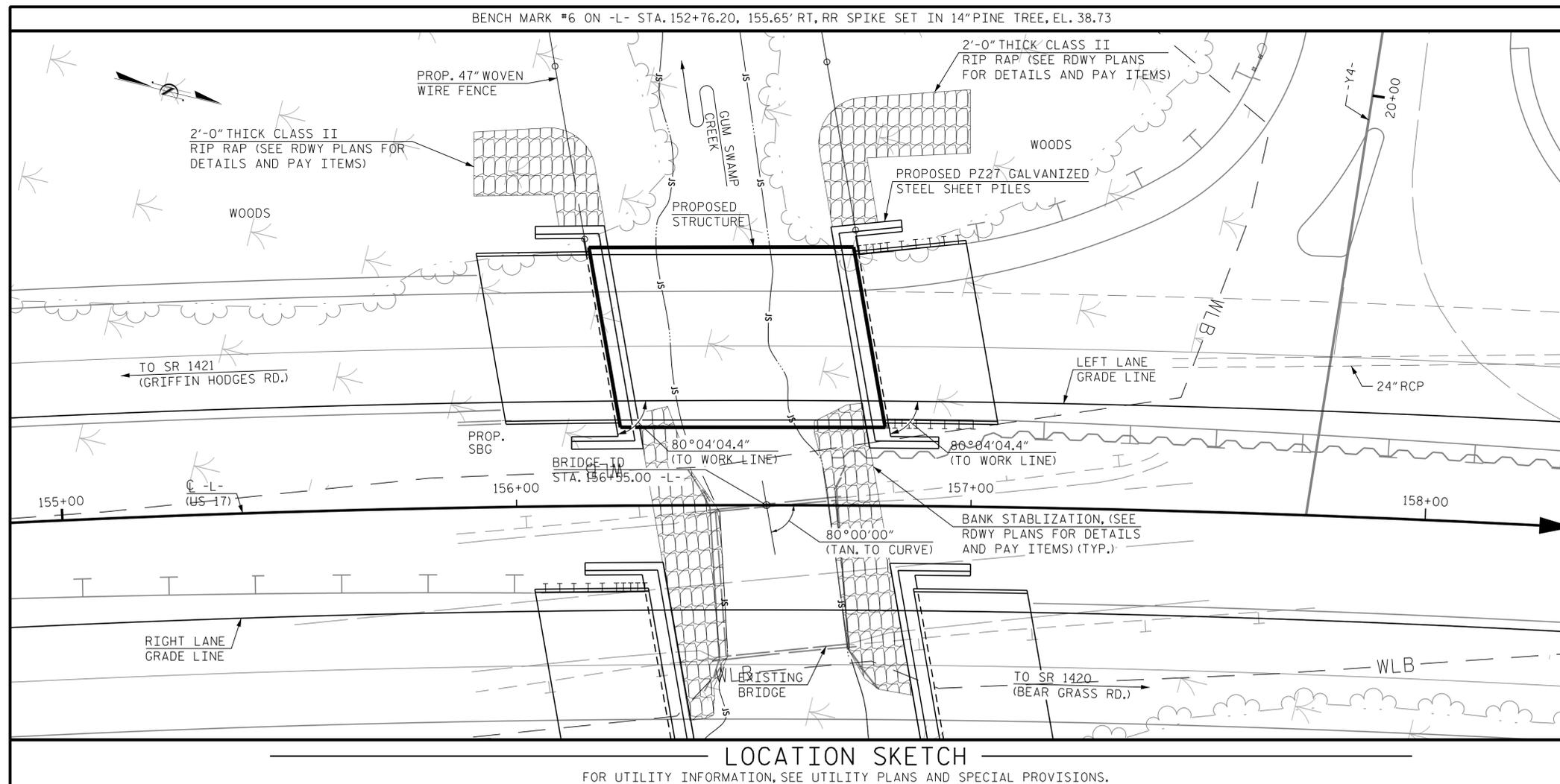
NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18" EVALUATING SCOUR AT BRIDGES.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

FOR REMOVAL OF EXISTING BRIDGE NOTES AND QUANTITIES, SEE RIGHT LANE BRIDGE PLANS, SR-4.

FOR 18" GALVANIZED STEEL SHEET PILES, SEE SPECIAL PROVISIONS.



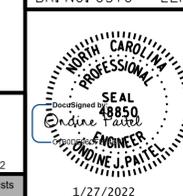
LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

PROJECT NO. R-2511
BEAUFORT COUNTY
 STATION: 156+55.00 -L-

SHEET 4 OF 5

BR. NO. 0370 - LEFT



1/27/2022

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
LOCATION SKETCH, TOTAL
BILL OF MATERIAL AND
GENERAL NOTES
LEFT LANE

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1			3		
2			4		

SHEET NO.

SL-4

TOTAL SHEETS

25



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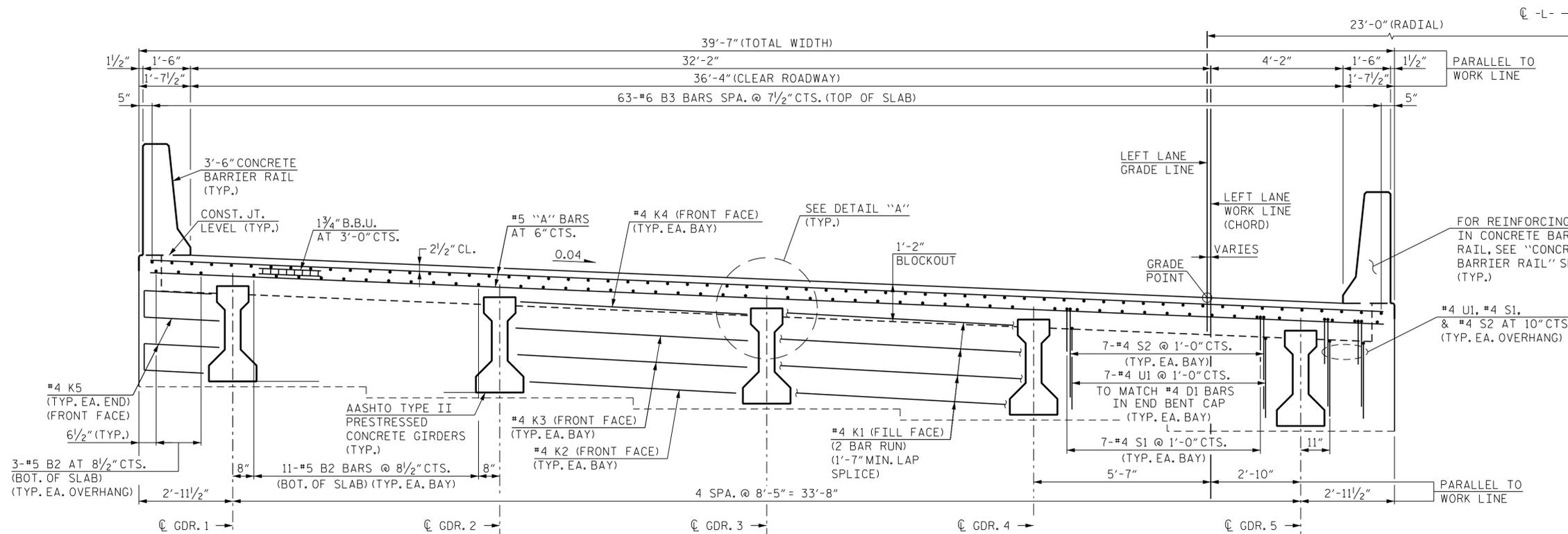
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 CHECKED BY : M. ZIEHL DATE : JAN 2022
 DESIGN ENGINEER OF RECORD : O. J. PAITEL DATE : JAN 2022

NOTES:

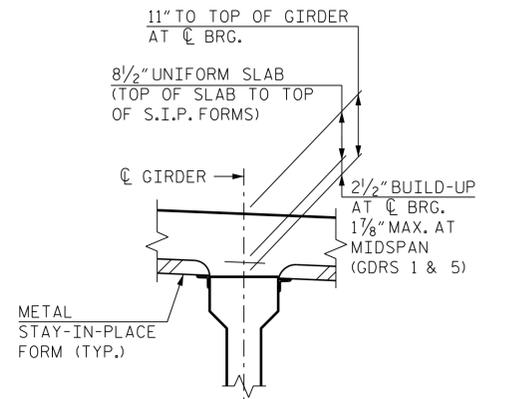
PROVIDE 1/4" BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS.

LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

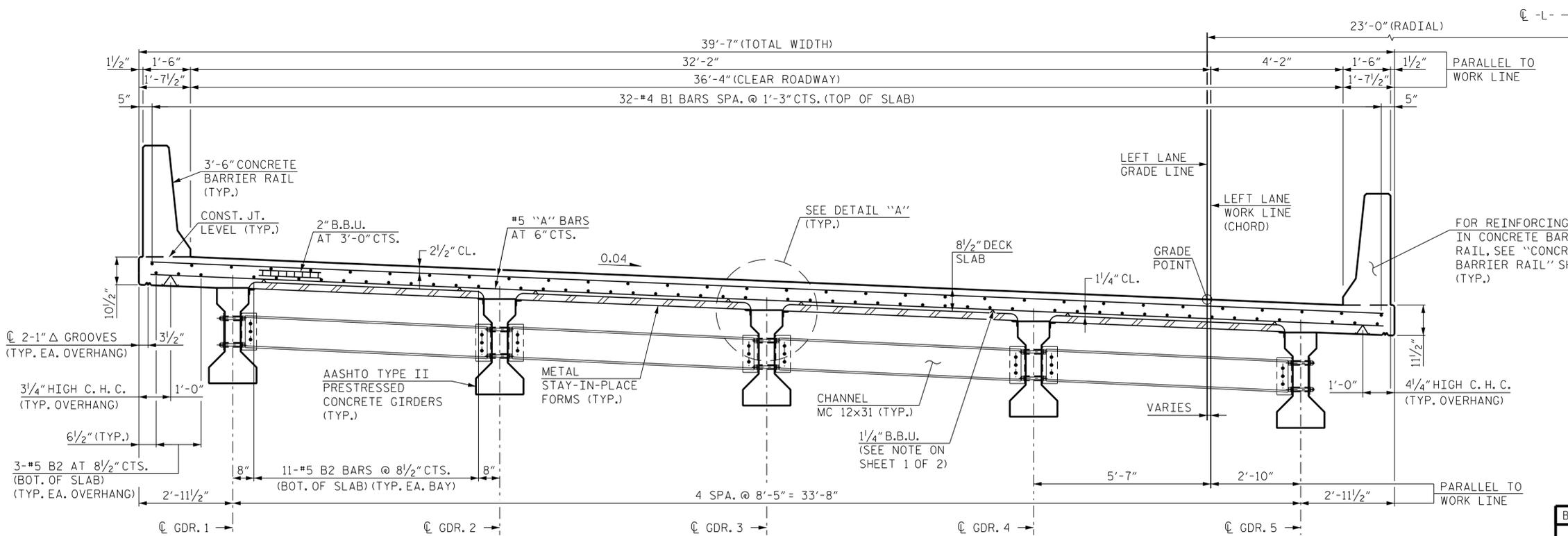
PREVIOUSLY CAST CONCRETE SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST.



TYPICAL SECTION AT INTEGRAL END BENT



DETAIL "A"



TYPICAL SECTION AT INTERMEDIATE DIAPHRAGM

NOTE: REINFORCING STEEL IN SLAB NOT SHOWN. LONGITUDINAL AND TRANSVERSE REINFORCING STEEL SHALL BE CONTINUOUS THROUGH JOINT.

TRANSVERSE CONSTRUCTION JOINT IN DECK SLAB

PROJECT NO. R-2511
BEAUFORT COUNTY
 STATION: 156+55.00 -L-

SHEET 1 OF 2

BR. NO. 0370 - LEFT

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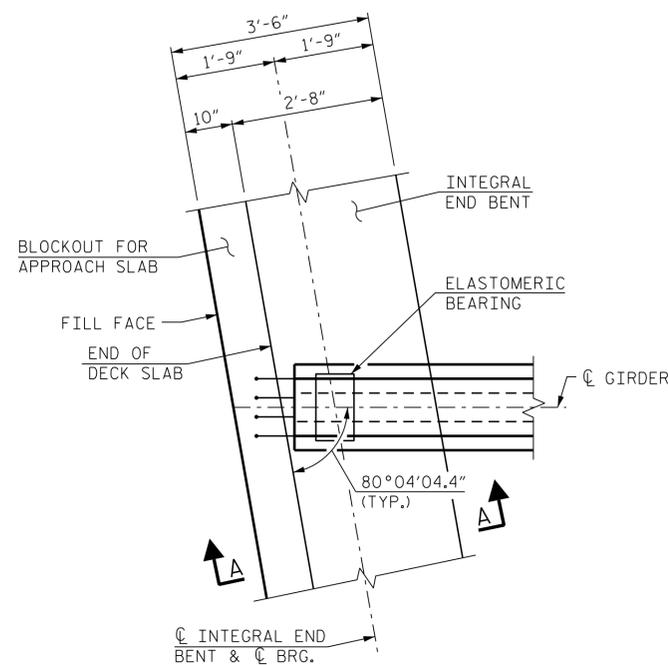
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUPERSTRUCTURE
 TYPICAL SECTIONS
LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	SL-6
1			3			TOTAL SHEETS
2			4			25

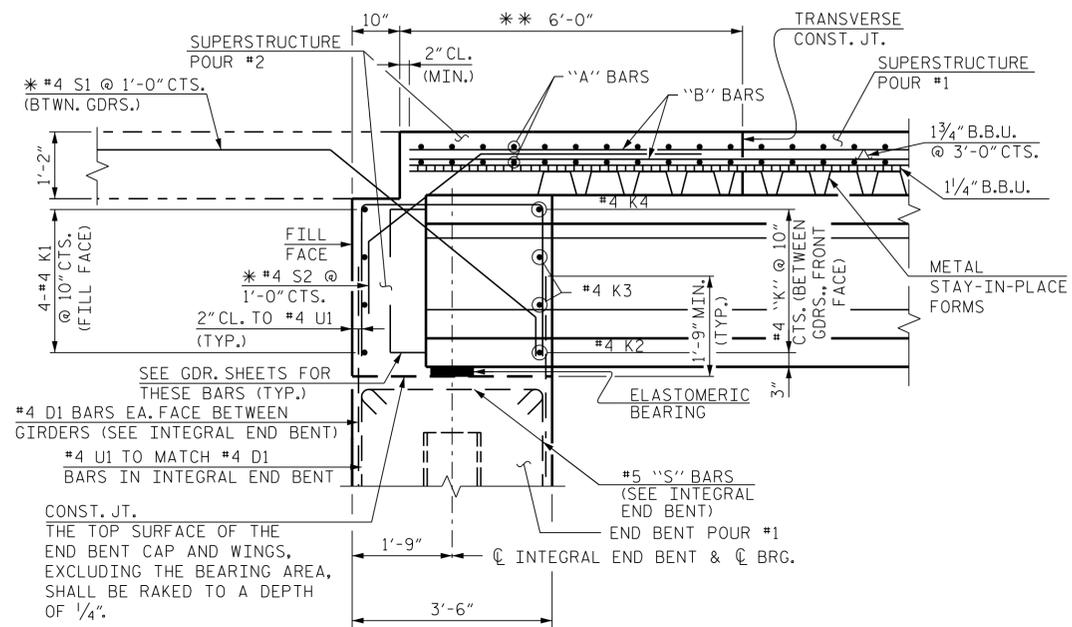
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PLAN OF GIRDER AT INTEGRAL END BENT
(END BENT 1 SHOWN, END BENT 2 SIMILAR)



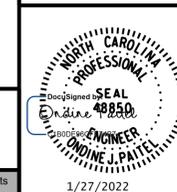
SECTION A-A
* EPOXY COATED BARS
(DIMENSIONS SHOWN ARE NORMAL TO THE END BENT)
(END BENT 1 SHOWN, END BENT 2 SIMILAR)
** MEASURED PARALLEL TO THE CHORD

INTEGRAL END BENT DETAILS
(FOR CLARITY, SHEET PILES NOT SHOWN)

PROJECT NO. R-2511
BEAUFORT COUNTY
STATION: 156+55.00 -L-

SHEET 2 OF 2

BR. NO. 0370 - LEFT



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
TYPICAL SECTION
DETAILS
LEFT LANE

REVISIONS

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1			3		
2			4		

SHEET NO.
SL-7
TOTAL SHEETS
25

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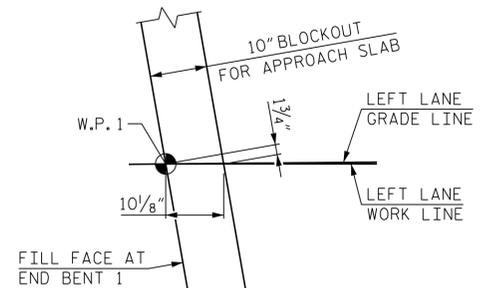
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DESIGN ENGINEER OF RECORD : O. J. PAITEL DATE : JAN 2022

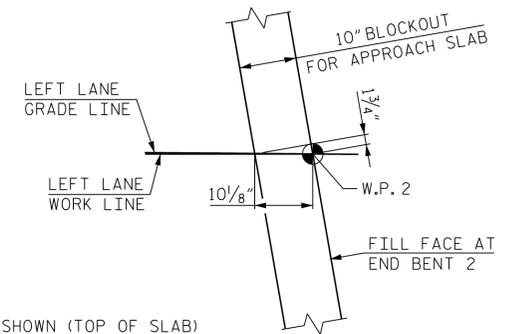
NOTE:

#5 "A" BARS SHALL BE PLACED PERPENDICULAR TO LONG CHORD BETWEEN WORK POINTS AT END BENT 1 AND END BENT 2 (LEFT LANE WORK LINE).

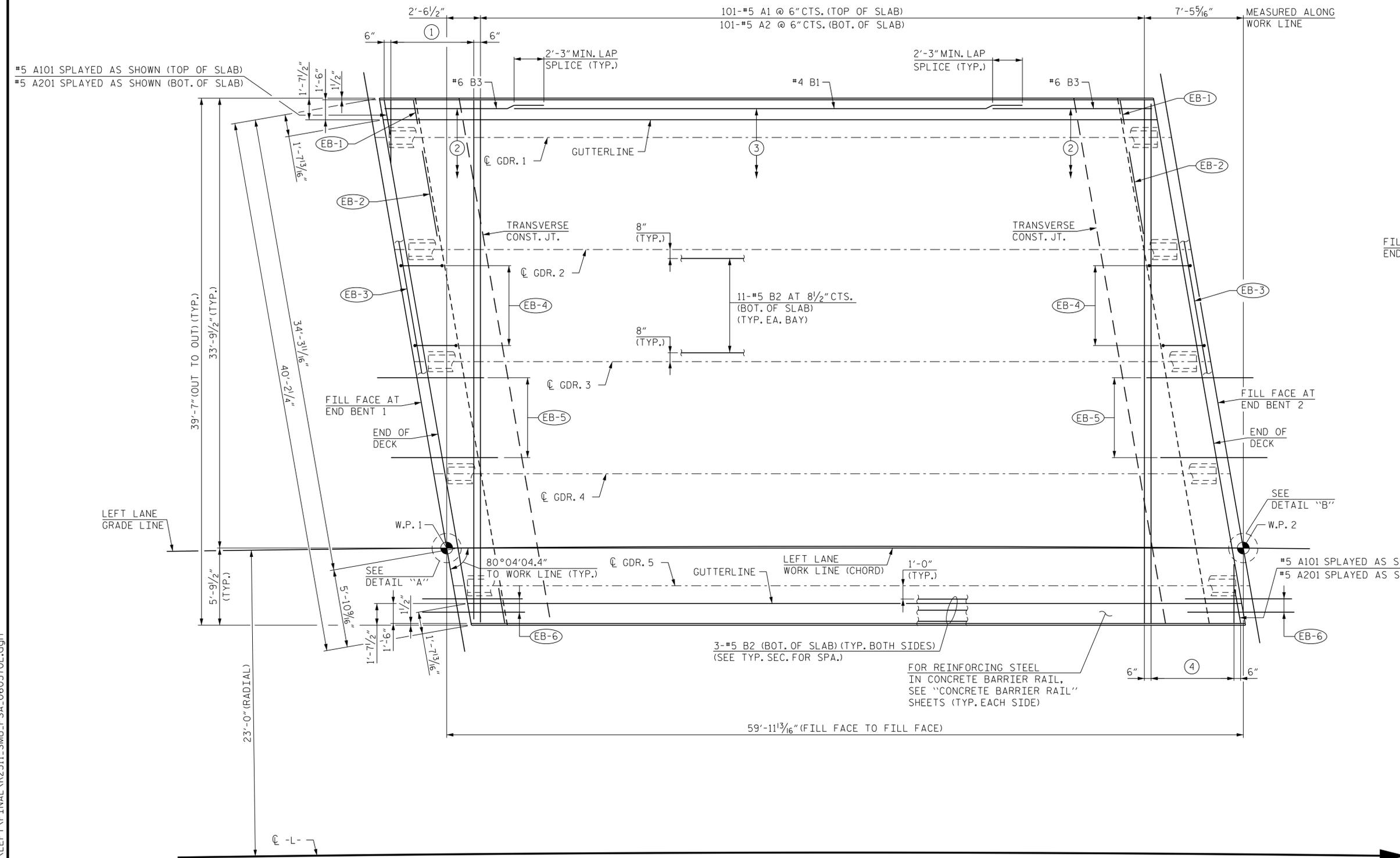
FOR POUR SEQUENCE AND LOCATION OF TRANSVERSE CONSTRUCTION JOINTS, SEE "SUPERSTRUCTURE BILL OF MATERIALS" SHEET SL-17.



DETAIL "A"



DETAIL "B"



PLAN OF SPAN A

PROJECT NO. R-2511
BEAUFORT COUNTY
 STATION: 156+55.00 -L-

- ① #5 A102 THROUGH #5 A114 @ 6" CTS. (TOP OF SLAB)
#5 A202 THROUGH #5 A214 @ 6" CTS. (BOT. OF SLAB)
- ② 63-#6 B3 (TOP OF SLAB)
(SEE TYPICAL SECTION FOR SPACING)
- ③ 32-#4 B1 (TOP OF SLAB)
(SEE TYPICAL SECTION FOR SPACING)
- ④ #5 A114 THROUGH #5 A102 @ 6" CTS. (TOP OF SLAB)
#5 A214 THROUGH #5 A202 @ 6" CTS. (BOT. OF SLAB)

END BENT DIAPHRAGM DETAILS

- (EB-1) #4 K5 BAR (TYP. EXT. GDRS.) (FRONT FACE)
- (EB-2) #4 K2, 2-#4 K3, #4 K4 BARS (FRONT FACE) (TYP. EA. BAY)
- (EB-3) 4-#4 K1 @ 10" CTS. (FILL FACE) (2 BAR RUN) (1'-7" SPLICE LENGTH MIN.)
- (EB-4) 7-#4 U1 @ 1'-0" CTS. (MATCH TO #4 D1 IN END BENT) (TYP. EA. BAY)
- (EB-5) 7-#4 S1 AND 7-#4 S2 @ 1'-0" CTS. (TYP. EA. BAY)
- (EB-6) 2-#4 S1, 2-#4 S2, AND 2-#4 U1 @ 10" CTS. IN OVERHANGS (TYP.)



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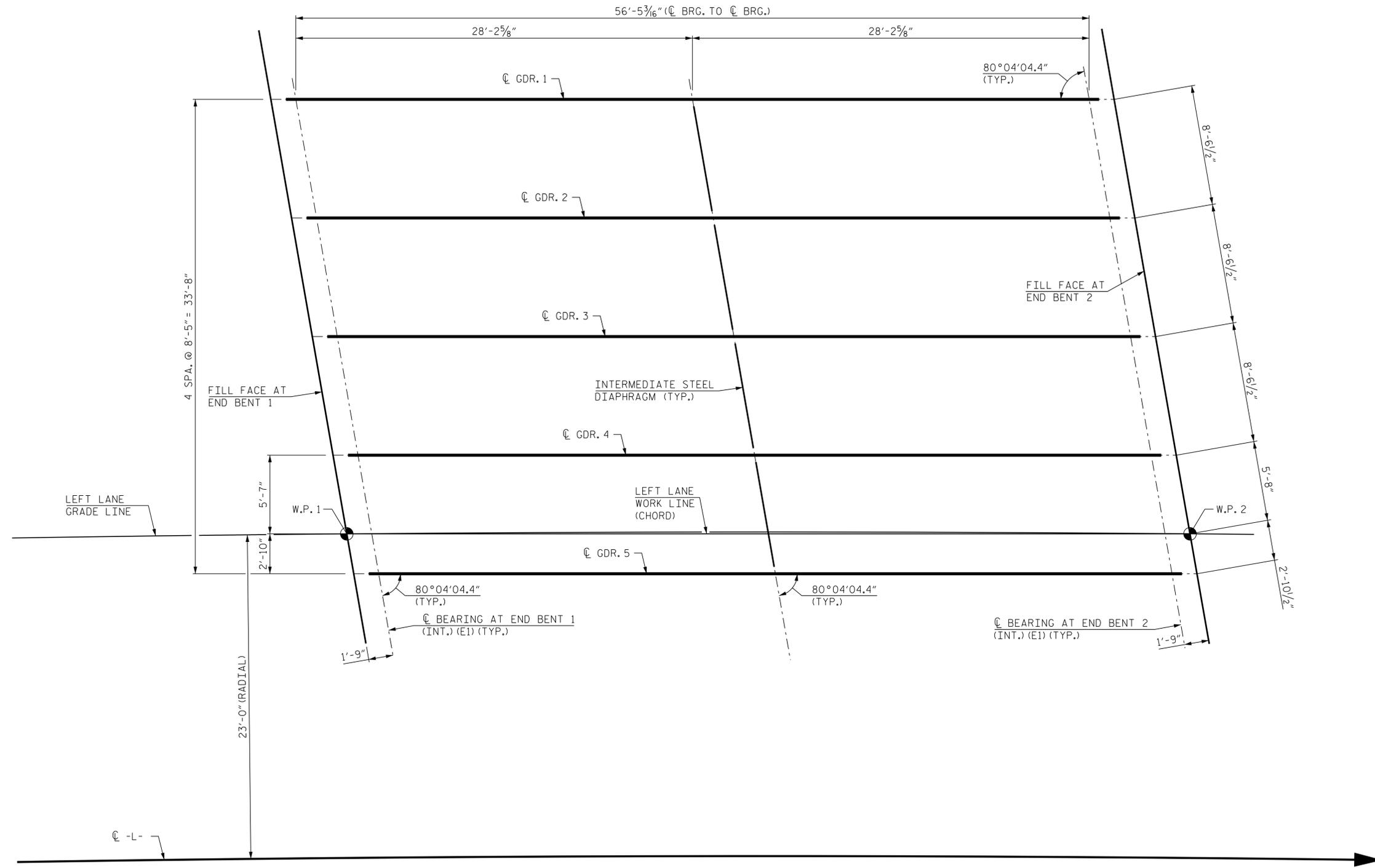
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUPERSTRUCTURE
 PLAN OF SPAN A
LEFT LANE

REVISIONS					
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SHEET NO. **SL-8**
 TOTAL SHEETS 25

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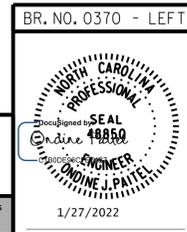
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BEAUFORT COUNTY
 STATION: 156+55.00 -L-

FRAMING PLAN

(ALL GIRDERS ARE PARALLEL TO THE LEFT LANE WORK LINE, WHICH IS THE CHORD BETWEEN THE WORK POINTS)



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUPERSTRUCTURE
 GIRDER
 FRAMING PLAN
LEFT LANE

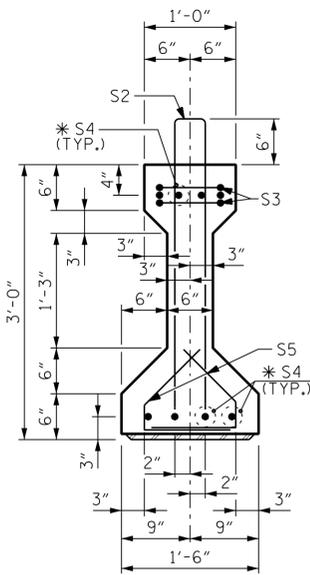
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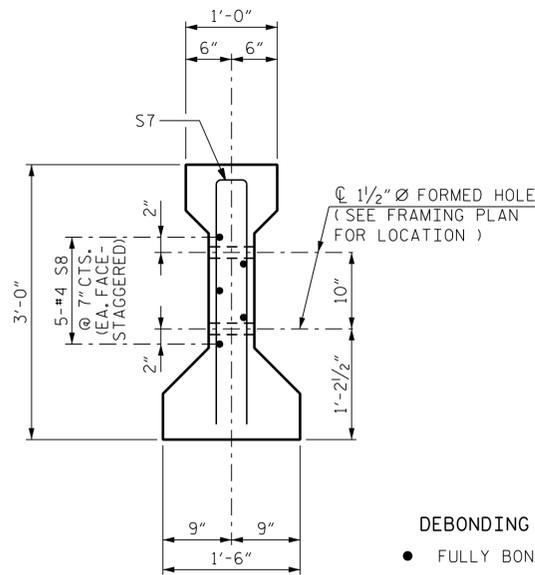
TOTAL SHEETS: 25

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 DESIGN ENGINEER OF RECORD : J. PATEL DATE : JAN 2022

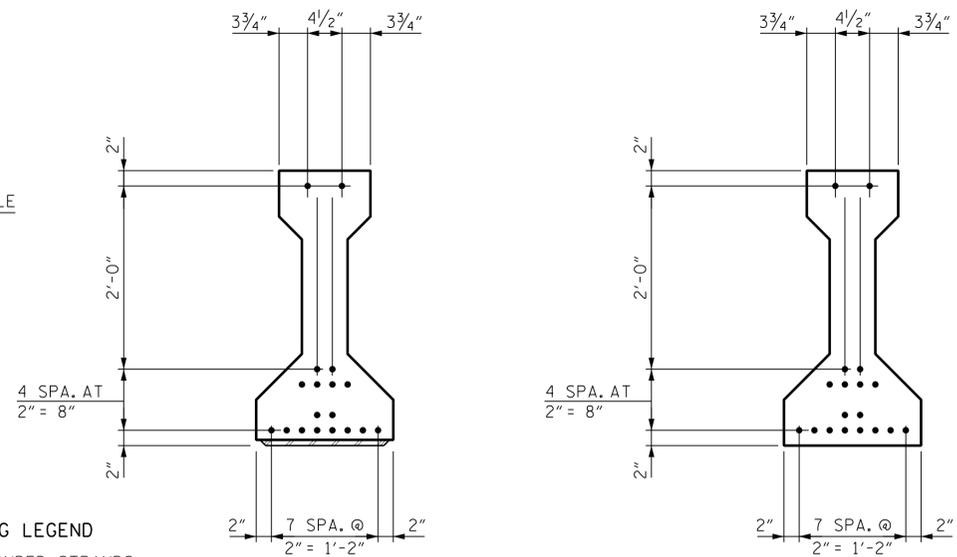
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SECTION A-A



SECTION C-C
(S1 BARS NOT SHOWN)

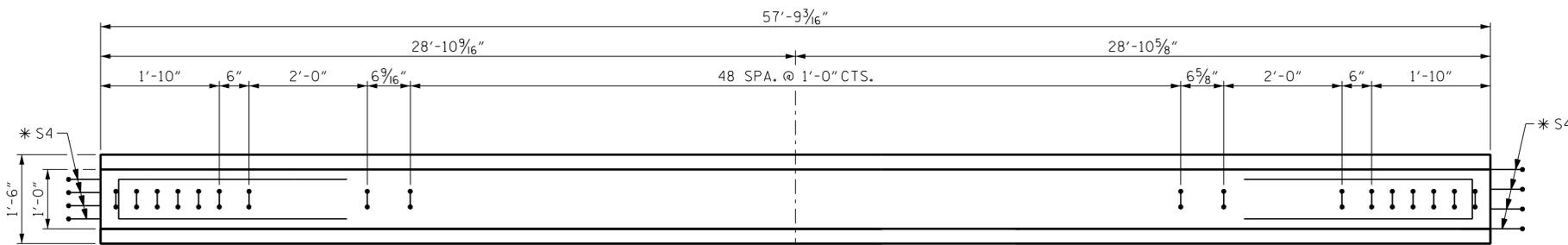


AT END OF GIRDER

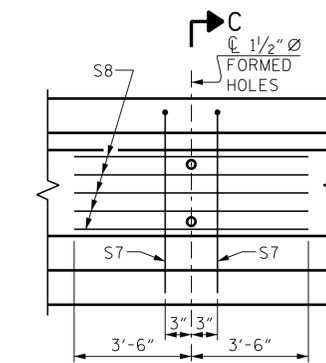
AT \bar{C} OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

DEBONDING LEGEND
● FULLY BONDED STRANDS

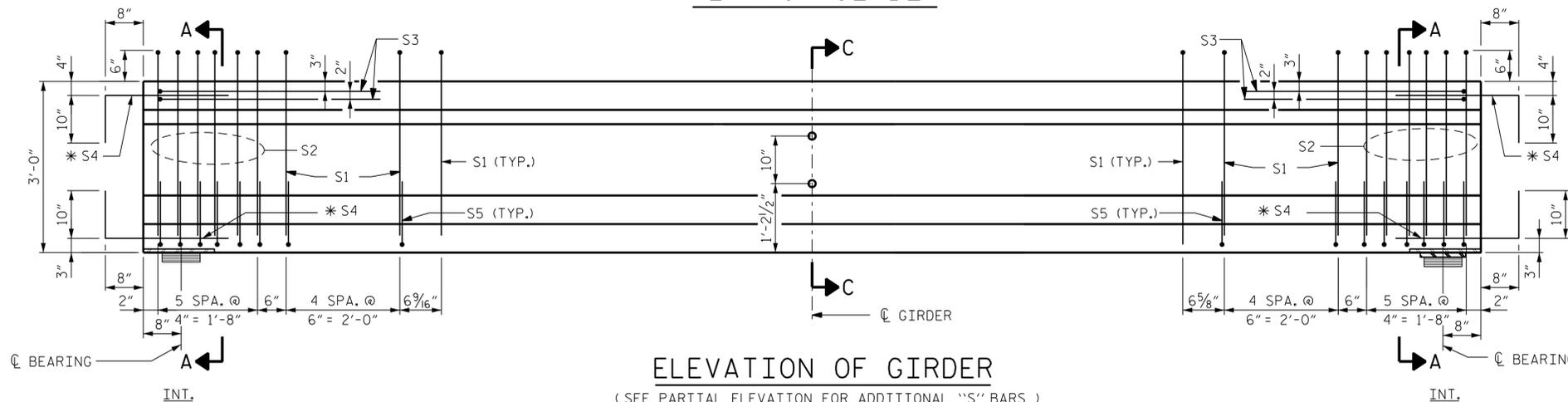


PLAN OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 1-5



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

NOTE:

STIRRUPS MAY BE SLIGHTLY SHIFTED TO AVOID CONFLICTS WITH FORMED HOLES.

0.6" Ø L. R. GRADE 270 STRANDS

AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

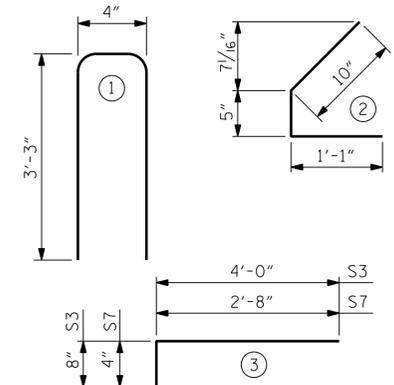
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	59	#4	1	6'-10"	269
S2	12	#6	1	6'-10"	123
S3	4	#4	3	8'-8"	23
*S4	16	#5	STR	3'-8"	61
S5	44	#4	2	2'-4"	69
S7	2	#5	3	5'-8"	12
S8	5	#4	STR	7'-0"	23

* NOTE: S4 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LBS.	8,000 PSI CONCRETE C.Y.	0.6" Ø L. R. STRANDS No.
AG1 THROUGH AG5	580	5.5	18

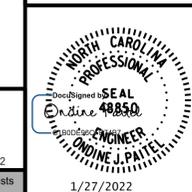
GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	57'-9 3/16"	288'-9 5/16"

PROJECT NO. R-2511
BEAUFORT COUNTY
STATION: 156+55.00 -L-

SHEET 1 OF 3

BR. NO. 0370 - LEFT



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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
AASHTO TYPE II
PRESTRESSED CONCRETE GIRDER
SIMPLE SPAN
LEFT LANE

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1			3			TOTAL SHEETS
2			4			25

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NOTES:

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL SHALL BE GRADE 60.

EMBEDDED PLATE "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

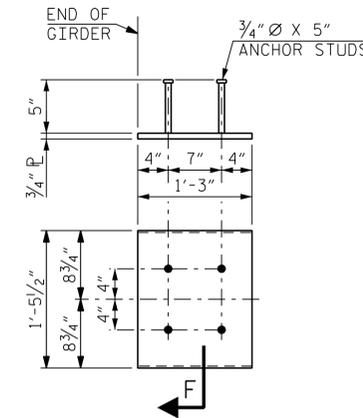
AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6,200 PSI.

DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

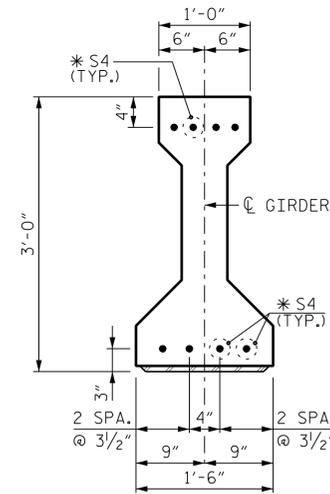
THE TOP SURFACE OF THE GIRDER SHALL BE RAKED TO A DEPTH OF 1/4" EXCEPT IN THE AREA BETWEEN STIRRUPS AND THE EDGE OF THE GIRDER.

THE CONTRACTOR HAS THE OPTION TO PROVIDE, AT NO ADDITIONAL COST TO THE DEPARTMENT, 2 ADDITIONAL STRANDS AT THE TOP OF THE GIRDER TO FACILITATE TYING OF THE REINFORCING STEEL. THESE STRANDS SHALL BE PULLED TO A LOAD OF 4500 lbs.

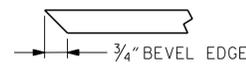


**EMBEDDED PLATE "B-1" DETAILS
FOR AASHTO TYPE II GIRDER**

(2 REQ'D PER GIRDER)



DETAIL "A"



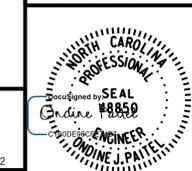
SECTION "F"

(SEE NOTES)

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SHEET 2 OF 3

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STATE OF NORTH CAROLINA
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 RALEIGH
SUPERSTRUCTURE
 PRESTRESSED CONCRETE GIRDER
 SIMPLE SPAN
 DETAILS
LEFT LANE

REVISIONS

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2			4		

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STRUCTURAL STEEL NOTES

ALL INTERMEDIATE DIAPHRAGM STEEL AND CONNECTOR PLATES SHALL BE AASHTO M270 GRADE 50 OR APPROVED EQUAL.

TENSION ON THE ASTM A325 BOLTS THROUGH THE CHANNEL MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL 1/4 TURN.

THE PLATES, BENT PLATES, CHANNELS, AND ANGLES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR METALLIZATION, APPLY A THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM, THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

GALVANIZE THE HIGH STRENGTH BOLTS, NUTS, WASHERS AND DIRECT TENSION INDICATORS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

USE AN ASTM F436 HARDENED WASHER WITH STANDARD AND SLOTTED HOLES UNDER EACH BOLT HEAD AND NUT.

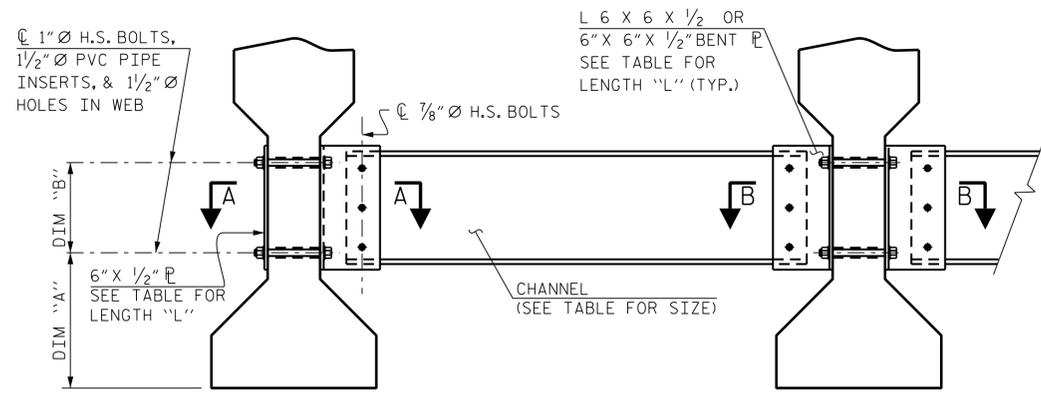
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

INTERMEDIATE DIAPHRAGM ASSEMBLY SHALL COMPLY WITH SECTION 1072 OF THE STANDARD SPECIFICATIONS.

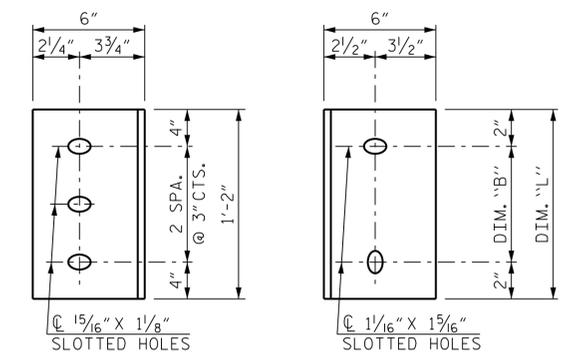
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.



EXTERIOR GIRDER **INTERIOR GIRDER**
PART SECTION AT INTERMEDIATE DIAPHRAGM



DIAPHRAGM FACE **WEB FACE**
CONNECTOR PLATE DETAILS

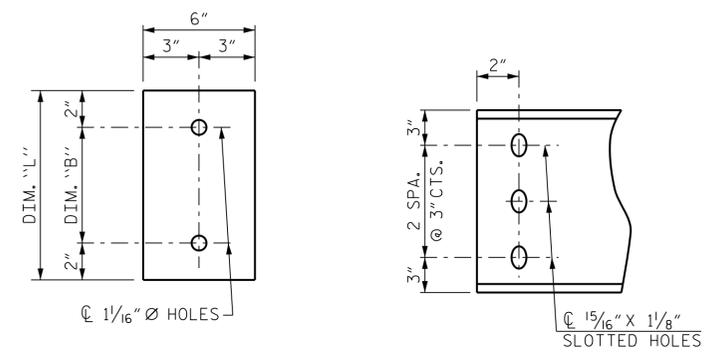
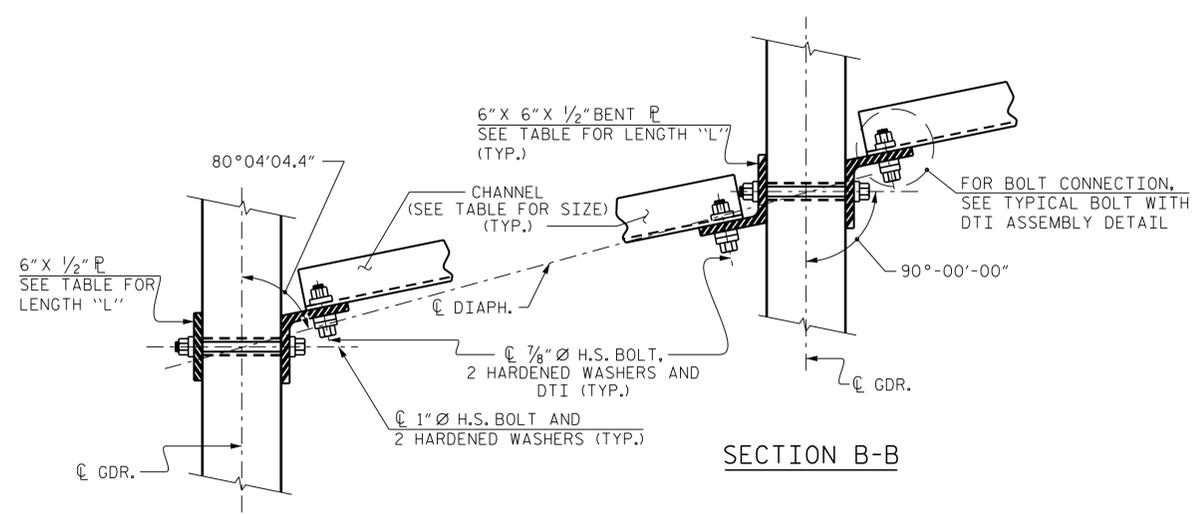
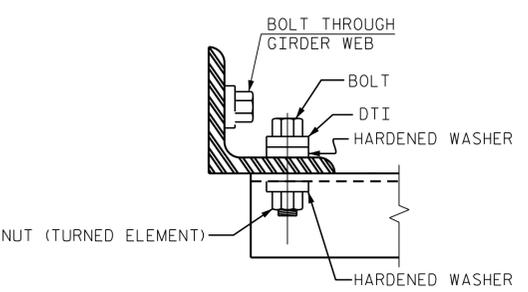


PLATE DETAILS **CHANNEL END**



SECTION A-A **SECTION B-B**
CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

TABLE

GIRDER TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
II	MC 12 x 31	1'-2 1/2"	10"	1'-2"

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SHEET 3 OF 3

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STATE OF NORTH CAROLINA
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INTERMEDIATE STEEL
DIAPHRAGMS FOR TYPE II
PRESTRESSED CONCRETE GIRDERS
LEFT LANE

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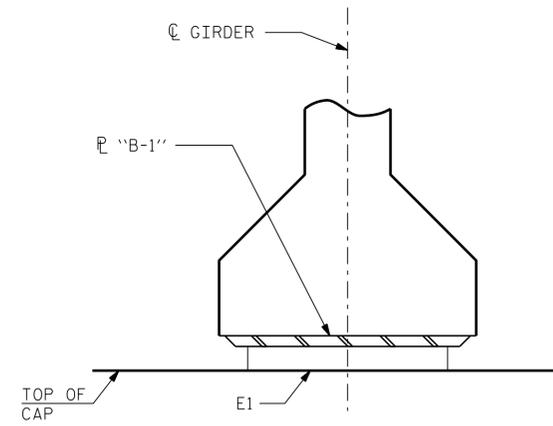
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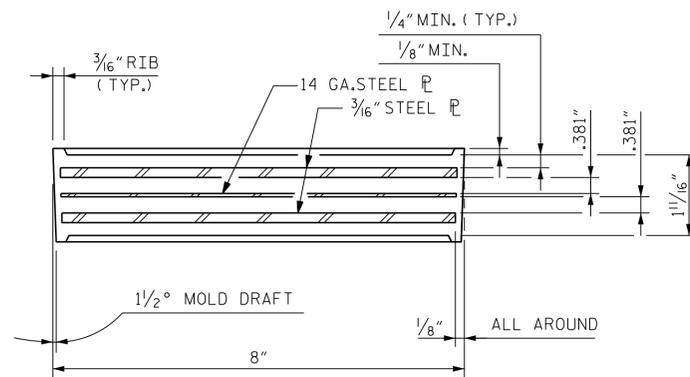
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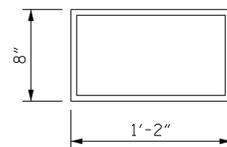
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SECTION E-E



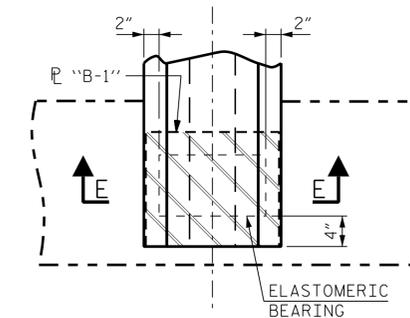
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E1 (10 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE II



TYPICAL PLAN

(INTEGRAL END BENT)

NOTES:

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE II	145 k

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 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUPERSTRUCTURE
 ELASTOMERIC BEARING
 DETAILS
 PRESTRESSED CONCRETE GIRDER
LEFT LANE

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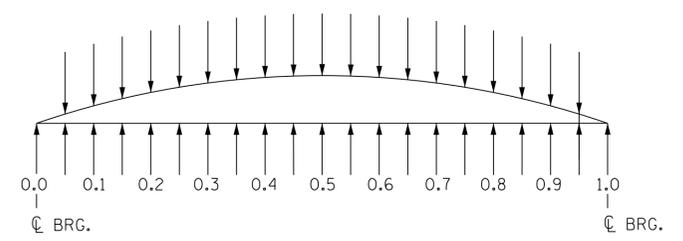
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DEAD LOAD DEFLECTION AND CAMBER TABLE FOR GIRDERS - SPAN A

GIRDER	TWENTIETH POINTS	0.0	0.05	0.1	0.15	0.2	0.25	0.3	0.35	0.4	0.45	0.5	0.55	0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1
1 & 5	CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.020	0.039	0.057	0.074	0.088	0.101	0.111	0.118	0.122	0.124	0.122	0.118	0.111	0.101	0.088	0.074	0.057	0.039	0.020	0.000
	DEFLECTION DUE TO SUPERIMPOSED D.L. * ↓	0.000	0.012	0.021	0.034	0.042	0.051	0.059	0.064	0.070	0.072	0.074	0.072	0.070	0.064	0.059	0.051	0.042	0.034	0.021	0.012	0.000
	FINAL CAMBER ↑	0"	1/16"	3/16"	1/4"	3/8"	7/16"	1/2"	9/16"	9/16"	5/8"	5/8"	5/8"	9/16"	9/16"	1/2"	7/16"	3/8"	1/4"	3/16"	1/16"	0"
2 THROUGH 4	CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.020	0.039	0.057	0.074	0.088	0.101	0.111	0.118	0.122	0.124	0.122	0.118	0.111	0.101	0.088	0.074	0.057	0.039	0.020	0.000
	DEFLECTION DUE TO SUPERIMPOSED D.L. * ↓	0.000	0.014	0.023	0.038	0.047	0.057	0.066	0.071	0.078	0.080	0.082	0.080	0.078	0.071	0.066	0.057	0.047	0.038	0.023	0.014	0.000
	FINAL CAMBER ↑	0"	1/16"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	7/16"	3/8"	5/16"	1/4"	3/16"	1/16"	0"



SCHMATIC CAMBER ORDINATES AT GIRDER TWENTIETH POINTS

DEFLECTIONS ARE IN FEET (DECIMAL FORM) AT TWENTIETH POINTS BETWEEN BEARINGS, REQUIRED CAMBER VALUES ARE IN INCHES (FRACTIONAL FORM).

* INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.

PROJECT NO. R-2511
BEAUFORT COUNTY
 STATION: 156+55.00 -L-

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 RALEIGH

SUPERSTRUCTURE

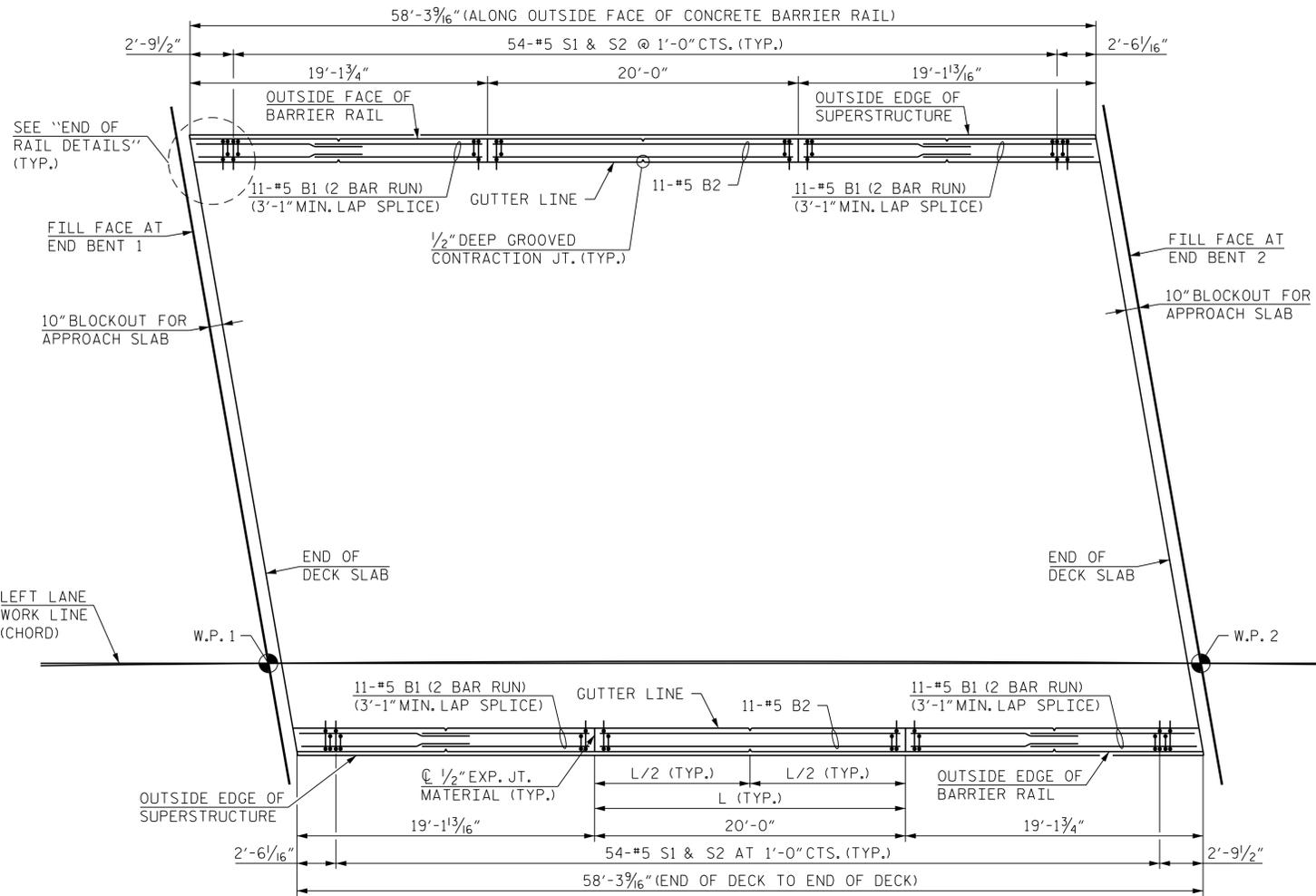
GIRDER CAMBER
 DETAILS

LEFT LANE

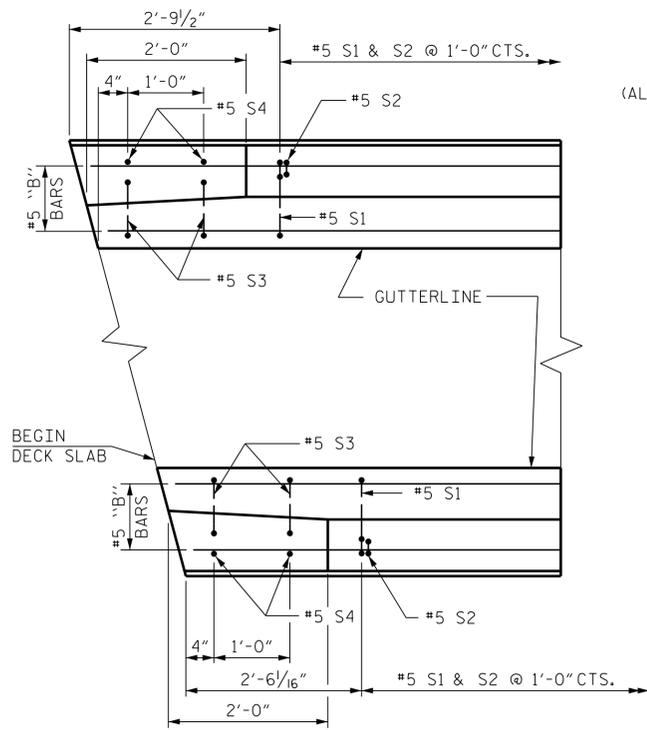
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SL-14
 TOTAL SHEETS
 25

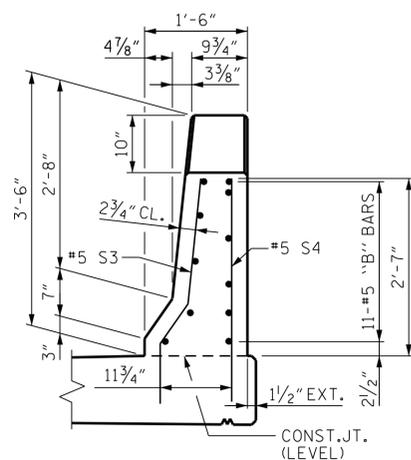
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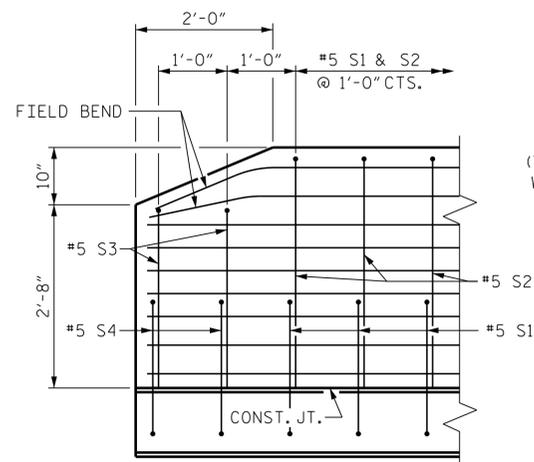
**SPAN A
PLAN OF BARRIER RAIL**
(ALL DIMENSIONS ARE MEASURED ALONG OUTSIDE FACE OF BARRIER RAIL)



PLAN



END VIEW



SIDE VIEW

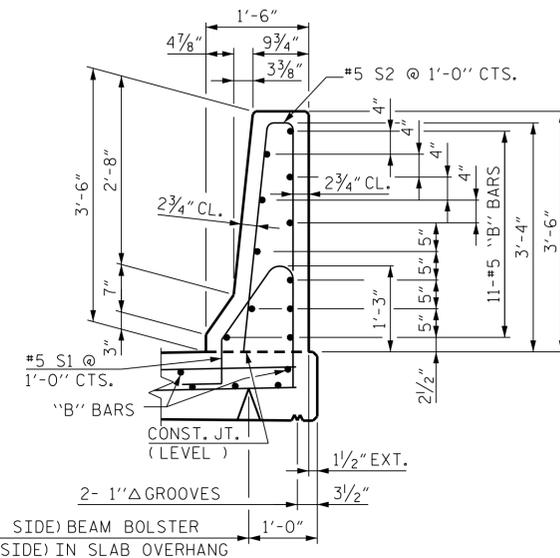
END OF RAIL DETAILS

NOTES:

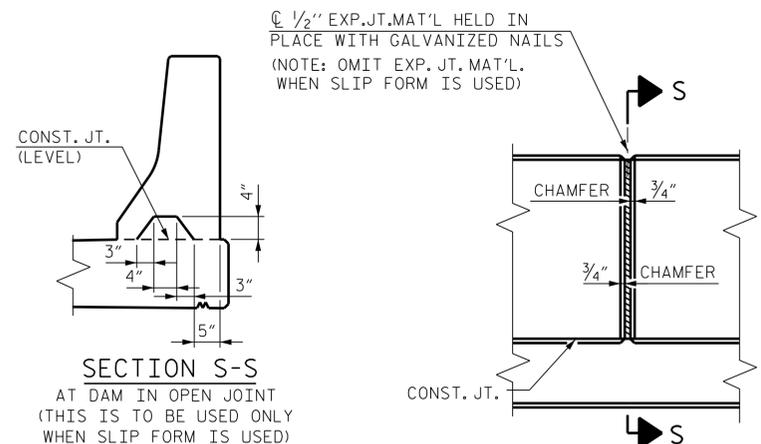
THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS, THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

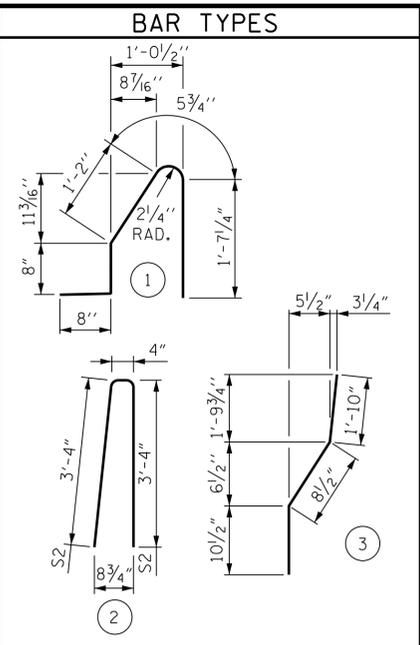


SECTION THRU RAIL



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

BAR NO.	SIZE	TYPE	LENGTH	WEIGHT
*B1	88	#5 STR.	11'-0"	1,010
*B2	22	#5 STR.	19'-7"	449
*S1	108	#5	4'-7"	516
*S2	108	#5	7'-0"	789
*S3	8	#5	3'-5"	29
*S4	8	#5 STR.	3'-3"	27
* EPOXY COATED REINFORCING STEEL				2,820 LBS.
CLASS AA CONCRETE				15.9 CU. YDS.
CONCRETE BARRIER RAIL				116.6 LIN. FT.

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SUPERSTRUCTURE
 CONCRETE BARRIER RAIL
LEFT LANE

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2		4	

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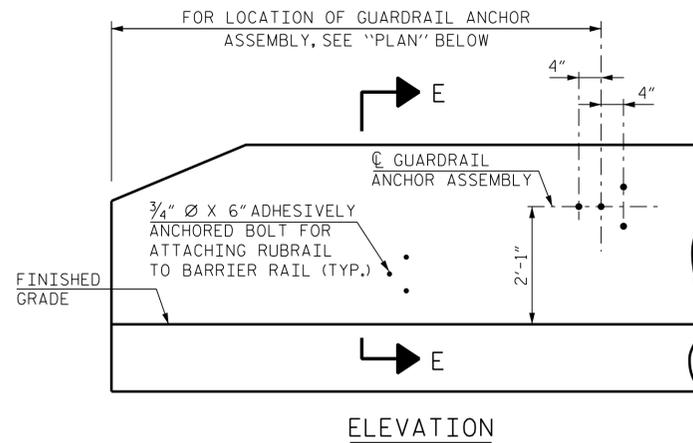
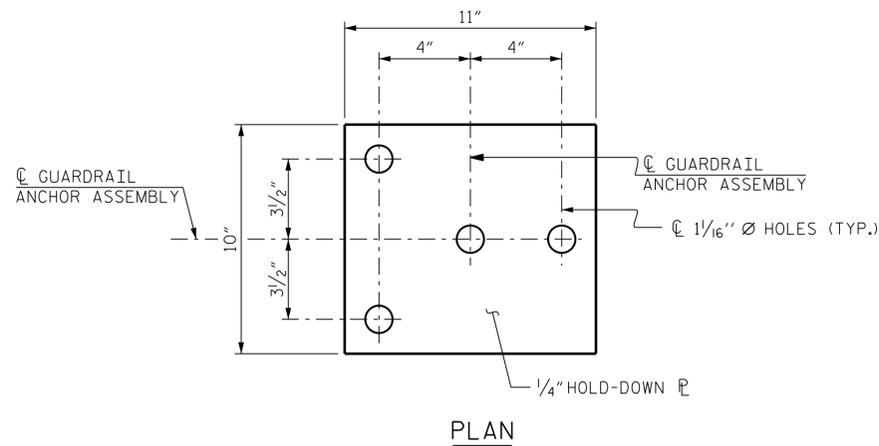
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 DESIGN ENGINEER OF RECORD: O. J. PAITEL DATE: JAN 2022



NOTES:

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD-DOWN PLATE AND 4 - 7/8" Ø BOLTS WITH NUTS AND WASHERS, RUBRAIL, AND ADHESIVELY ANCHORED BOLTS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

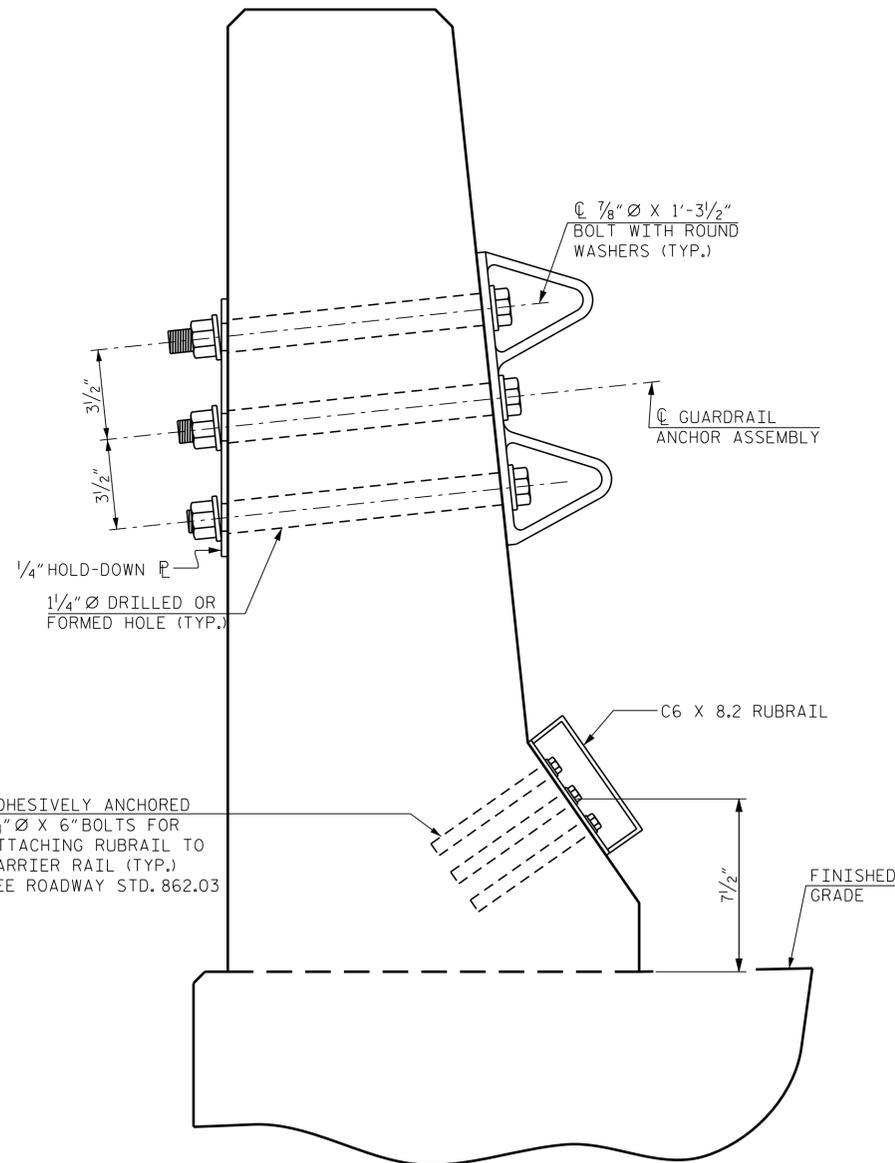
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

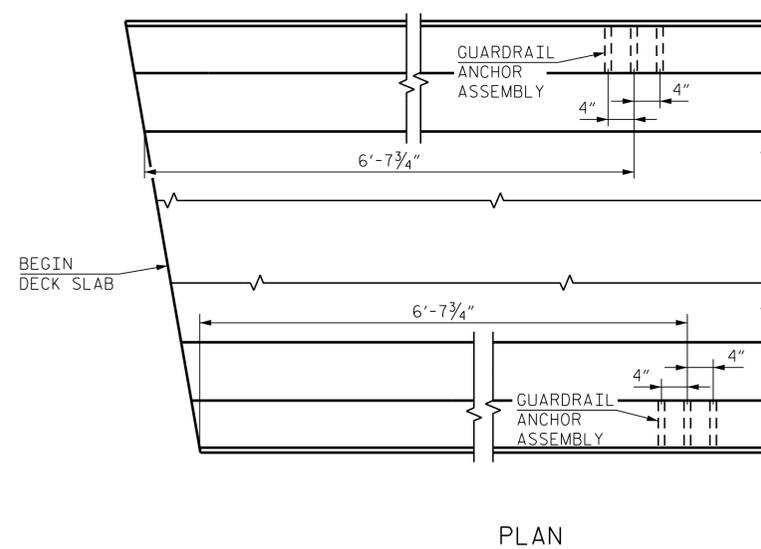
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

THE 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.

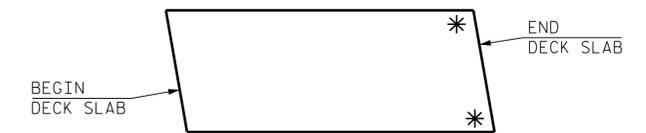


**SECTION E-E
GUARDRAIL ANCHOR ASSEMBLY DETAILS**



LOCATION OF ANCHORS FOR GUARDRAIL

END BENT 1 SHOWN, END BENT 2 SIMILAR.

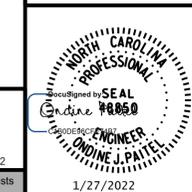


SKETCH SHOWING POINTS OF ATTACHMENTS

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. R-2511
BEAUFORT COUNTY
 STATION: 156+55.00 -L-

BR. NO. 0370 - LEFT



STATE OF NORTH CAROLINA
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 RALEIGH

SUPERSTRUCTURE

GUARDRAIL ANCHORAGE DETAILS

LEFT LANE

REVISIONS

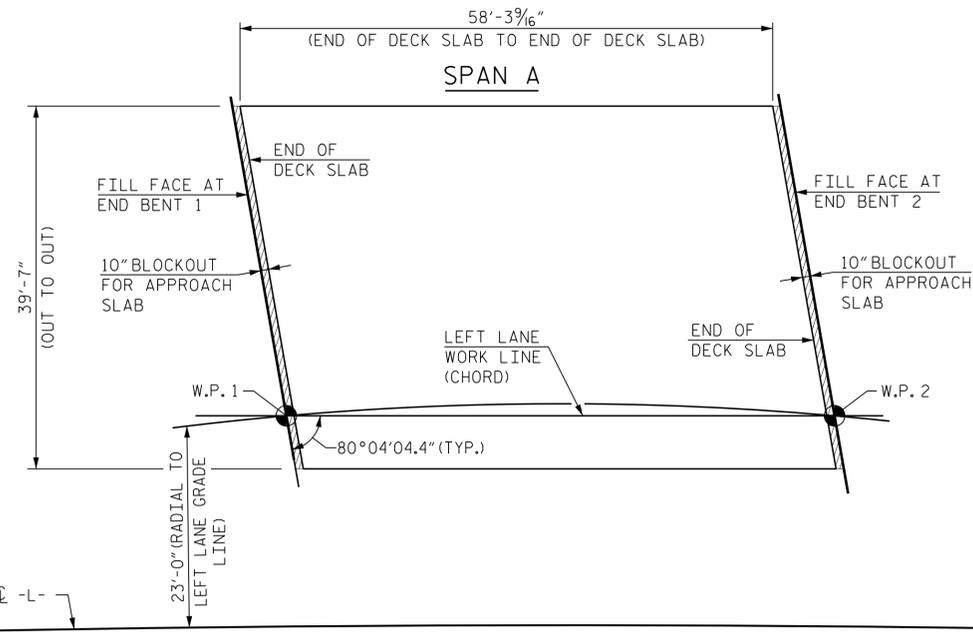
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			SL-16
2			4			TOTAL SHEETS 25



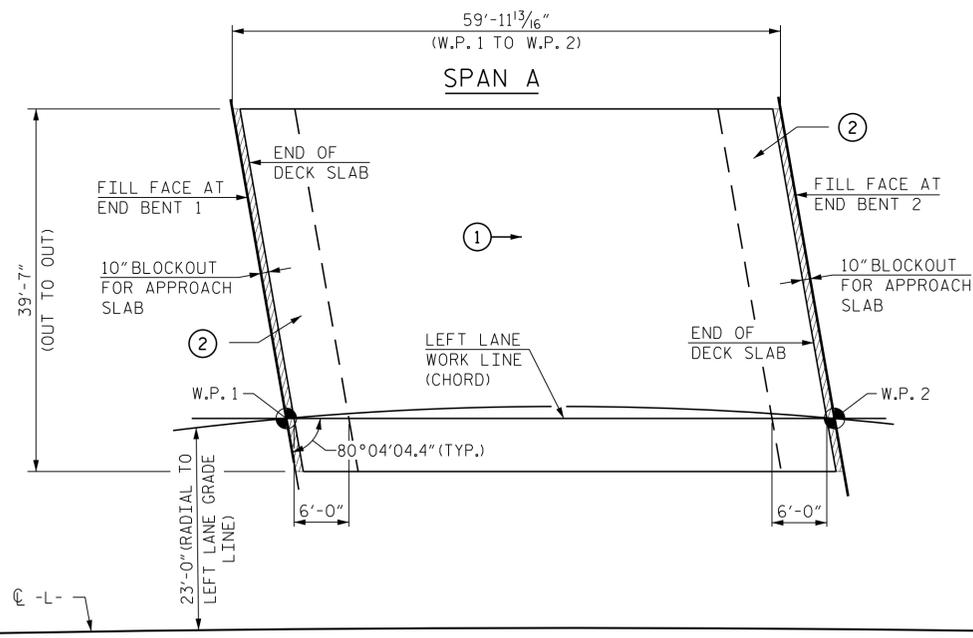
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 DESIGN ENGINEER OF RECORD : O. J. PAITEL DATE : JAN 2022



LAYOUT FOR COMPUTING AREA
REINFORCED CONCRETE DECK SLAB
(SQ. FT. = 2,308)



POURING SEQUENCE

○ INDICATES POUR NUMBER AND DIRECTION OF POUR

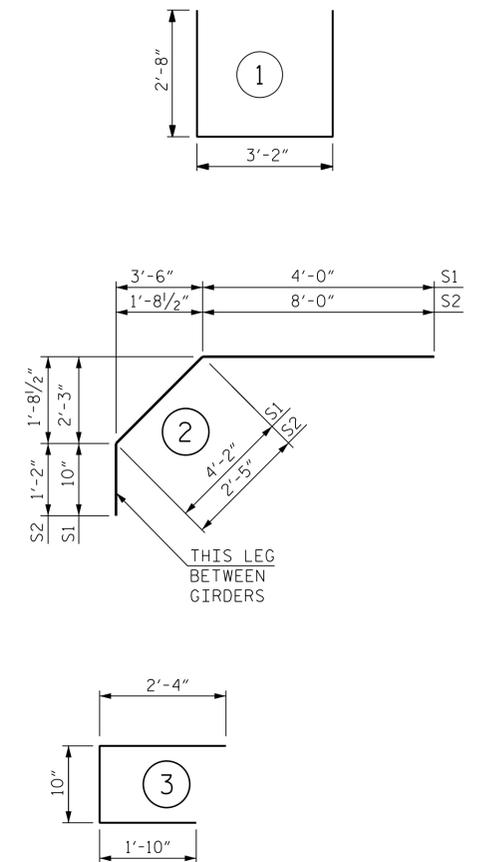
SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPETS, AND BARRIER RAILS		APPROACH SLABS		PARAPETS AND BARRIER RAILS
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	1'-11"	1'-7"	1'-11"	1'-7"	2'-6"
#5	2'-5"	2'-0"	2'-5"	2'-0"	3'-1"
#6	2'-10"	2'-5"	3'-7"	2'-5"	3'-8"
#7	4'-2"	2'-9"			
#8	4'-9"	3'-2"			

REINFORCING BAR SCHEDULE

SPAN A					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	101	#5	STR	39'-2"	4,126
A2	101	#5	STR	39'-2"	4,126
* A101	2	#5	STR	3'-0"	6
A201	2	#5	STR	3'-0"	6
* A102	2	#5	STR	4'-8"	10
A202	2	#5	STR	4'-8"	10
* A103	2	#5	STR	7'-6"	16
A203	2	#5	STR	7'-6"	16
* A104	2	#5	STR	10'-4"	22
A204	2	#5	STR	10'-4"	22
* A105	2	#5	STR	13'-3"	28
A205	2	#5	STR	13'-3"	28
* A106	2	#5	STR	16'-1"	34
A206	2	#5	STR	16'-1"	34
* A107	2	#5	STR	18'-11"	39
A207	2	#5	STR	18'-11"	39
* A108	2	#5	STR	21'-9"	45
A208	2	#5	STR	21'-9"	45
* A109	2	#5	STR	24'-8"	51
A209	2	#5	STR	24'-8"	51
* A110	2	#5	STR	27'-6"	57
A210	2	#5	STR	27'-6"	57
* A111	2	#5	STR	30'-4"	63
A211	2	#5	STR	30'-4"	63
* A112	2	#5	STR	33'-3"	69
A212	2	#5	STR	33'-3"	69
* A113	2	#5	STR	36'-1"	75
A213	2	#5	STR	36'-1"	75
* A114	2	#5	STR	38'-11"	81
A214	2	#5	STR	38'-11"	81
* B1	32	#4	STR	38'-6"	823
B2	50	#5	STR	57'-11"	3,020
* B3	126	#6	STR	12'-0"	2,271
K1	16	#4	STR	20'-3"	216
K2	8	#4	STR	6'-8"	36
K3	16	#4	STR	7'-8"	82
K4	8	#4	STR	7'-2"	38
K5	8	#4	3	5'-0"	27
* S1	64	#4	2	9'-0"	385
* S2	64	#4	2	11'-7"	495
U1	64	#4	1	8'-6"	363
REINFORCING STEEL				8,504 LBS.	
* EPOXY COATED REINFORCING STEEL				8,696 LBS.	

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
POUR 1	56.4		
POUR 2	45.0		
TOTALS**	101.4	8,504	8,696

**QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

PROJECT NO. R-2511
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STATION: 156+55.00 -L-

GROOVING BRIDGE FLOORS	
APPROACH SLABS	1,659 SQ.FT.
BRIDGE DECK	1,932 SQ.FT.
TOTAL	3,591 SQ.FT.

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BR. NO. 0370 - LEFT
SEAL
DESIGNED BY
18850
ENGINEER
J. PAITEL
1/27/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
BILL OF MATERIAL
LEFT LANE

REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

TOTAL SHEETS: 25

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NOTES:

FOR SECTION A-A AND SECTION B-B, SEE SHEET 3 OF 3.

FOR PILE SPLICE DETAILS, SEE END BENT 1 SHEET 3 OF 3.

FOR TEMPORARY DRAINAGE, SEE END BENT 2 SHEET 3 OF 3.

STIRRUPS IN THE CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #4 DOWELS.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAILS ARE CAST IF SLIP FORMING IS USED.

THE TOP SURFACE OF THE END BENT CAP AND WINGS, EXCEPT THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".

#4 D1 DOWELS MAY BE SHIFTED SLIGHTLY TO AVOID CONFLICTS WITH CAP STEPS.

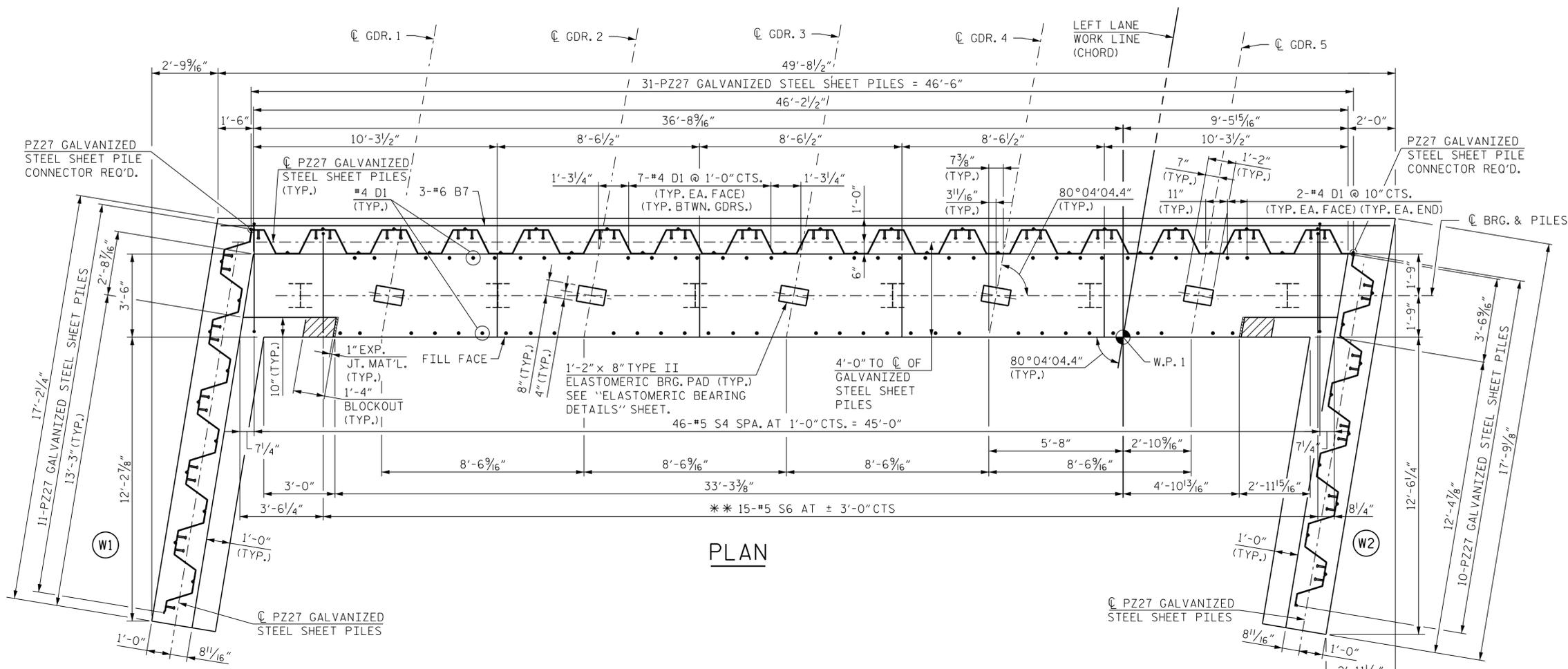
"V" BARS IN WINGWALLS SHALL BE PLACED 2" CLEAR FROM TOP OF WING.

** #5 S6 SHOULD BE SHIFTED SLIGHTLY TO AVOID CONFLICTS WITH HP 12 x 53 VERTICAL STEEL PILES.

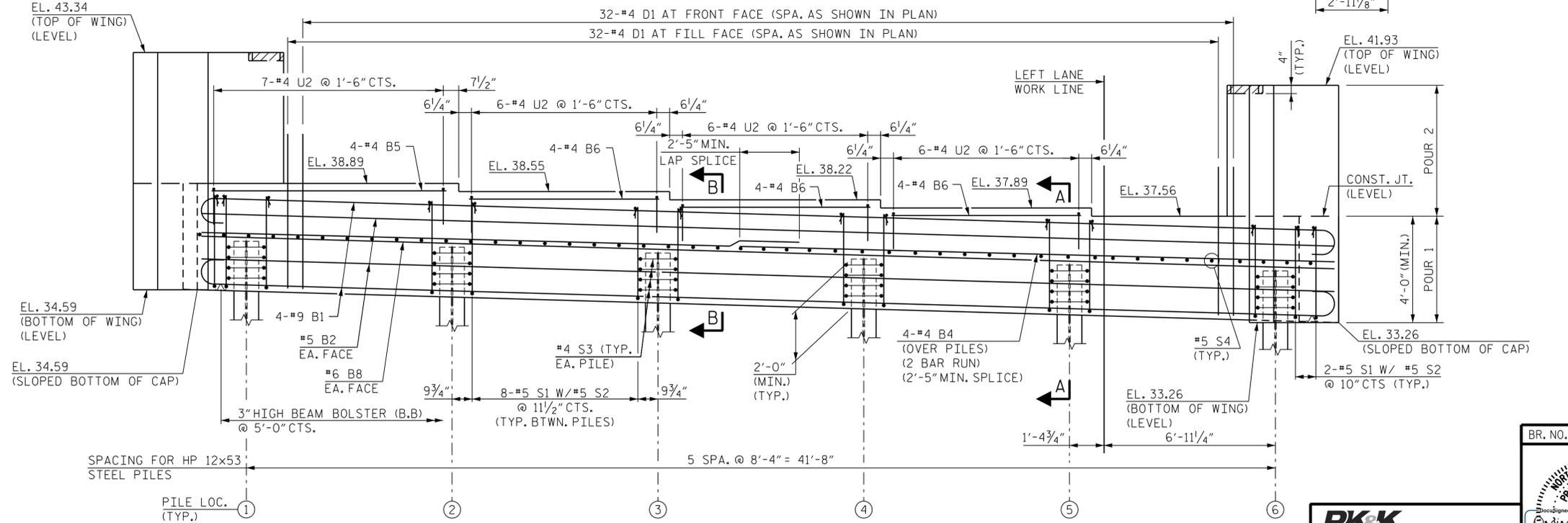
TOP OF PILE ELEVATION TABLE	
NO.	ELEVATION
1	36.52
2	36.28
3	36.05
4	35.81
5	35.57
6	35.33

LEGEND:

HP 12x53 VERTICAL STEEL PILES



PLAN



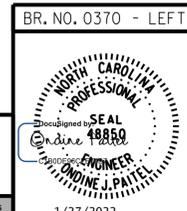
ELEVATION

PZ27 GALVANIZED STEEL SHEET PILES AND WINGS NOT SHOWN FOR CLARITY, FOR ADDITIONAL REINFORCING STEEL IN SHEET PILES CAP, SEE SHEETS 2 OF 3 AND 3 OF 3.

PROJECT NO. R-2511
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 STATION: 156+55.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUBSTRUCTURE
 END BENT 1
 PLAN AND ELEVATION
 LEFT LANE



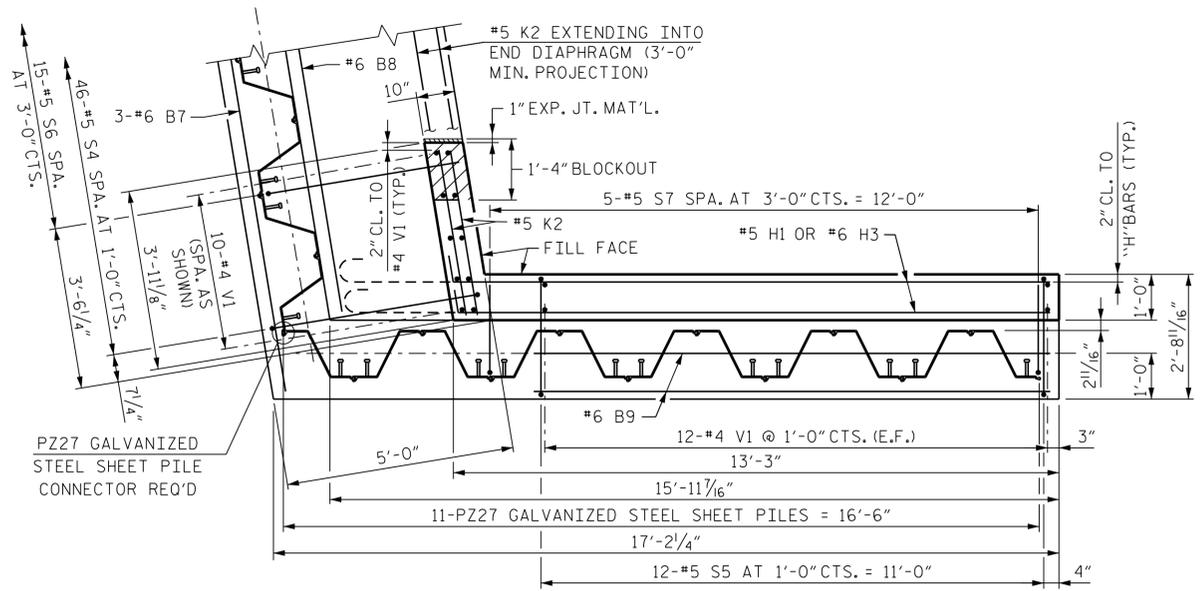
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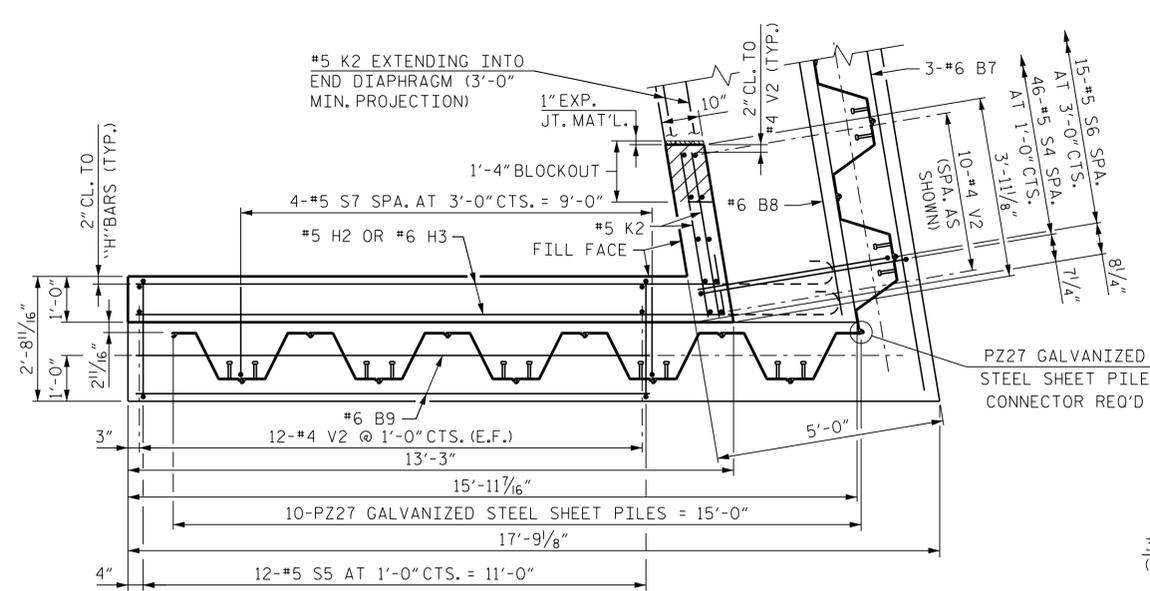
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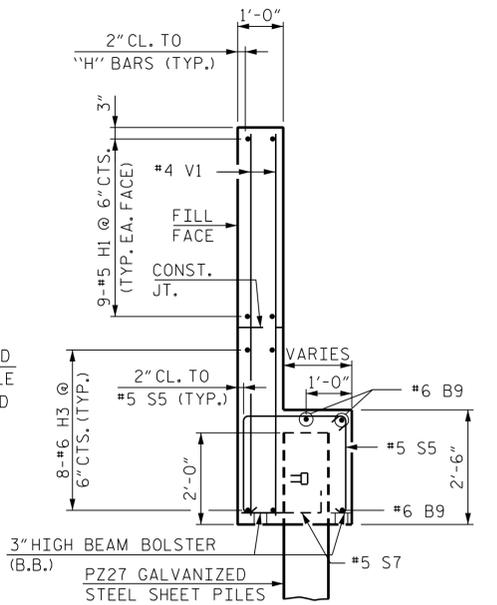
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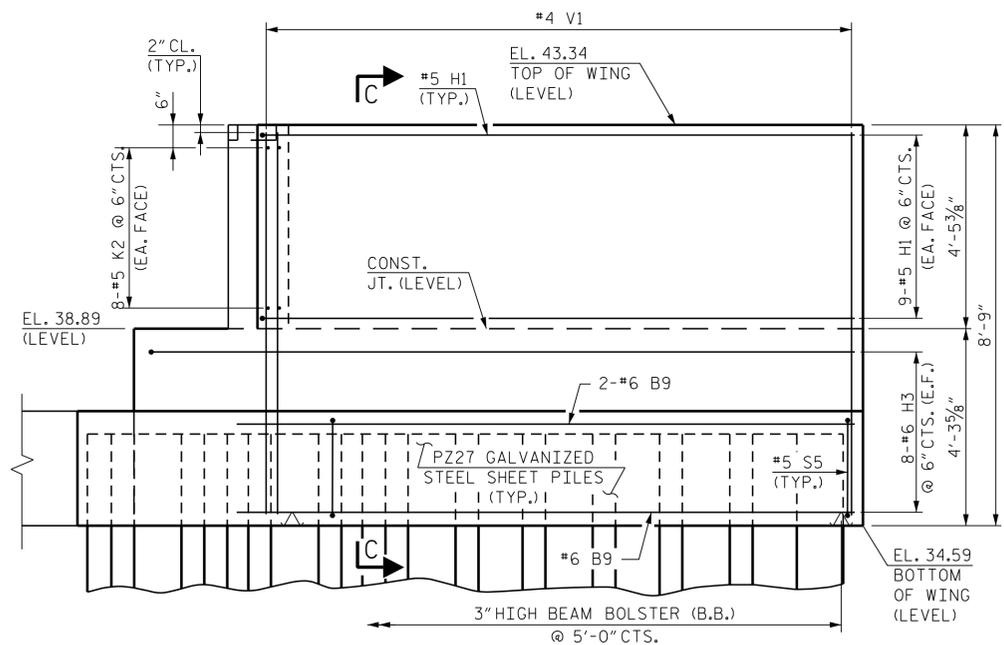
PLAN OF LEFT WINGWALL



PLAN OF RIGHT WINGWALL

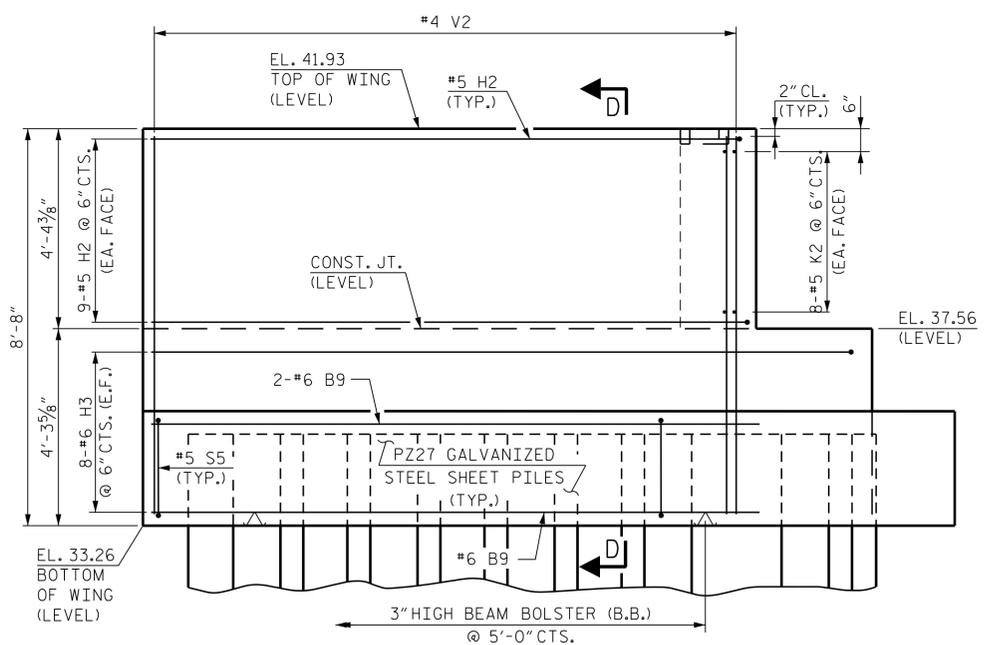


SECTION C-C



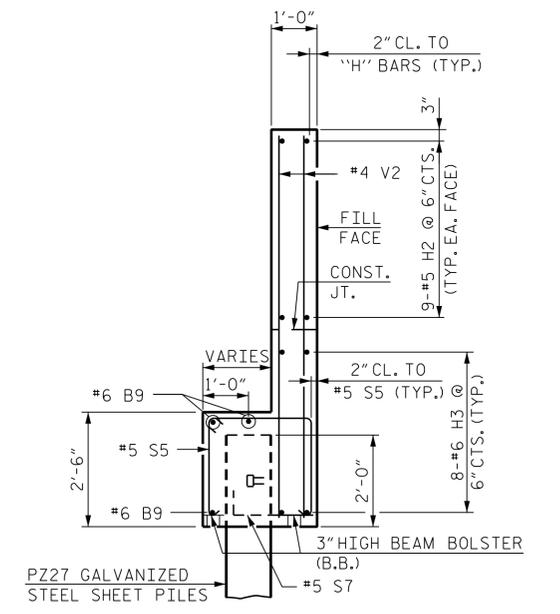
ELEVATION OF LEFT WINGWALL

LEFT WINGWALL DETAILS (W1)



ELEVATION OF RIGHT WINGWALL

RIGHT WINGWALL DETAILS (W2)



SECTION D-D

PROJECT NO. R-2511
 BEAUFORT COUNTY
 STATION: 156+55.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT 1
 WINGWALL DETAILS
 LEFT LANE

BR. NO. 0370 - LEFT
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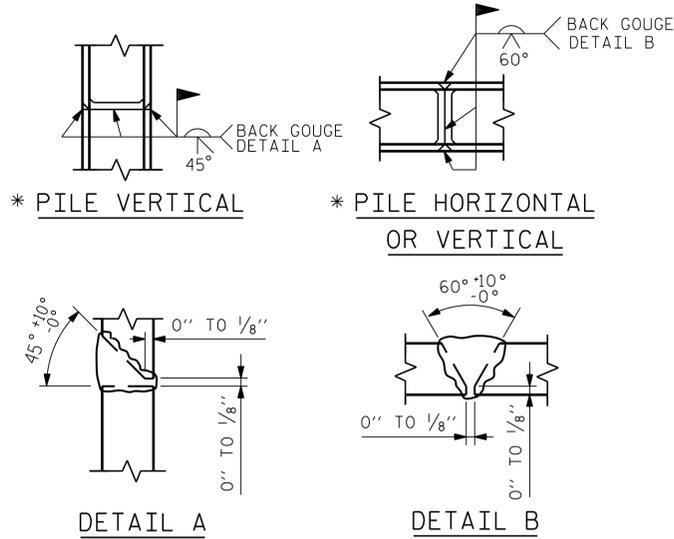
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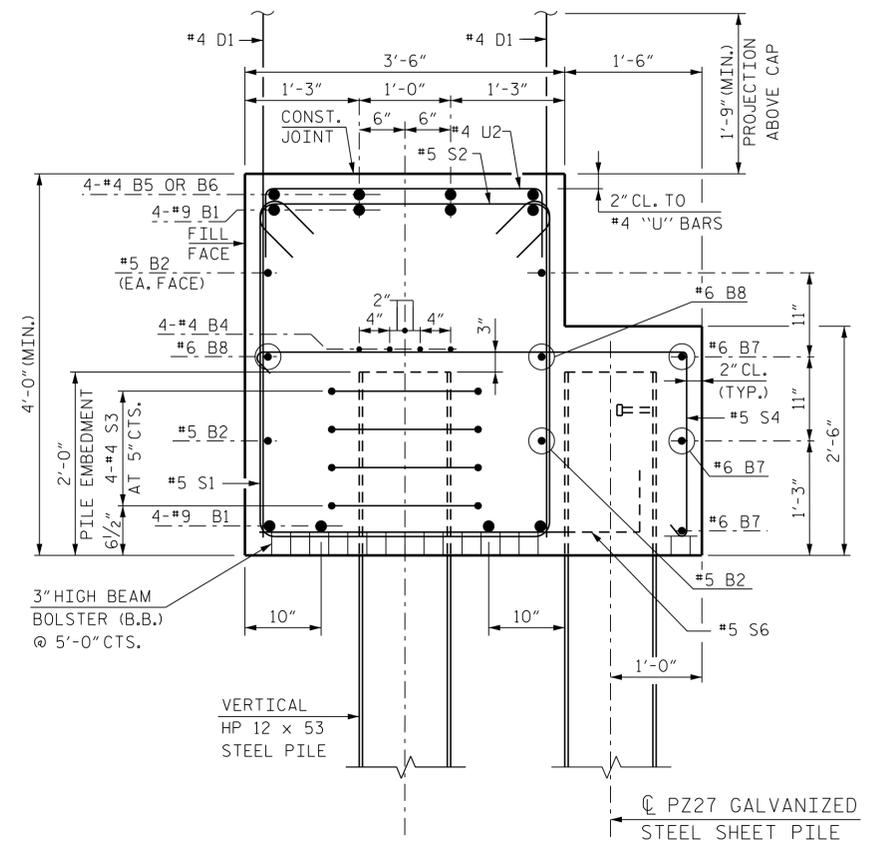
TOTAL SHEETS: 25

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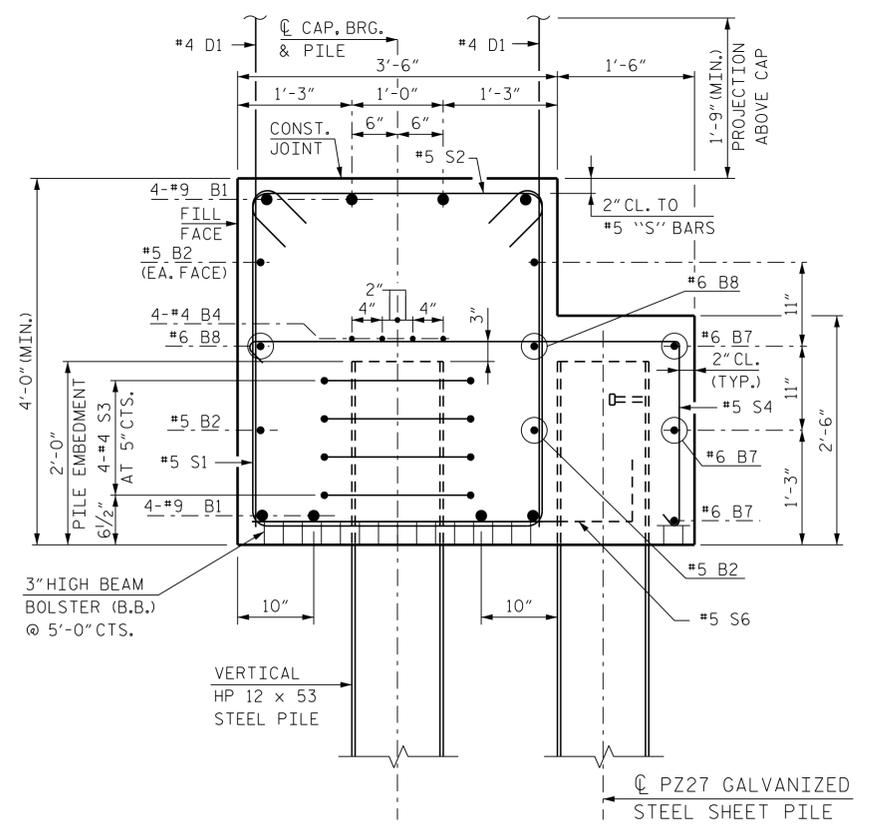
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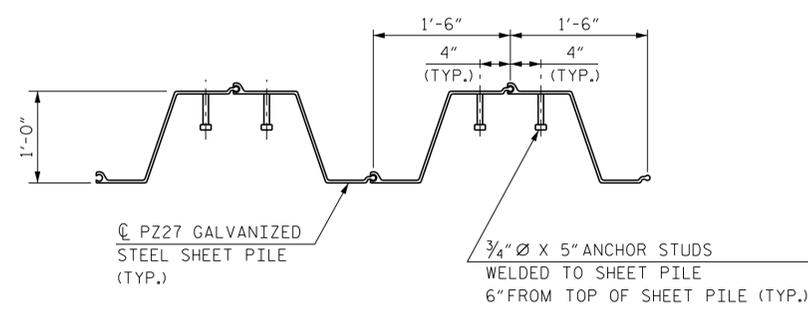
PILE SPLICING DETAILS
* POSITION OF PILE DURING WELDING.



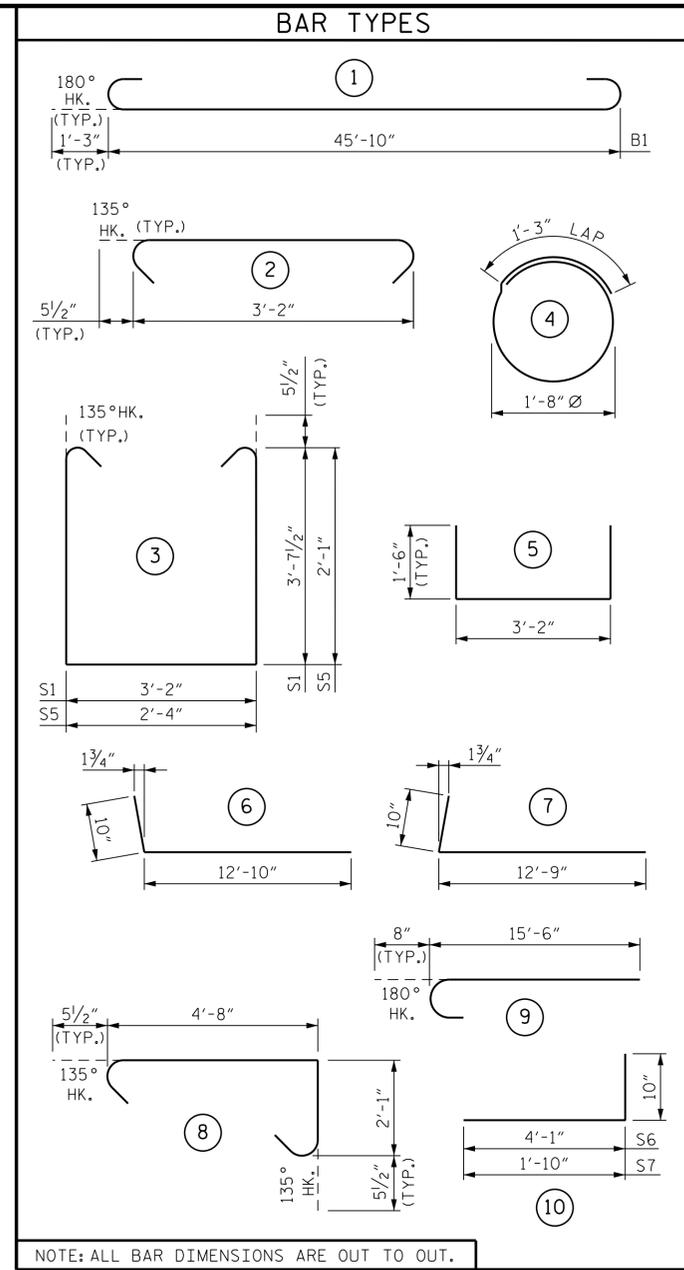
SECTION B-B
(DIMENSIONS SHOWN ARE NORMAL TO THE END BENT)
(SECTION THROUGH CAP STEP)



SECTION A-A
(DIMENSIONS SHOWN ARE NORMAL TO THE END BENT)



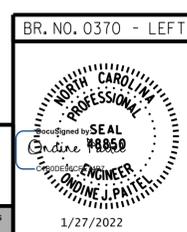
SHEET PILE ANCHOR STUD DETAILS



BILL OF MATERIAL					
END BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	48'-4"	1,315
B2	4	#5	STR.	45'-10"	191
B4	8	#4	STR.	24'-1"	129
B5	4	#4	STR.	9'-9"	26
B6	12	#4	STR.	8'-0"	64
B7	3	#6	STR.	49'-4"	222
B8	2	#6	STR.	45'-10"	138
B9	6	#6	STR.	12'-0"	108
D1	64	#4	STR.	6'-3"	267
H1	18	#5	6	13'-8"	257
H2	18	#5	7	13'-7"	255
H3	32	#6	9	16'-2"	777
K2	32	#5	STR.	6'-3"	209
S1	44	#5	3	11'-4"	520
S2	44	#5	2	4'-1"	187
S3	24	#4	4	6'-6"	104
S4	46	#5	8	7'-8"	368
S5	24	#5	3	7'-5"	186
S6	15	#5	10	4'-11"	77
S7	9	#5	10	2'-8"	25
U2	25	#4	5	6'-2"	103
V1	34	#4	STR.	8'-5"	191
V2	34	#4	STR.	8'-4"	189
REINFORCING STEEL					5,908 LBS.
CLASS "A" CONCRETE					
POUR 1 (CAP, LOWER WINGS AND COPING)					41.2 C.Y.
POUR 2 (UPPER WINGS)					5.0 C.Y.
TOTAL					46.2 C.Y.
HP 12 x 53 STEEL PILES					
NO.					6
LIN. FEET					480
PILE REDRIVES					3 EA.
PILE DRIVING EQUIPMENT SETUP FOR HP 12 x 53 STEEL PILES					6 EA.
18" GALVANIZED STEEL SHEET PILES					
NO.					52
SQ. FEET					3,584

PROJECT NO. R-2511
BEAUFORT COUNTY
 STATION: 156+55.00 -L-

SHEET 3 OF 3



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT 1
 MISCELLANEOUS DETAILS
 AND BILL OF MATERIAL
 LEFT LANE

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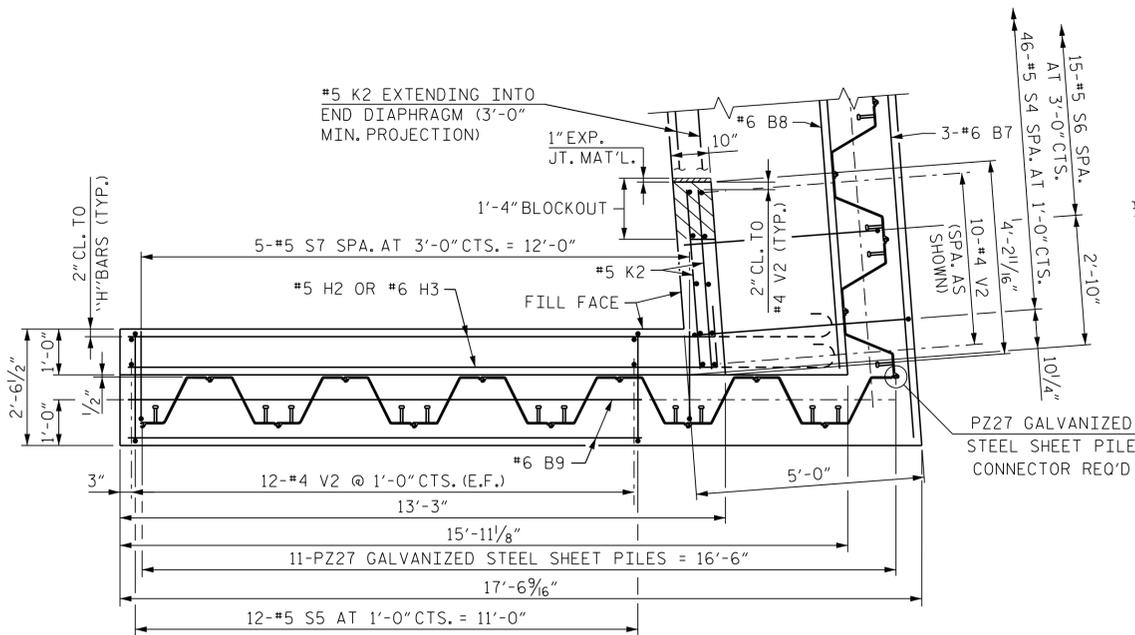
REVISIONS					
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SHEET NO.					
					SL-20
					TOTAL SHEETS
					25

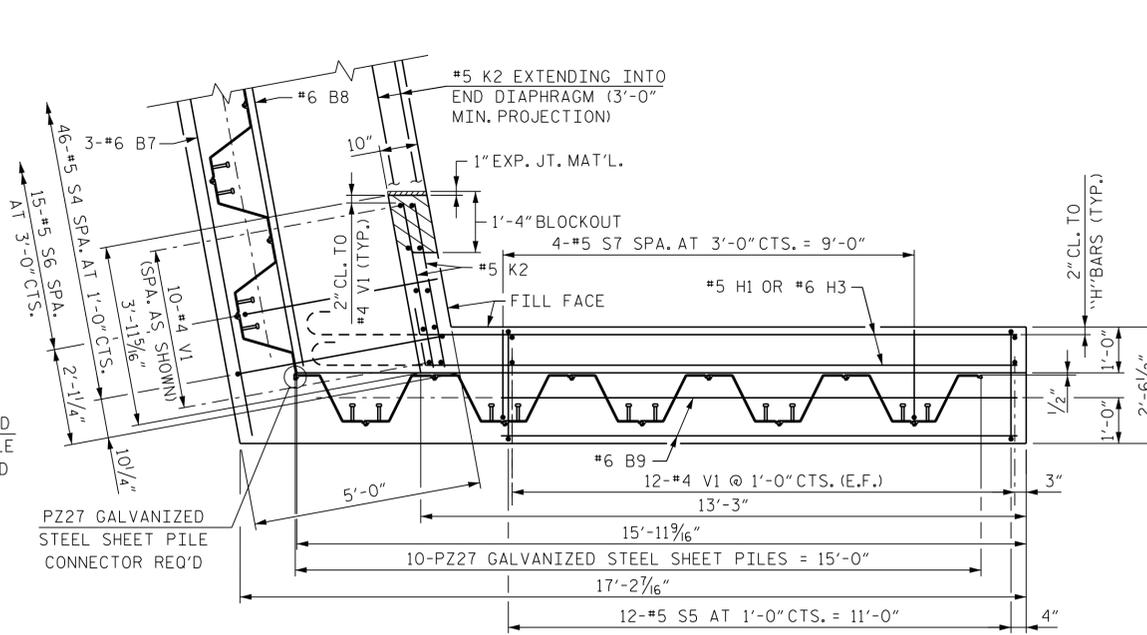
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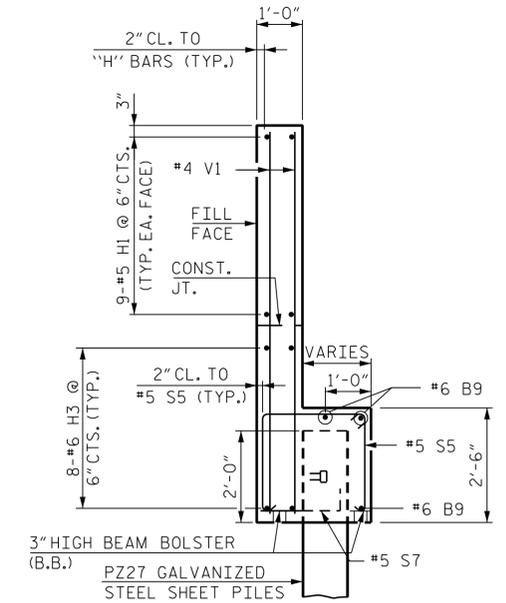
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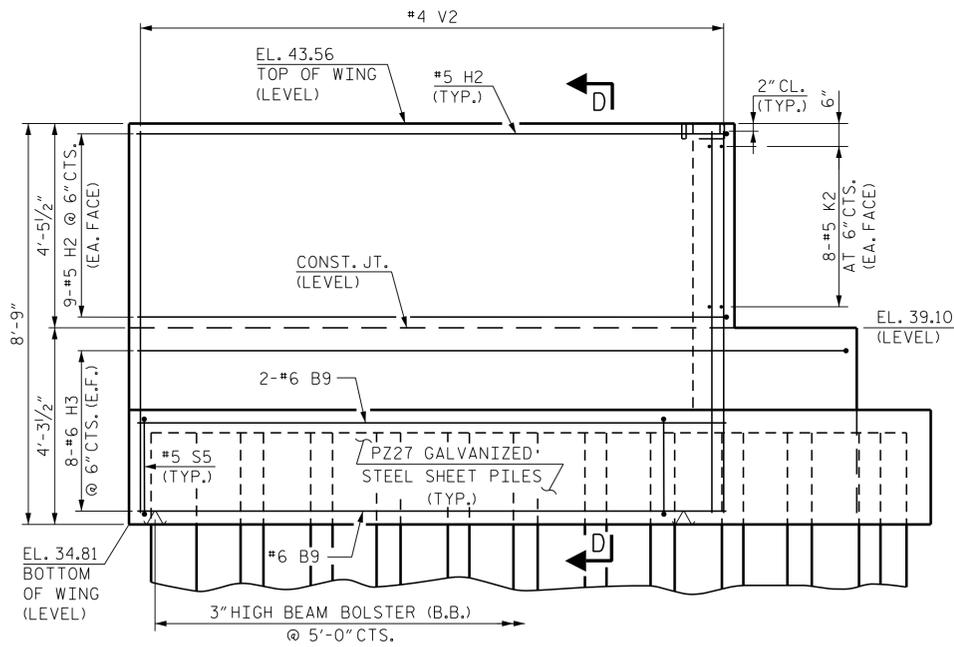
PLAN OF LEFT WINGWALL



PLAN OF RIGHT WINGWALL

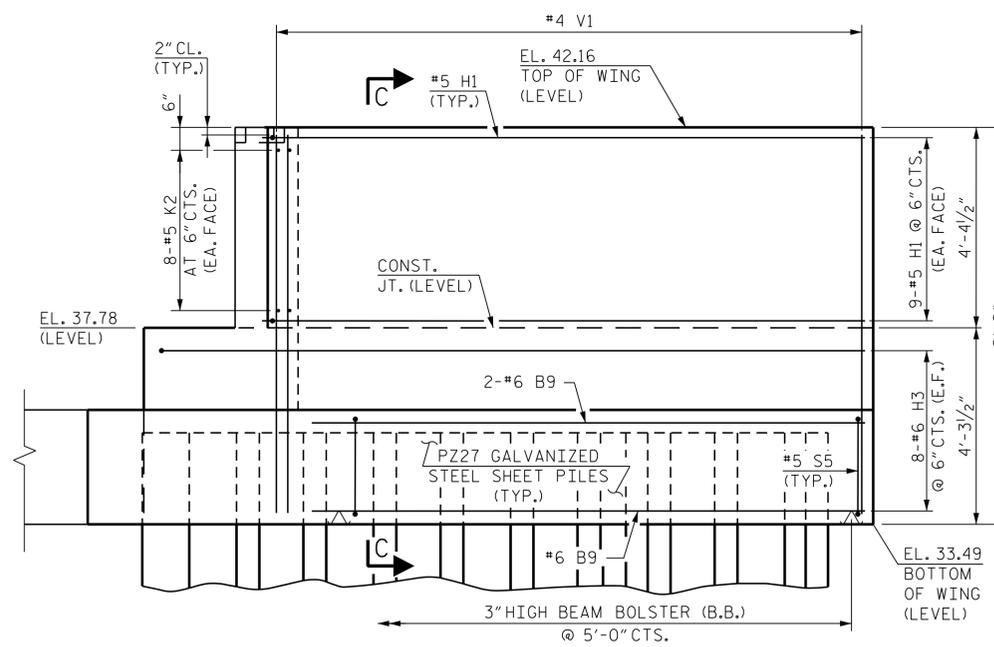


SECTION C-C



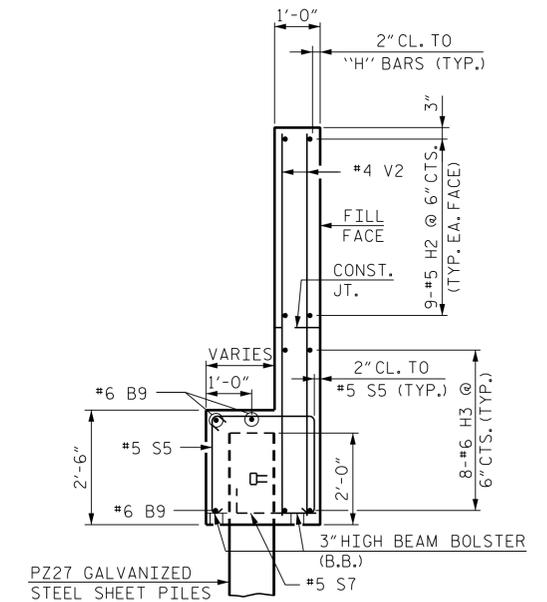
ELEVATION OF LEFT WINGWALL

LEFT WINGWALL DETAILS (W1)



ELEVATION OF RIGHT WINGWALL

RIGHT WINGWALL DETAILS (W2)



SECTION D-D

PROJECT NO. R-2511
 BEAUFORT COUNTY
 STATION: 156+55.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE

END BENT 2
 WINGWALL DETAILS

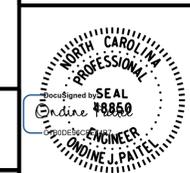
LEFT LANE

REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.
 SL-22
 TOTAL SHEETS
 25

BR. NO. 0370 - LEFT



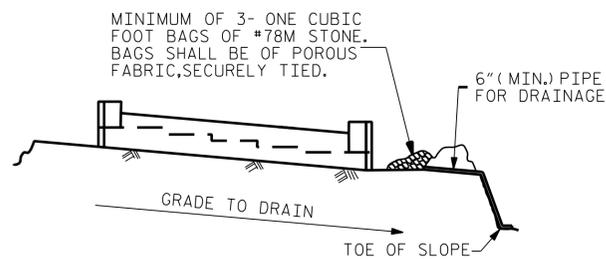
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 DESIGN ENGINEER OF RECORD : J. J. PAITEL DATE : JAN 2022

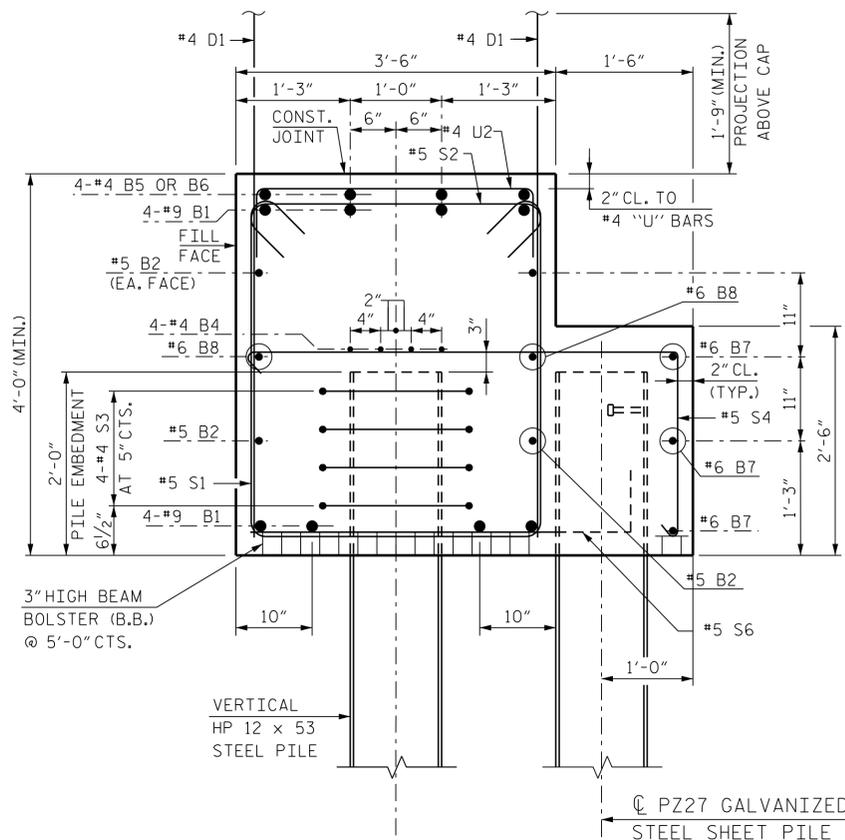


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

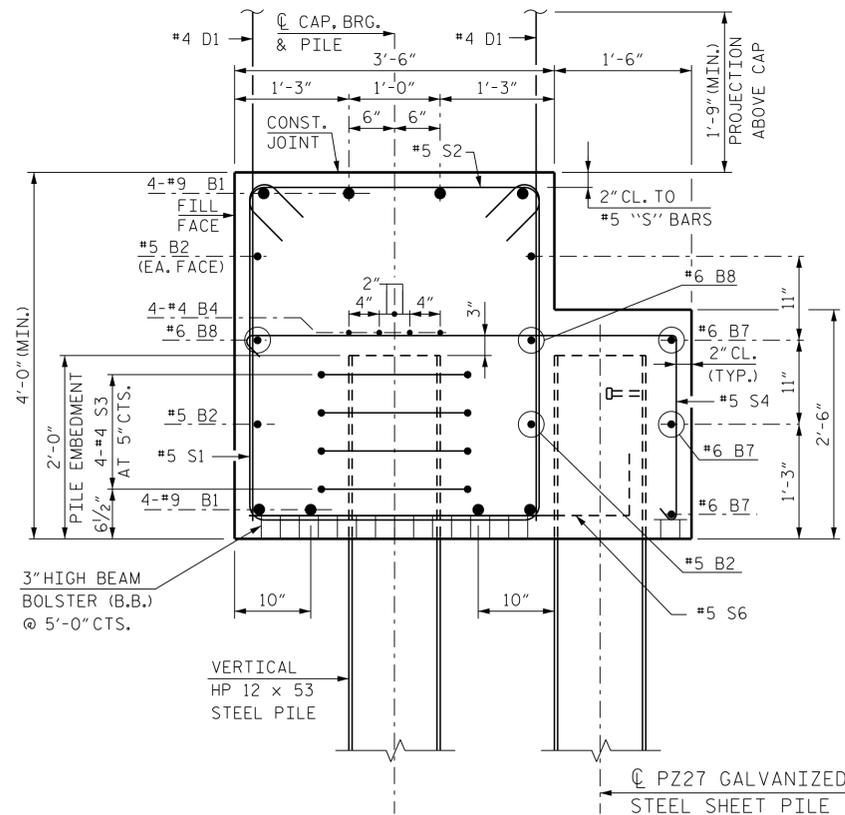
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



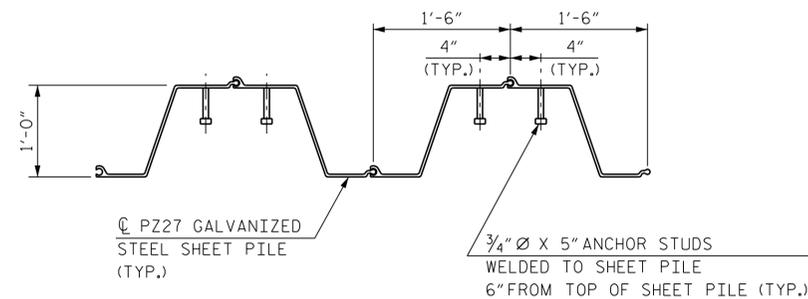
SECTION B-B

(DIMENSIONS SHOWN ARE NORMAL TO THE END BENT)
(SECTION THROUGH CAP STEP)



SECTION A-A

(DIMENSIONS SHOWN ARE NORMAL TO THE END BENT)



SHEET PILE ANCHOR STUD DETAILS

BAR TYPES		BILL OF MATERIAL	
		END BENT 2	
BAR NO.	SIZE	TYPE	WEIGHT
B1	#9	1	1,319
B2	#5	STR.	192
B4	#4	STR.	129
B5	#4	STR.	26
B6	#4	STR.	64
B7	#6	STR.	220
B8	#6	STR.	138
B9	#6	STR.	110
D1	#4	STR.	267
K2	#5	STR.	209
H1	#5	6	257
H2	#5	7	257
H3	#6	9	781
S1	#5	3	520
S2	#5	2	187
S3	#4	4	104
S4	#5	8	368
S5	#5	3	181
S6	#5	10	77
S7	#5	10	25
U2	#4	5	103
V1	#4	STR.	189
V2	#4	STR.	191
REINFORCING STEEL		5,914 LBS.	
CLASS "A" CONCRETE			
POUR 1 (CAP, LOWER WINGS AND COPING)		41.2 C.Y.	
POUR 2 (UPPER WINGS)		4.9 C.Y.	
TOTAL		46.1 C.Y.	
HP 12 x 53 STEEL PILES			
NO.		6	
LIN. FEET		480	
PILE REDRIVES		3 EA.	
PILE DRIVING EQUIPMENT SETUP FOR HP 12 x 53 STEEL PILES		6 EA.	
18" GALVANIZED STEEL SHEET PILES			
NO.		52	
SQ. FEET		3,601	

NOTE: ALL BAR DIMENSIONS ARE OUT TO OUT.

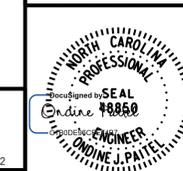
PROJECT NO. R-2511
BEAUFORT COUNTY
STATION: 156+55.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 2
MISCELLANEOUS DETAILS
AND BILL OF MATERIAL
LEFT LANE

BR. NO. 0370 - LEFT



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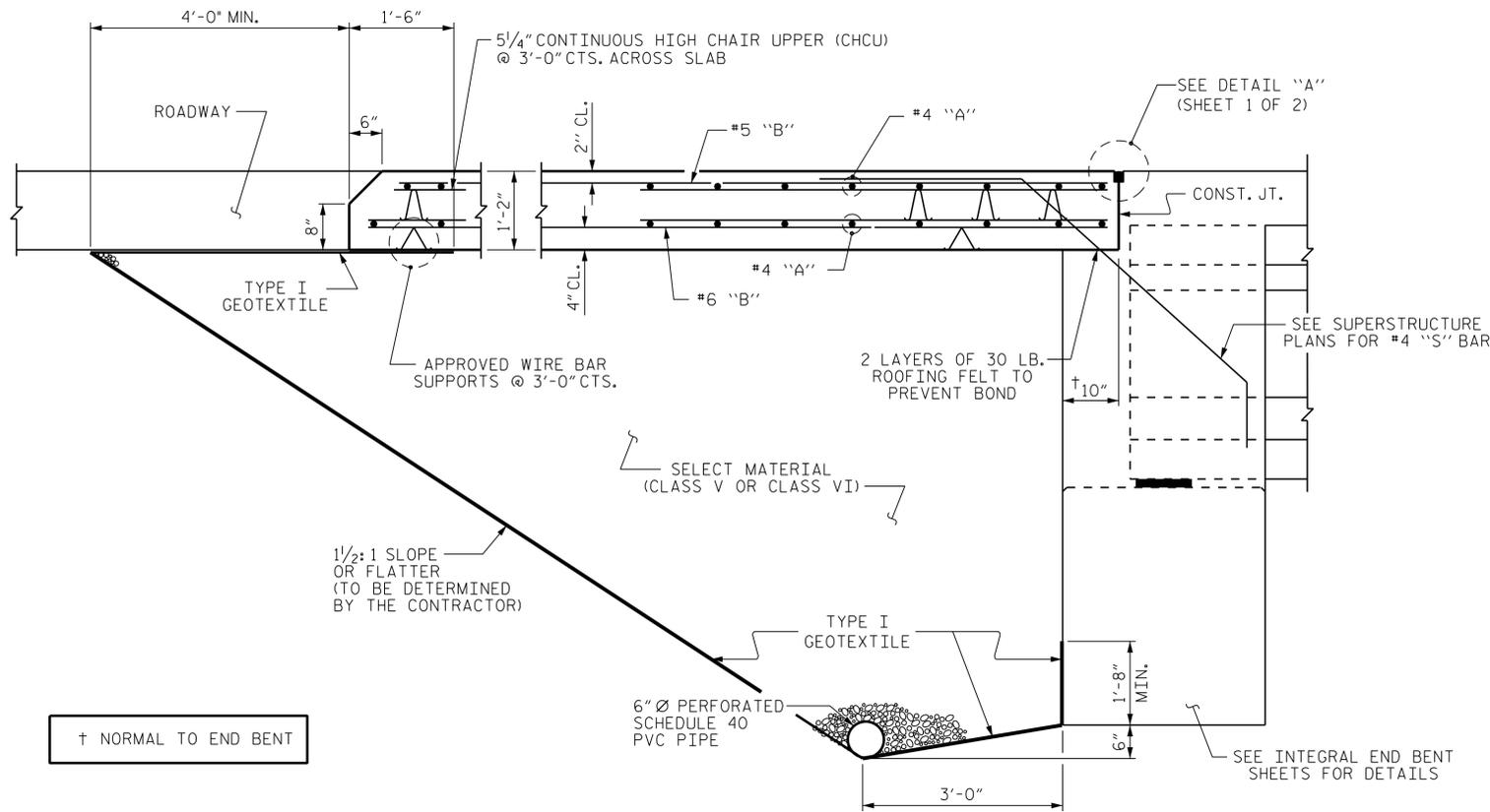
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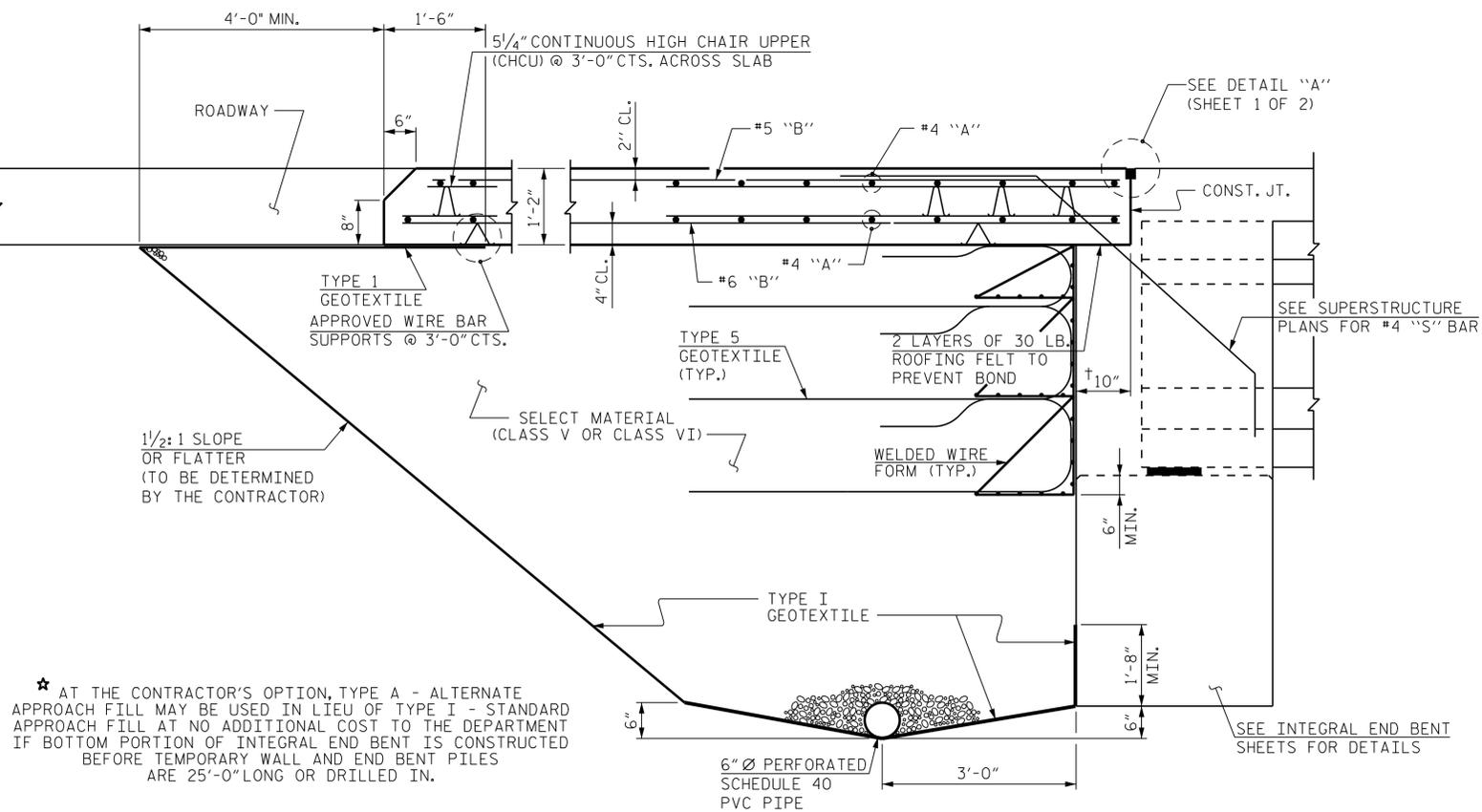
REVISIONS		SHEET NO.	
NO.	BY:	DATE:	NO.
1			SL-23
2			TOTAL SHEETS
			25

1/27/2022 R:\Structures\Bridge\GN\LEFT\FINAL\R2511_SMU_E2C_060370L.dgn

DRAWN BY : B. A. HAAG DATE : JAN 2022
CHECKED BY : M. ZIEHL DATE : JAN 2022
DESIGN ENGINEER OF RECORD : J. PAITEL DATE : JAN 2022



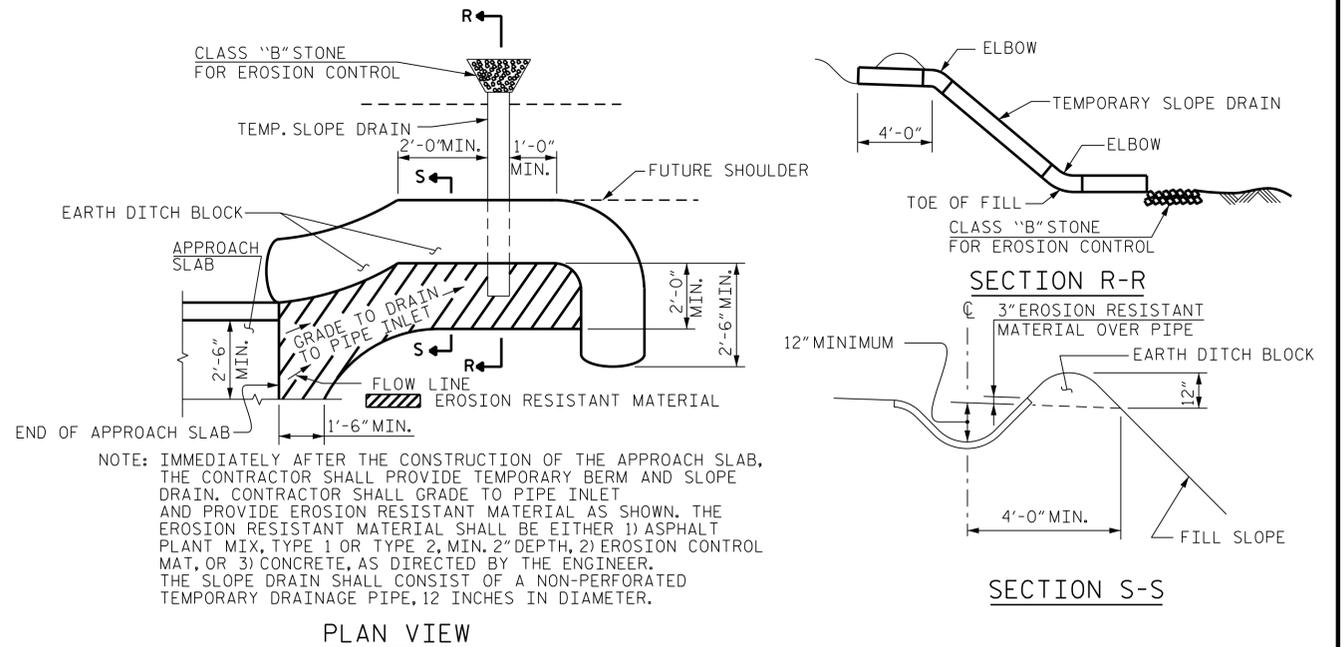
SECTION THRU SLAB
(TYPE I - STANDARD APPROACH FILL)



SECTION THRU SLAB
(TYPE A - ALTERNATE APPROACH FILL)

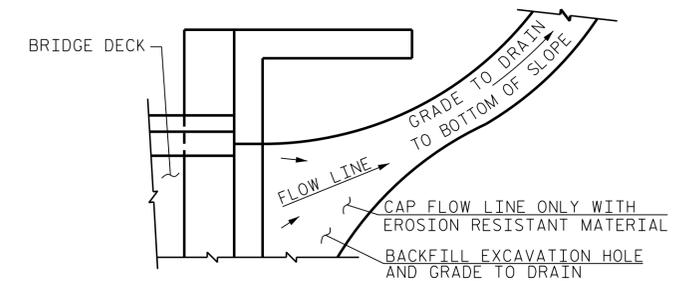
★ AT THE CONTRACTOR'S OPTION, TYPE A - ALTERNATE APPROACH FILL MAY BE USED IN LIEU OF TYPE I - STANDARD APPROACH FILL AT NO ADDITIONAL COST TO THE DEPARTMENT IF BOTTOM PORTION OF INTEGRAL END BENT IS CONSTRUCTED BEFORE TEMPORARY WALL AND END BENT PILES ARE 25'-0" LONG OR DRILLED IN.

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TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



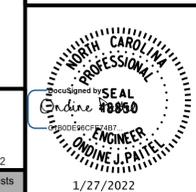
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO THE STRUCTURE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE MATERIALS PRIOR TO CONSTRUCTION OF THE APPROACH SLAB.

TEMPORARY DRAINAGE DETAIL

PROJECT NO. R-2511
 BEAUFORT COUNTY
 STATION: 156+55.00 -L-

SHEET 2 OF 2

BR. NO. 0370 - LEFT



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 BRIDGE APPROACH
 SLAB DETAILS
 LEFT LANE



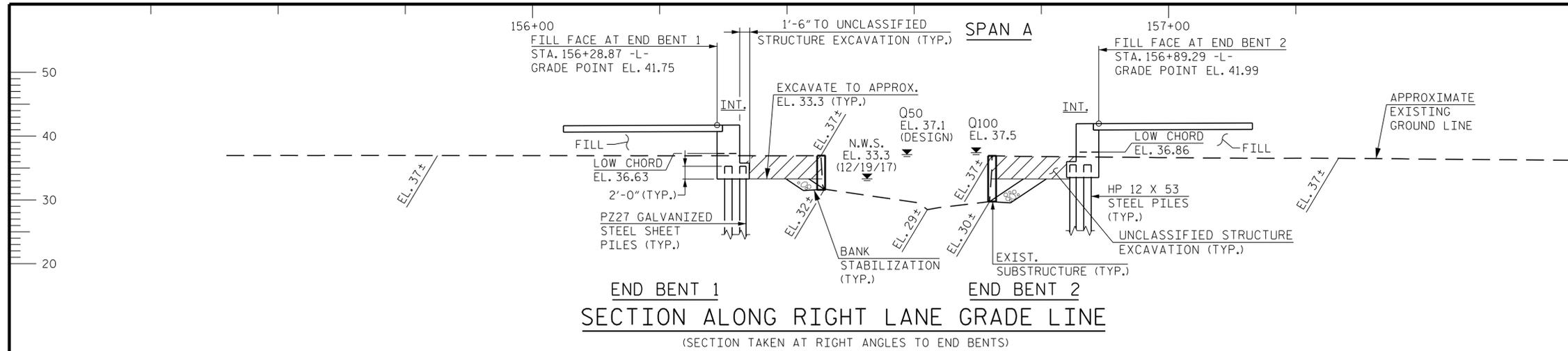
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	SL-25
1			3			TOTAL SHEETS
2			4			25

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1/28/2022 R:\Structures\Bridges\RIGHT\final\R2511_SML_GD_060371R.dgn



P.V.I. = 158+25.00 -L-
 EL. = 42.54
 V.C. = 180.00 FT.
 (+)0.4000% (-)0.3093%

-L- GRADE DATA

HYDRAULIC DATA

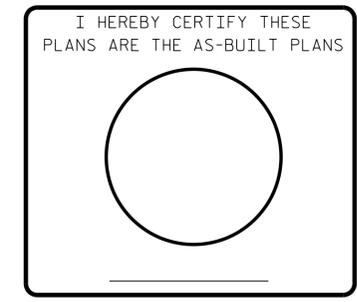
DESIGN DISCHARGE..... 1,165 C.F.S.
 FREQUENCY OF DESIGN FLOOD..... 50 YR.
 DESIGN HIGH WATER ELEVATION..... 37.1
 DRAINAGE AREA..... 3.86 SQ. MI.
 BASE DISCHARGE (Q100)..... 1,436 C.F.S.
 BASE HIGH WATER ELEVATION..... 37.5

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE..... 2,790 C.F.S.
 FREQUENCY OF OVERTOPPING FLOOD..... 500 YR.+
 OVERTOPPING FLOOD ELEVATION..... 41.0

HORIZONTAL CURVE DATA -L-

P.I. STA. 158+92.32
 $\Delta = 17^{\circ}05'49.9''$ (RT.)
 $D = 1^{\circ}41'06.6''$
 $L = 1,014.57'$
 $T = 511.08'$
 $R = 3,400.00'$



PROJECT NO. R-2511
BEAUFORT COUNTY
 STATION: 156+55.00 -L-

SHEET 1 OF 5 REPLACES BRIDGE NO. 0056

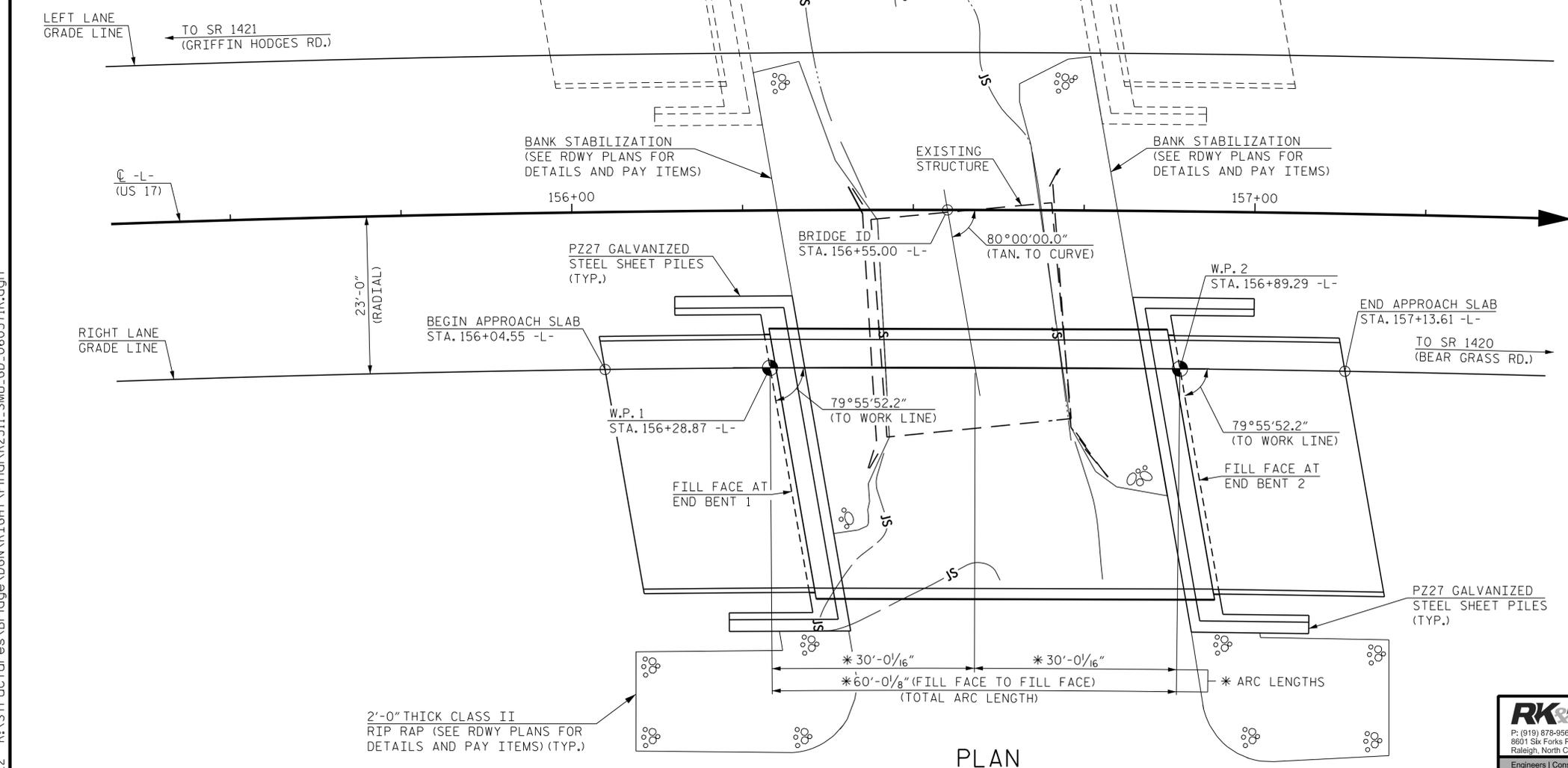
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 FOR BRIDGE ON US 17
 OVER GUM SWAMP BETWEEN
 SR 1421 AND SR 1420
RIGHT LANE

REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SR-1
TOTAL SHEETS
26

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 SEAL
 J. PAITEL
 1/28/2022



PLAN

(HP 12 x 53 STEEL PILES NOT SHOWN FOR CLARITY)
 * MEASURED ALONG RIGHT LANE GRADE LINE (ARC LENGTHS)
 THE RIGHT WORK LINE IS THE CHORD BETWEEN THE WORK POINTS AT THE END BENTS

DRAWN BY : B. A. HAAG DATE : JAN 2022
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 DESIGN ENGINEER OF RECORD : J. PAITEL DATE : JAN 2022

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FOUNDATION NOTES:

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENTS 1 AND 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 98 TONS PER PILE.

DRIVE PILES AT END BENTS 1 AND 2 TO A REQUIRED DRIVING RESISTANCE OF 165 TONS PER PILE.

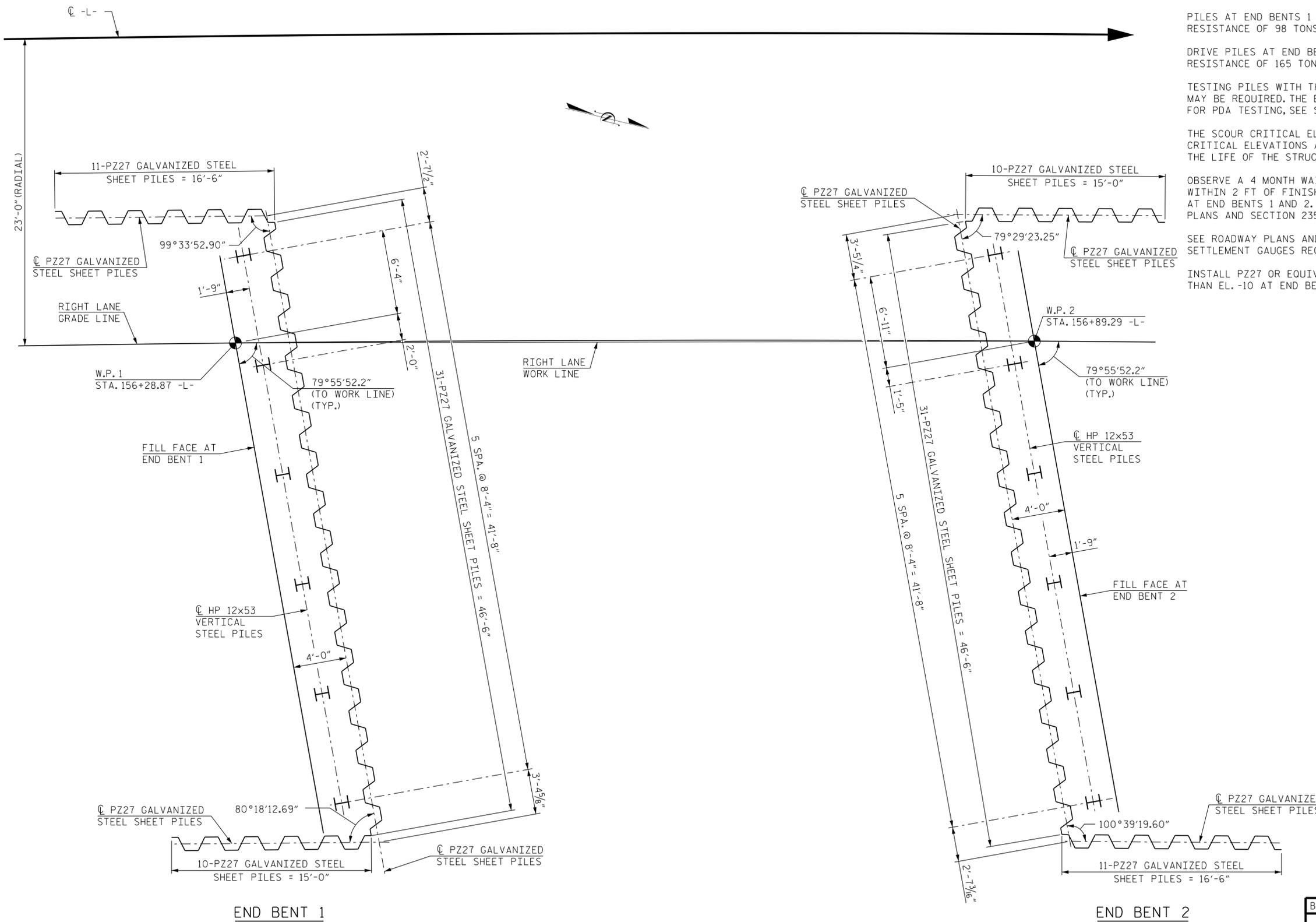
TESTING PILES WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

THE SCOUR CRITICAL ELEVATION FOR END BENTS 1 AND 2 IS ELEVATION 12. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

OBSERVE A 4 MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT TO WITHIN 2 FT OF FINISHED GRADE BEFORE BEGINNING END BENT CONSTRUCTION AT END BENTS 1 AND 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.

SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS FOR THE SETTLEMENT GAUGES REQUIRED AT END BENTS 1 AND 2.

INSTALL P227 OR EQUIVALENT SHEET PILE SECTION TO A TIP ELEVATION NO HIGHER THAN EL. -10 AT END BENTS 1 AND 2.



FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO THE CENTERLINE OF PILES
THE RIGHT WORK LINE IS THE CHORD BETWEEN THE WORK POINTS AT THE END BENTS

PROJECT NO. R-2511
BEAUFORT COUNTY
STATION: 156+55.00 -L-

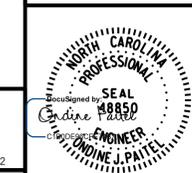
SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
GENERAL DRAWING
FOUNDATION LAYOUT

RIGHT LANE

REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS
					26

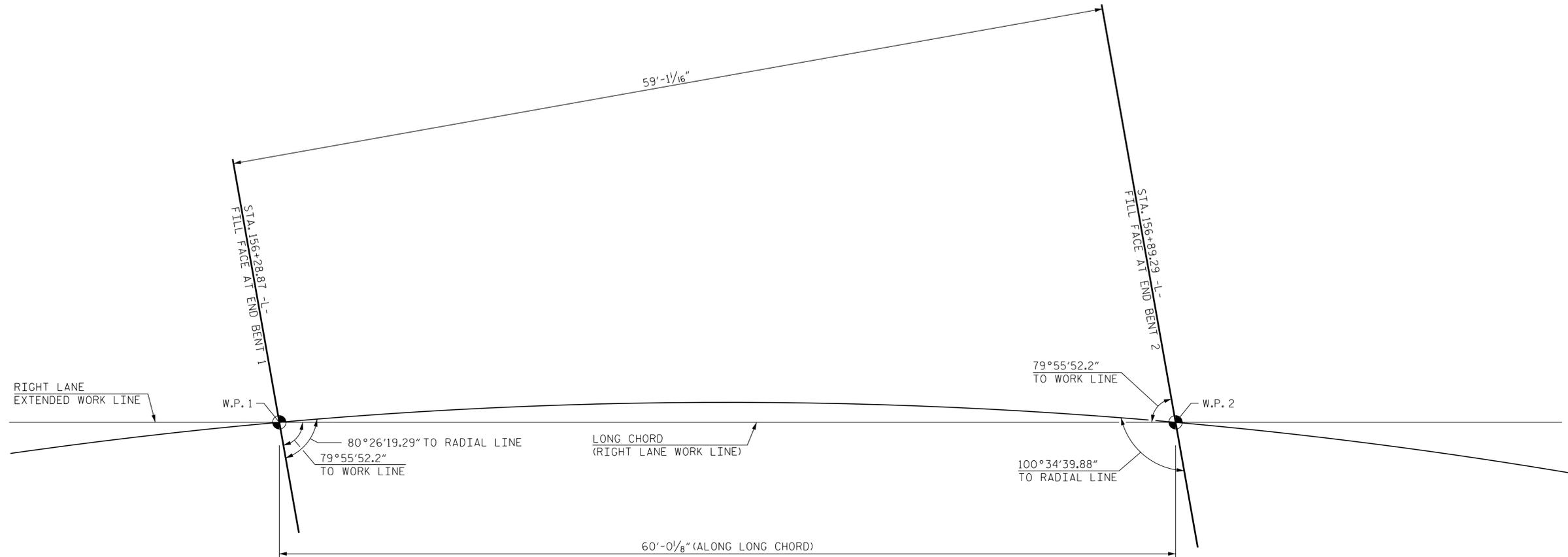
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DESIGN ENGINEER OF RECORD : O. J. PAITEL DATE : JAN 2022



LONG CHORD LAYOUT
NOTE: END BENTS ARE PARALLEL.

PROJECT NO. R-2511
BEAUFORT COUNTY
 STATION: 156+55.00 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
LONG CHORD LAYOUT

RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	SR-3
1			3			TOTAL SHEETS
2			4			26

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SEAL
 State of North Carolina
 Professional Engineer
 8850
 O. J. PAITEL
 1/28/2022

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 DESIGN ENGINEER OF RECORD : O. J. PAITEL DATE : JAN 2022

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE AT STA. 156+55.00 -L-	ASBESTOS ASSESMENT	PDA TESTING	UNCLASSIFIED STRUCTURE EXCAVATION AT STA. 155+56.00 -L-	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLAB	REINFORCING STEEL	36" PRESTRESSED CONCRETE GIRDERS	PILE DRIVING EQUIPMENT SETUP FOR HP 12 x 53 STEEL PILES	HP 12 X 53 STEEL PILES	PILES REDRIVES	ELASTOMERIC BEARINGS	CONCRETE BARRIER RAIL	18" GALVANIZED STEEL SHEET PILES	
	LUMP SUM	LUMP SUM	EA.	LUMP SUM	SQ.FT.	SQ.FT.	CU.YDS.	LUMP SUM	LBS.	LIN.FT.	EA.	NO.	LIN.FT.	NO.	LUMP SUM	LIN.FT.	SQ. FT.
SUPERSTRUCTURE	-	-	-	-	2,308	3,556	-	LUMP SUM	-	288.96	-	-	-	LUMP SUM	116.6	-	
END BENT 1	-	-	-	-	-	-	46.2	-	5,882	-	6	6	480	3	-	3,500	
END BENT 2	-	-	-	-	-	-	46.3	-	5,886	-	6	6	480	3	-	3,517	
TOTAL	LUMP SUM	LUMP SUM	1	LUMP SUM	2,308	3,556	92.5	LUMP SUM	11,768	288.96	12	12	960	6	LUMP SUM	116.6	7,017

GENERAL NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

THIS BRIDGE IS LOCATED IN THE SEISMIC ZONE 1.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SR-26.

FOR SUBMITAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

PRESTRESSED CONCRETE DECK PANELS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STA. 156+55.00".

ALL METALLIZED SURFACES SHALL RECEIVE A SEAL COATING AS SPECIFIED IN THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18" EVALUATING SCOUR AT BRIDGES.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

THE EXISTING STRUCTURE CONSISTING OF SINGLE SPAN OF 22 FT LONG, 34.1 FT CLEAR ROADWAY WIDTH ON REINFORCED CONCRETE FLOOR ON I-BEAMS WITH A REINFORCED CONCRETE SLAB AND LOCATED 55' UPSTREAM FROM PROPOSAL STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR. THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

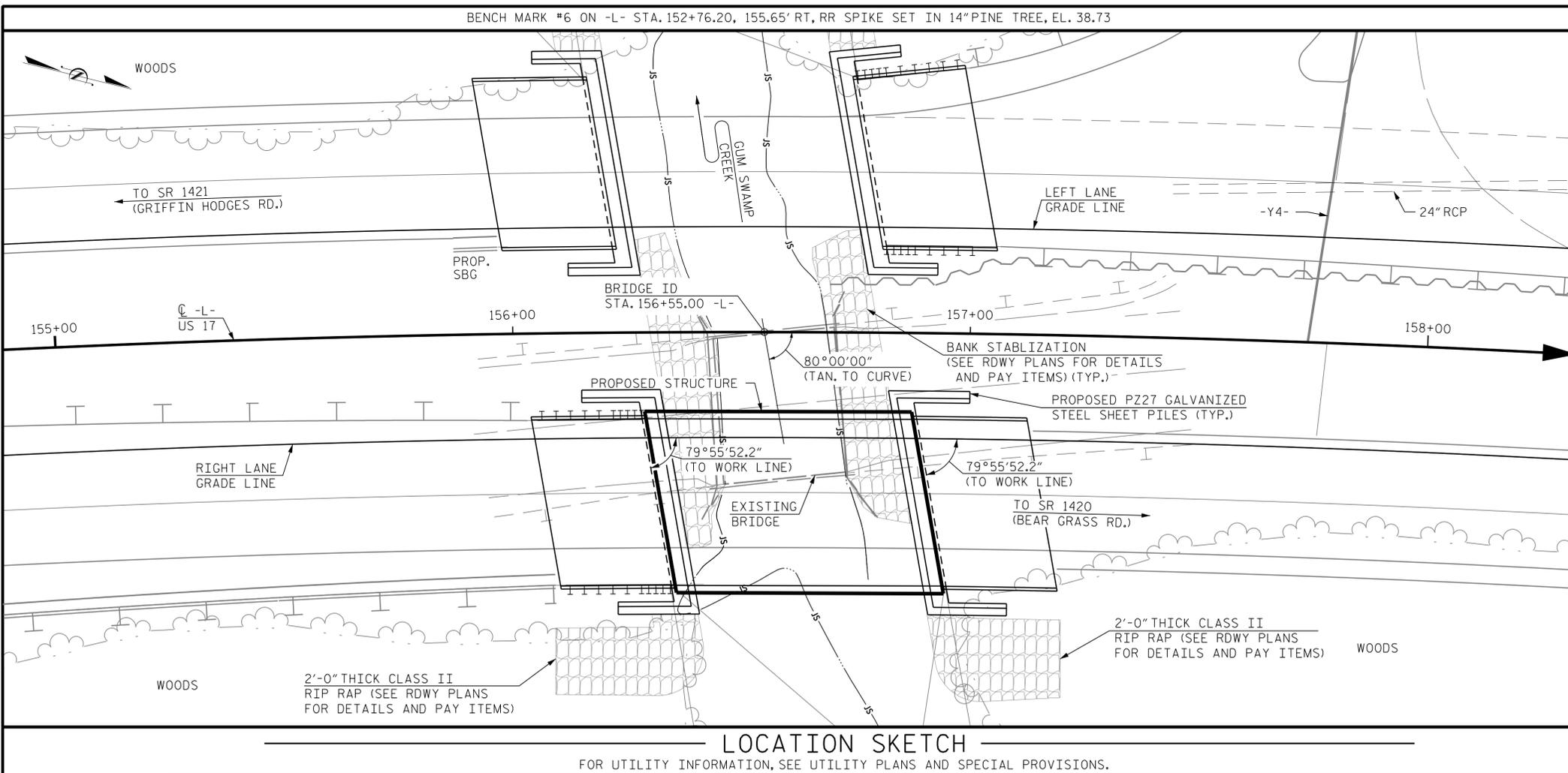
THE MATERIAL SHOWN IN THE CROSS HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 22.583 FT LEFT AND 47.25 FT RIGHT OF CENTERLINE OF ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

FOR 18" GALVANIZED STEEL SHEET PILES, SEE SPECIAL PROVISIONS.

PROJECT NO. R-2511
BEAUFORT COUNTY
 STATION: 156+55.00 -L-

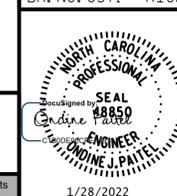
SHEET 4 OF 5



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

BR. NO. 0371 - RIGHT



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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
 LOCATION SKETCH,
 TOTAL BILL OF MATERIAL
 AND GENERAL NOTES
RIGHT LANE

REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.

SR-4

TOTAL SHEETS

26

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 DRAWN BY : B. A. HAAG DATE : JAN 2022
 CHECKED BY : M. ZIEHL DATE : JAN 2022
 DESIGN ENGINEER OF RECORD : O. J. PAITEL DATE : JAN 2022

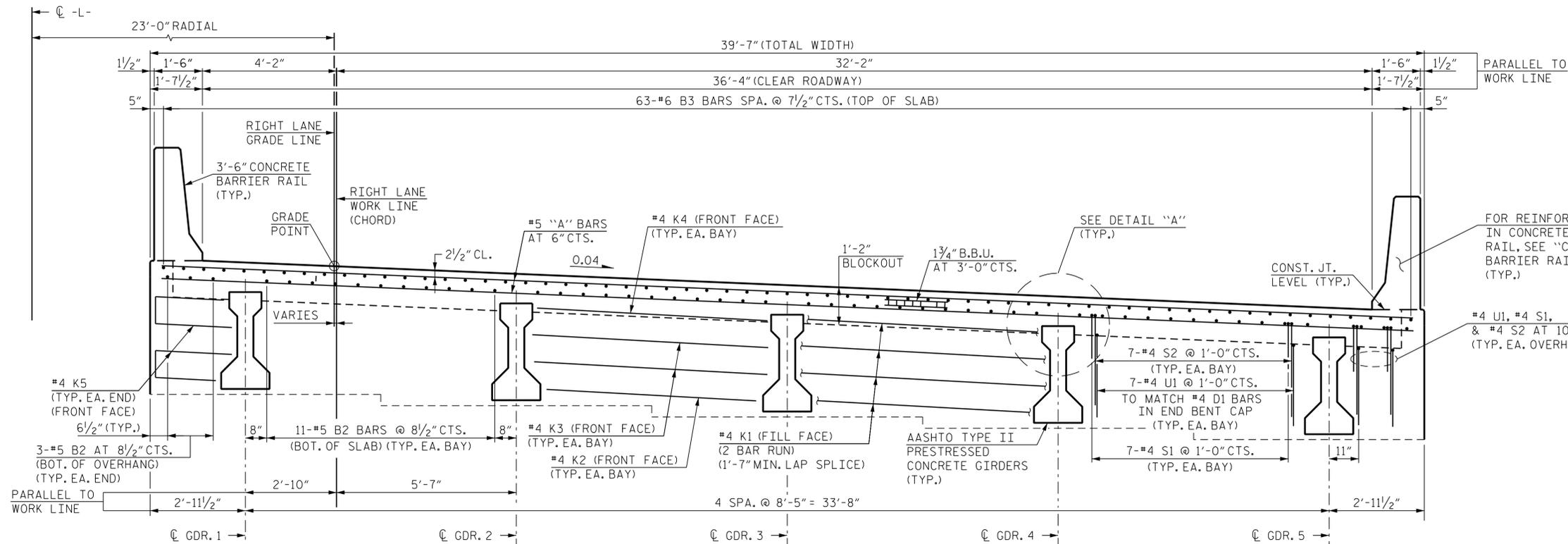
tboyd

NOTES:

PROVIDE 1/4" BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS.

LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

PREVIOUSLY CAST CONCRETE SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST.

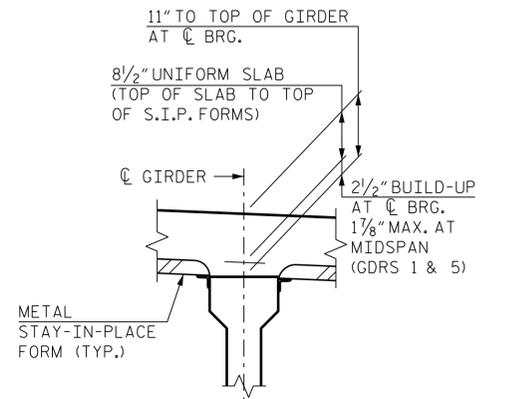


TYPICAL SECTION AT INTEGRAL END BENT

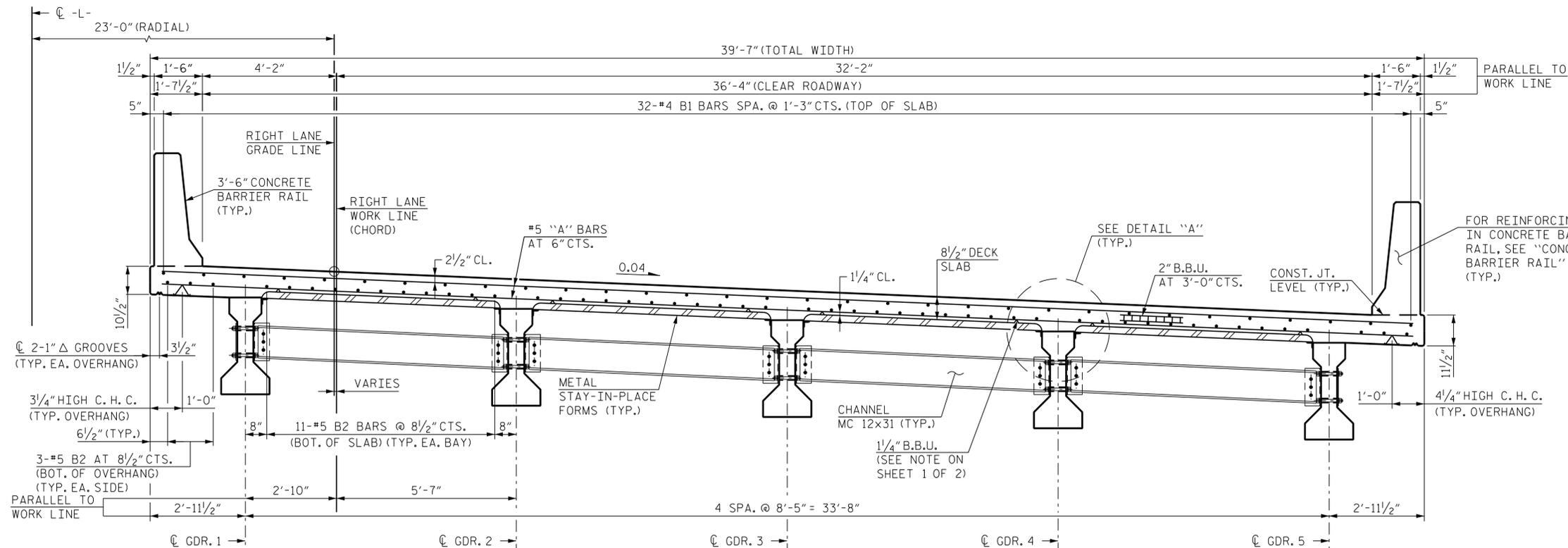
FOR REINFORCING STEEL IN CONCRETE BARRIER RAIL, SEE "CONCRETE BARRIER RAIL" SHEETS (TYP.)

#4 U1, #4 S1, & #4 S2 AT 10" CTS. (TYP. EA. OVERHANG)

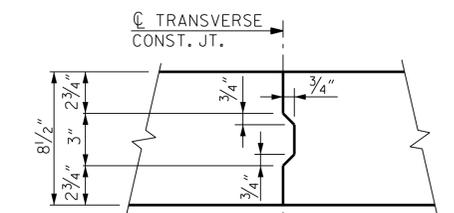
7-#4 S2 @ 1'-0" CTS. (TYP. EA. BAY)
7-#4 U1 @ 1'-0" CTS. TO MATCH #4 D1 BARS IN END BENT CAP (TYP. EA. BAY)
7-#4 S1 @ 1'-0" CTS. (TYP. EA. BAY)



DETAIL "A"



TYPICAL SECTION AT INTERMEDIATE DIAPHRAGM



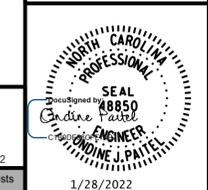
NOTE: REINFORCING STEEL IN SLAB NOT SHOWN. LONGITUDINAL AND TRANSVERSE REINFORCING STEEL SHALL BE CONTINUOUS THROUGH JOINT.

TRANSVERSE CONSTRUCTION JOINT IN DECK SLAB

PROJECT NO. R-2511
BEAUFORT COUNTY
STATION: 156+55.00 -L-

SHEET 1 OF 2

BR. NO. 0371 - RIGHT



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTIONS

RIGHT LANE

REVISIONS

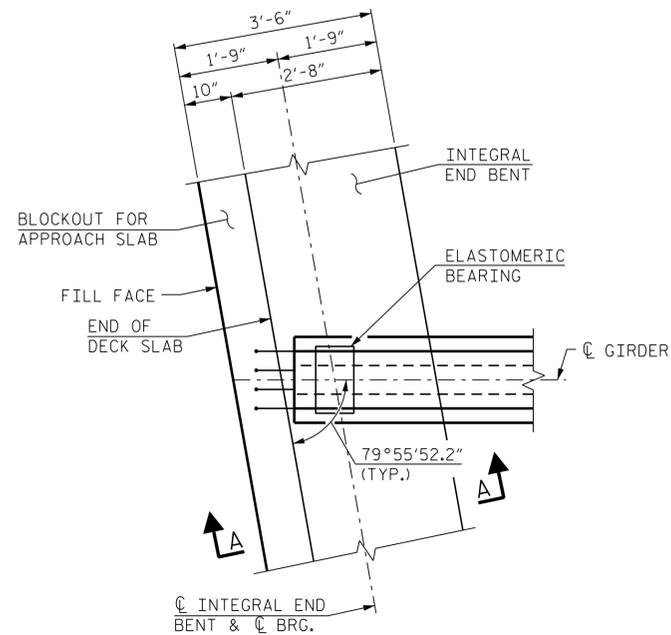
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			SR-6
2			4			TOTAL SHEETS 26



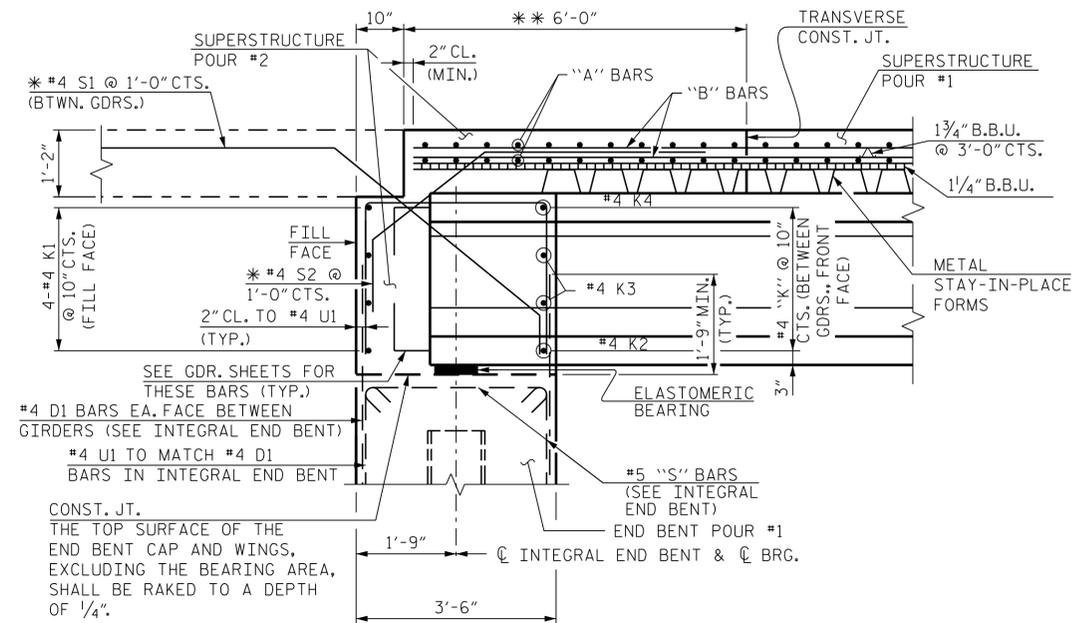
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DESIGN ENGINEER OF RECORD : O. J. PAATEL DATE : JAN 2022



PLAN OF GIRDER AT INTEGRAL END BENT
(END BENT 1 SHOWN, END BENT 2 SIMILAR)



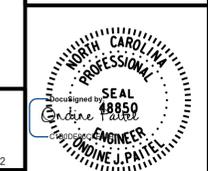
SECTION A-A
* EPOXY COATED BARS
(DIMENSIONS SHOWN ARE NORMAL TO THE END BENT)
(END BENT 1 SHOWN, END BENT 2 SIMILAR)
** MEASURED PARALLEL TO THE CHORD

INTEGRAL END BENT DETAILS
(FOR CLARITY, SHEET PILES NOT SHOWN)

PROJECT NO. R-2511
BEAUFORT COUNTY
STATION: 156+55.00 -L-

SHEET 2 OF 2

BR. NO. 0371 - RIGHT



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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
TYPICAL SECTION
DETAILS
RIGHT LANE

REVISIONS

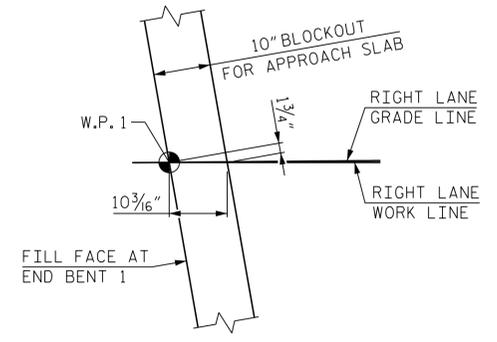
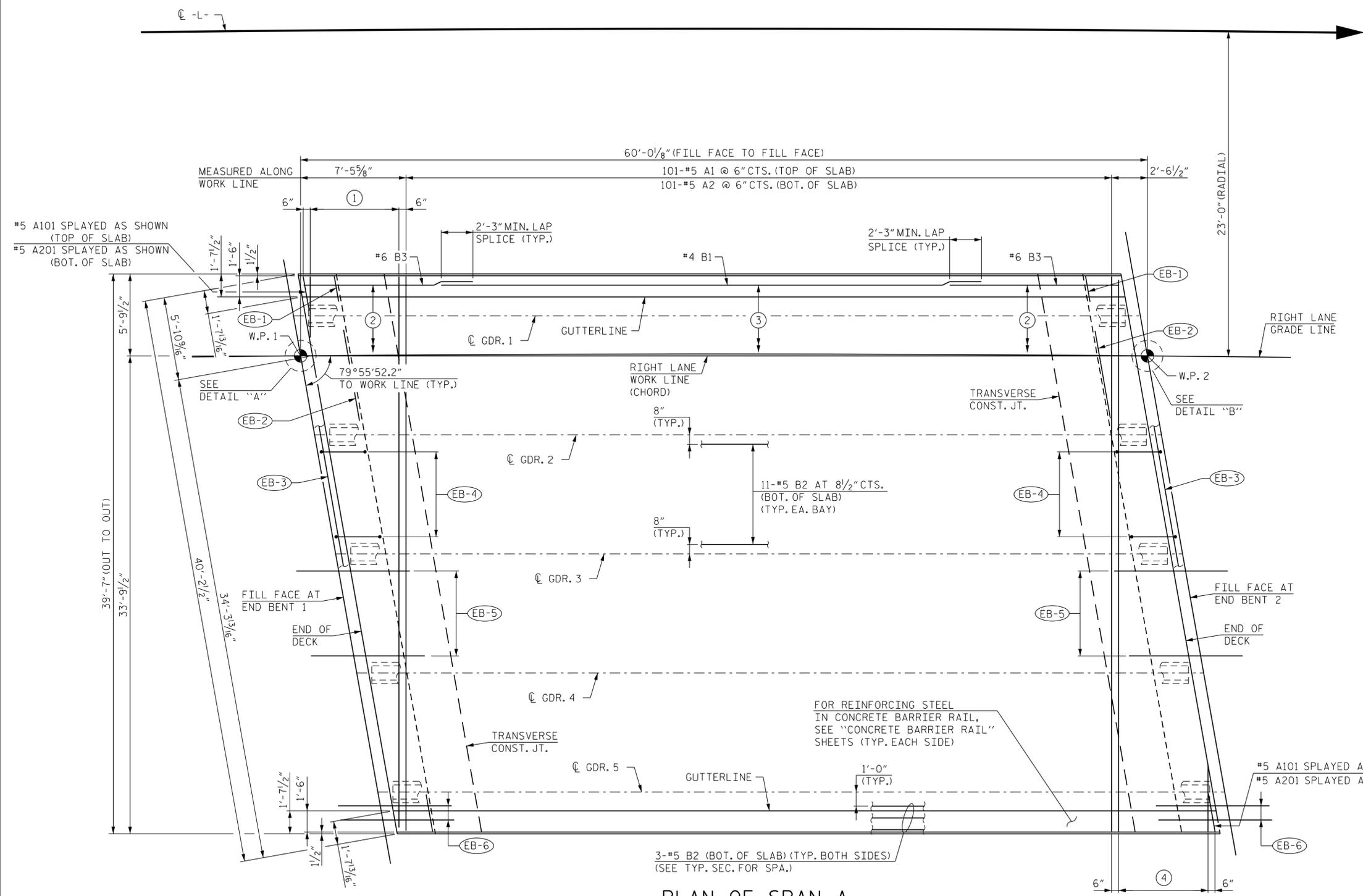
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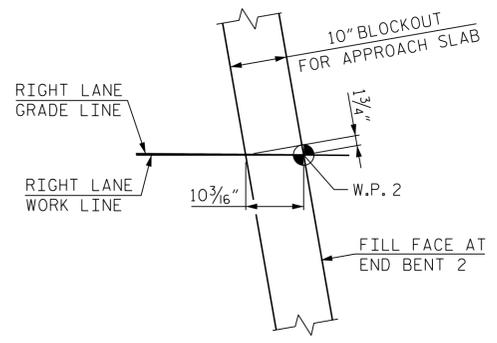
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NOTE:
 #5 "A" BARS SHALL BE PLACED PERPENDICULAR TO LONG CHORD BETWEEN WORK POINTS AT END BENT 1 AND END BENT 2 (RIGHT LANE WORK LINE).
 FOR FOUR SEQUENCE AND LOCATION OF TRANSVERSE CONSTRUCTION JOINTS, SEE "SUPERSTRUCTURE BILL OF MATERIALS" SHEET SR-17.



DETAIL "A"



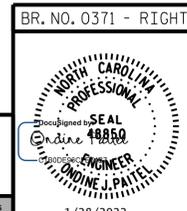
DETAIL "B"

PLAN OF SPAN A

PROJECT NO. R-2511
 BEAUFORT COUNTY
 STATION: 156+55.00 -L-

- ① #5 A102 THROUGH #5 A114 @ 6" CTS. (TOP OF SLAB)
 #5 A202 THROUGH #5 A214 @ 6" CTS. (BOT. OF SLAB)
- ② 63-#6 B3 (TOP OF SLAB)
 (SEE TYPICAL SECTION FOR SPACING)
- ③ 32-#4 B1 (TOP OF SLAB)
 (SEE TYPICAL SECTION FOR SPACING)
- ④ #5 A114 THROUGH #5 A102 @ 6" CTS. (TOP OF SLAB)
 #5 A214 THROUGH #5 A202 @ 6" CTS. (BOT. OF SLAB)

END BENT DIAPHRAGM DETAILS	
EB-1 #4 K5 BAR (TYP. EXT. GDRS.) (FRONT FACE)	EB-4 7-#4 U1 @ 1'-0" CTS. (MATCH TO #4 D1 IN END BENT) (TYP. EA. BAY)
EB-2 #4 K2, 2-#4 K3, #4 K4 BARS (FRONT FACE) (TYP. EA. BAY)	EB-5 7-#4 S1 AND 7-#4 S2 @ 1'-0" CTS. (TYP. EA. BAY)
EB-3 4-#4 K1 @ 10" CTS. (FILL FACE) (2 BAR RUN) (1'-7" SPLICE LENGTH MIN.)	EB-6 2-#4 S1, 2-#4 S2, AND 2-#4 U1 @ 10" CTS. IN OVERHANGS (TYP.)



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 RALEIGH
SUPERSTRUCTURE
 PLAN OF SPAN A
RIGHT LANE



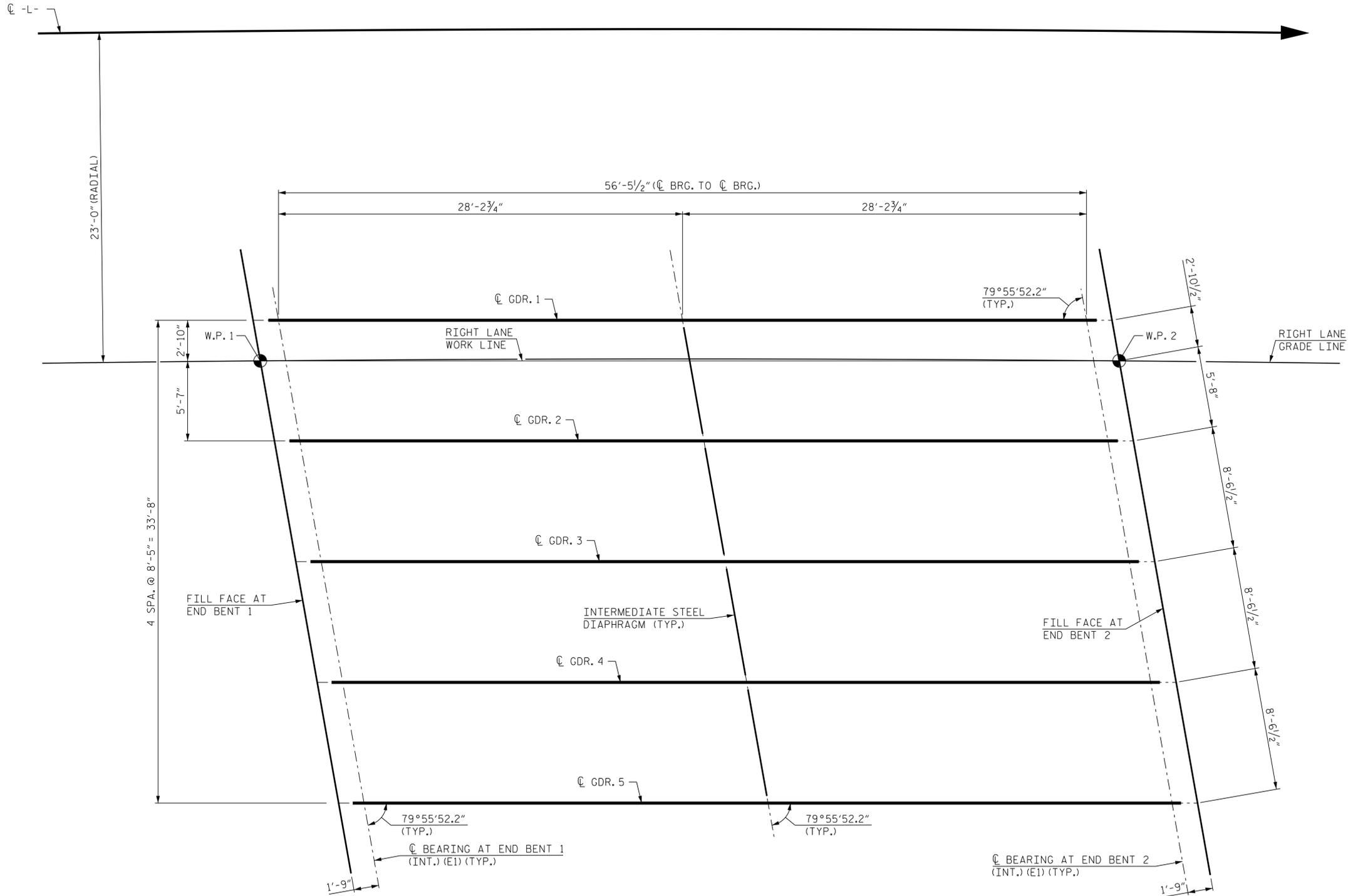
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FRAMING PLAN

(ALL GIRDERS ARE PARALLEL TO THE LEFT LANE WORK LINE, WHICH IS THE CHORD BETWEEN THE WORK POINTS)

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STATE OF NORTH CAROLINA
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SUPERSTRUCTURE
 GIRDER
 FRAMING PLAN
RIGHT LANE

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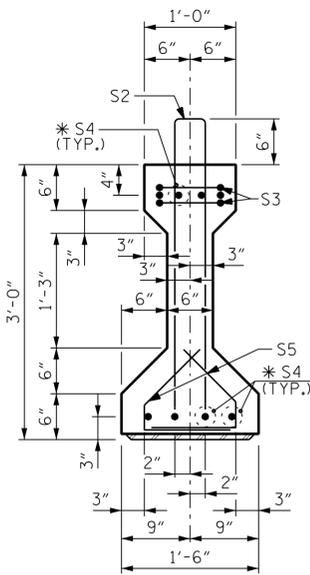
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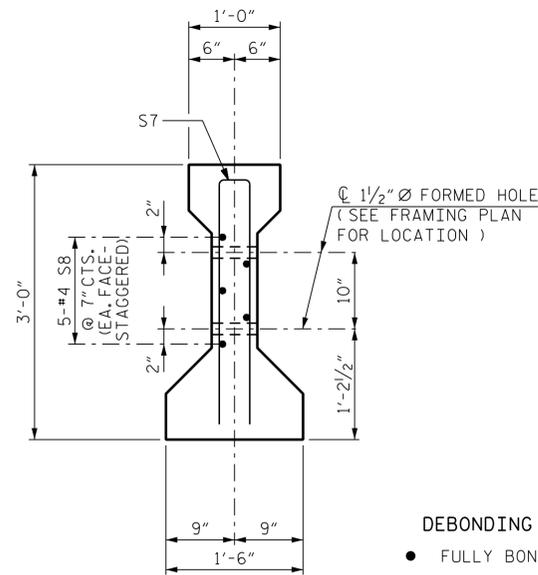
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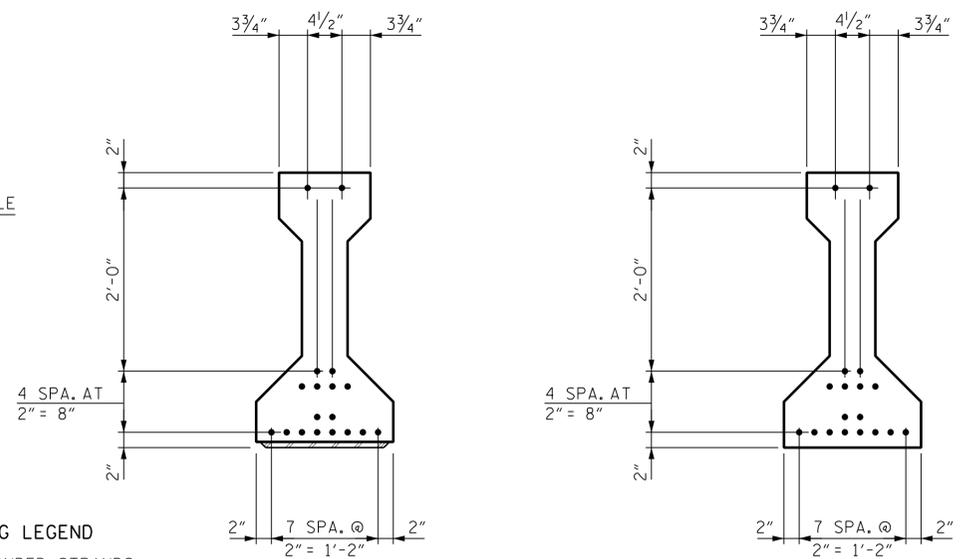
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SECTION A-A

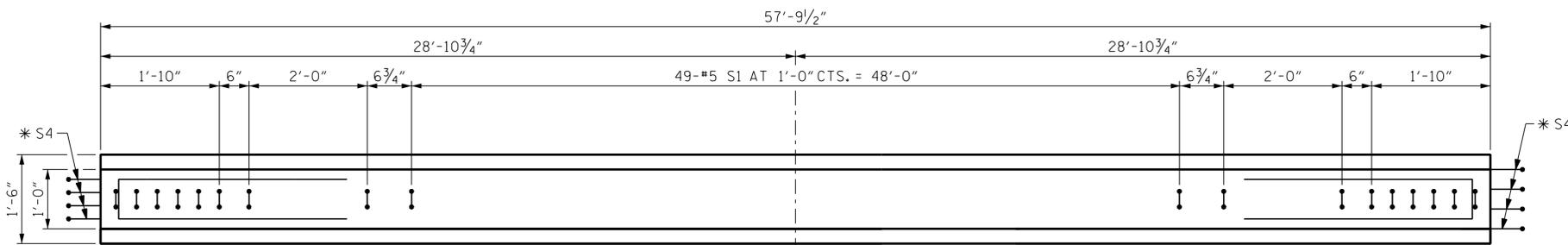


SECTION C-C
(S1 BARS NOT SHOWN)

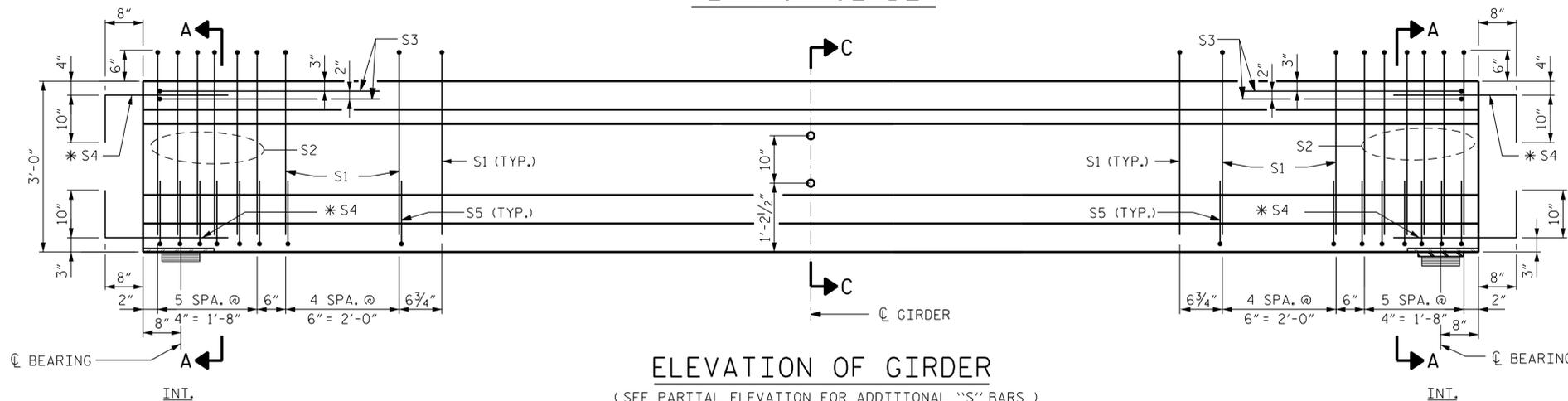


AT END OF GIRDER
AT \bar{C} OF GIRDER
0.6" Ø LOW RELAXATION STRAND LAYOUT

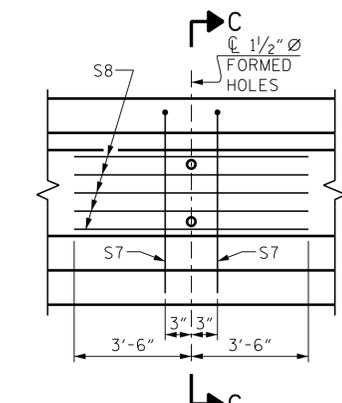
DEBONDING LEGEND
● FULLY BONDED STRANDS



PLAN OF GIRDER



ELEVATION OF GIRDER
(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



PARTIAL ELEVATION
SHOWING INTERMEDIATE DIAPHRAGM
REINFORCING STEEL FOR GIRDER Nos. 1-5

0.6" Ø L. R. GRADE 270 STRANDS

AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

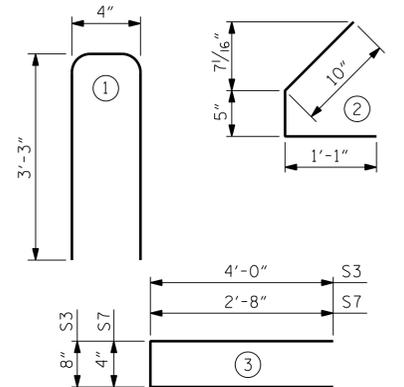
REINFORCING STEEL
FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	59	#4	1	6'-10"	269
S2	12	#6	1	6'-10"	123
S3	4	#4	3	8'-8"	23
*S4	16	#5	STR	3'-8"	61
S5	44	#4	2	2'-4"	69
S7	2	#5	3	5'-8"	12
S8	5	#4	STR	7'-0"	23

* NOTE: S4 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LBS.	8,000 PSI CONCRETE C.Y.	0.6" Ø L. R. STRANDS No.
AG1 THROUGH AG5	580	5.5	18

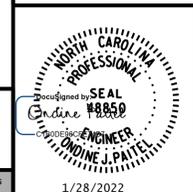
GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	57'-9 1/2"	288'-11 1/2"

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SHEET 1 OF 3

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1/28/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
AASHTO TYPE II
PRESTRESSED CONCRETE GIRDER
SIMPLE SPAN
RIGHT LANE

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SR-10
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NOTE:

STIRRUPS MAY BE SLIGHTLY SHIFTED TO AVOID CONFLICTS WITH FORMED HOLES.

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NOTES:

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL SHALL BE GRADE 60.

EMBEDDED PLATE "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

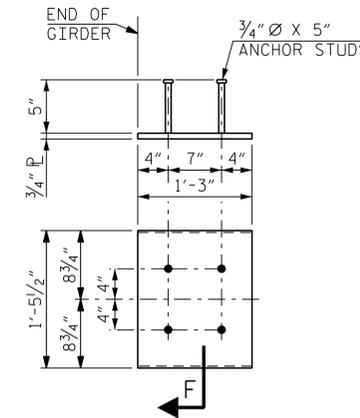
AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6,200 PSI.

DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

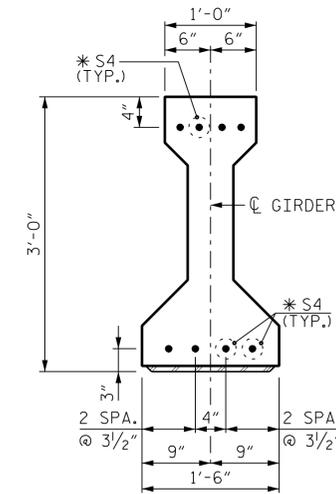
THE TOP SURFACE OF THE GIRDER SHALL BE RAKED TO A DEPTH OF 1/4" EXCEPT IN THE AREA BETWEEN STIRRUPS AND THE EDGE OF THE GIRDER.

THE CONTRACTOR HAS THE OPTION TO PROVIDE, AT NO ADDITIONAL COST TO THE DEPARTMENT, 2 ADDITIONAL STRANDS AT THE TOP OF THE GIRDER TO FACILITATE TYING OF THE REINFORCING STEEL. THESE STRANDS SHALL BE PULLED TO A LOAD OF 4500 lbs.

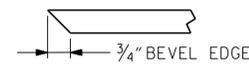


**EMBEDDED PLATE "B-1" DETAILS
FOR AASHTO TYPE II GIRDER**

(2 REQ'D PER GIRDER)



DETAIL "A"



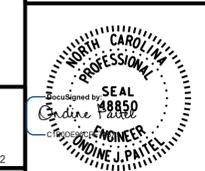
SECTION "F"

(SEE NOTES)

PROJECT NO. R-2511
BEAUFORT COUNTY
 STATION: 156+55.00 -L-

SHEET 2 OF 3

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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUPERSTRUCTURE
 PRESTRESSED CONCRETE GIRDER
 SIMPLE SPAN
 DETAILS
RIGHT LANE

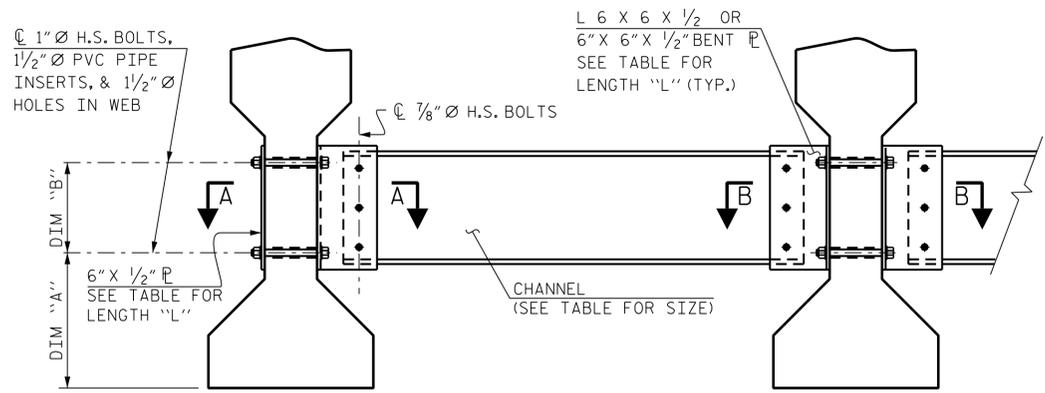
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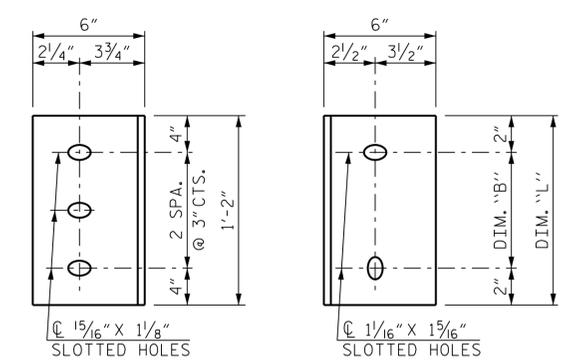
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EXTERIOR GIRDER INTERIOR GIRDER
PART SECTION AT INTERMEDIATE DIAPHRAGM



DIAPHRAGM FACE WEB FACE
CONNECTOR PLATE DETAILS

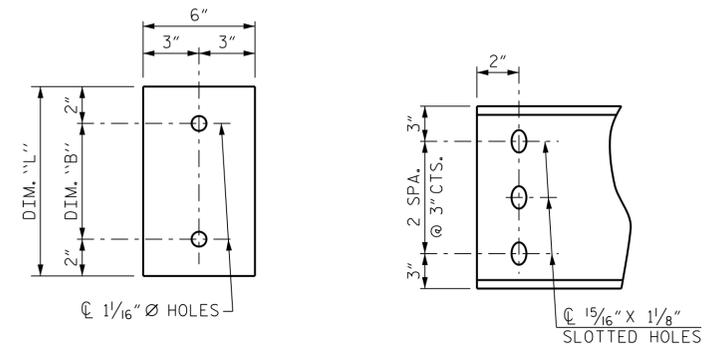


PLATE DETAILS CHANNEL END

STRUCTURAL STEEL NOTES

ALL INTERMEDIATE DIAPHRAGM STEEL AND CONNECTOR PLATES SHALL BE AASHTO M270 GRADE 50 OR APPROVED EQUAL.

TENSION ON THE ASTM A325 BOLTS THROUGH THE CHANNEL MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL 1/4 TURN.

THE PLATES, BENT PLATES, CHANNELS, AND ANGLES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR METALLIZATION, APPLY A THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM, THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

GALVANIZE THE HIGH STRENGTH BOLTS, NUTS, WASHERS AND DIRECT TENSION INDICATORS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

USE AN ASTM F436 HARDENED WASHER WITH STANDARD AND SLOTTED HOLES UNDER EACH BOLT HEAD AND NUT.

FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4\" PROJECTION BEYOND THE NUT.

INTERMEDIATE DIAPHRAGM ASSEMBLY SHALL COMPLY WITH SECTION 1072 OF THE STANDARD SPECIFICATIONS.

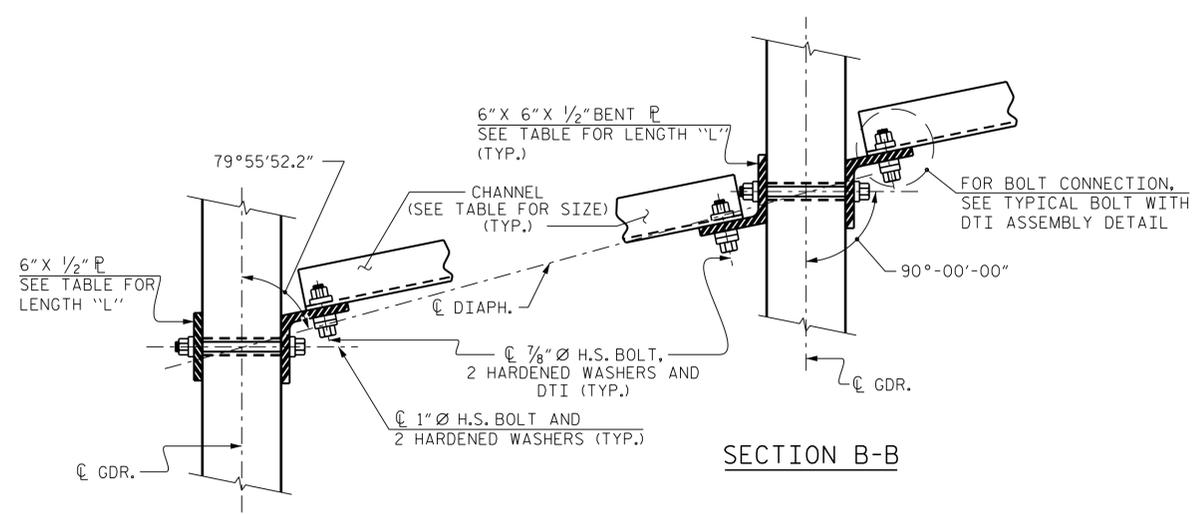
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

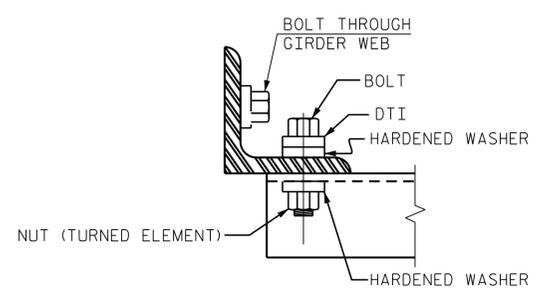
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.

TABLE

GIRDER TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
II	MC 12 x 31	1'-2 1/2"	10"	1'-2"



SECTION A-A SECTION B-B
CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

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SHEET 3 OF 3

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STATE OF NORTH CAROLINA
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INTERMEDIATE STEEL
DIAPHRAGMS FOR TYPE II
PRESTRESSED CONCRETE GIRDERS
RIGHT LANE

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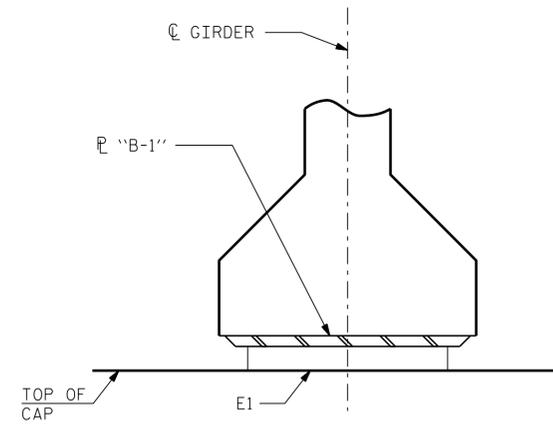
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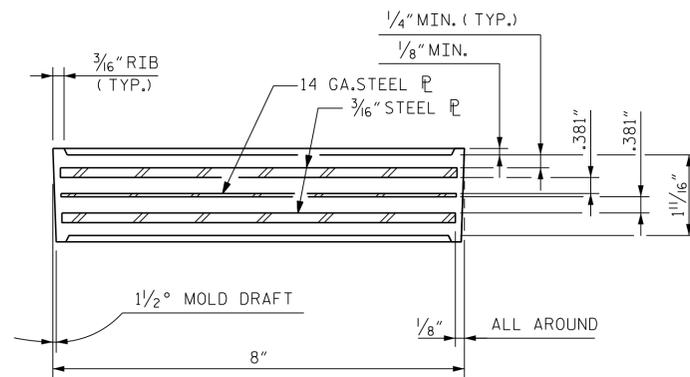
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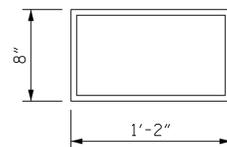
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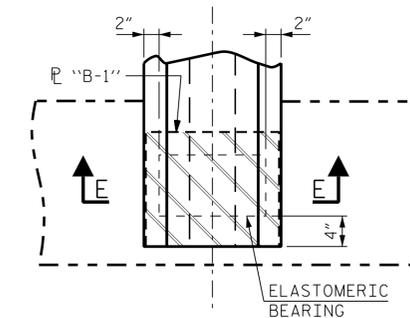
SECTION E-E



TYPICAL SECTION OF ELASTOMERIC BEARINGS



**E1 (10 REQ'D)
PLAN VIEW OF ELASTOMERIC BEARING
TYPE II**



**TYPICAL PLAN
(INTEGRAL END BENT)**

NOTES:

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.
FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE II	145 k

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48850
ENGINEER
ENGINEER J. PAITEL
1/28/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
**SUPERSTRUCTURE
ELASTOMERIC BEARING
DETAILS
PRESTRESSED CONCRETE GIRDER
RIGHT LANE**

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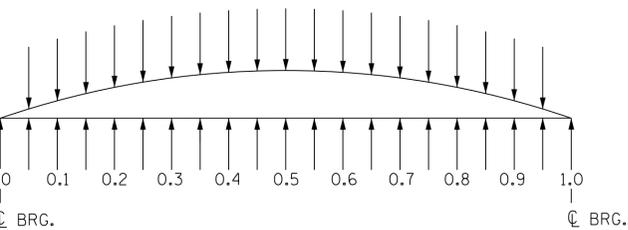
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SCHEMATIC CAMBER ORDINATES AT GIRDER TWENTIETH POINTS

DEFLECTIONS ARE IN FEET (DECIMAL FORM) AT TWENTIETH POINTS BETWEEN BEARINGS, REQUIRED CAMBER VALUES ARE IN INCHES (FRACTIONAL FORM).

* INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.

DEAD LOAD DEFLECTION AND CAMBER TABLE FOR GIRDERS - SPAN A																						
GIRDER	TWENTIETH POINTS	0.0	0.05	0.1	0.15	0.2	0.25	0.3	0.35	0.4	0.45	0.5	0.55	0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1
1 & 5	CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.020	0.039	0.057	0.074	0.088	0.101	0.111	0.118	0.122	0.124	0.122	0.118	0.111	0.101	0.088	0.074	0.057	0.039	0.020	0.000
	DEFLECTION DUE TO SUPERIMPOSED D.L. * ↓	0.000	0.012	0.021	0.034	0.042	0.051	0.059	0.064	0.070	0.072	0.074	0.072	0.070	0.064	0.059	0.051	0.042	0.034	0.021	0.012	0.000
	FINAL CAMBER ↑	0"	1/16"	3/16"	1/4"	3/8"	7/16"	1/2"	9/16"	5/8"	5/8"	5/8"	5/8"	9/16"	5/8"	1/2"	7/16"	3/8"	1/4"	3/16"	1/16"	0"
2 THROUGH 4	CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.020	0.039	0.057	0.074	0.088	0.101	0.111	0.118	0.122	0.124	0.122	0.118	0.111	0.101	0.088	0.074	0.057	0.039	0.020	0.000
	DEFLECTION DUE TO SUPERIMPOSED D.L. * ↓	0.000	0.014	0.023	0.038	0.047	0.057	0.066	0.071	0.078	0.080	0.082	0.080	0.078	0.071	0.066	0.057	0.047	0.038	0.023	0.014	0.000
	FINAL CAMBER ↑	0"	1/16"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	7/16"	3/8"	5/16"	1/4"	3/16"	1/16"	0"

PROJECT NO. R-2511
BEAUFORT COUNTY
 STATION: 156+55.00 -L-

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 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE

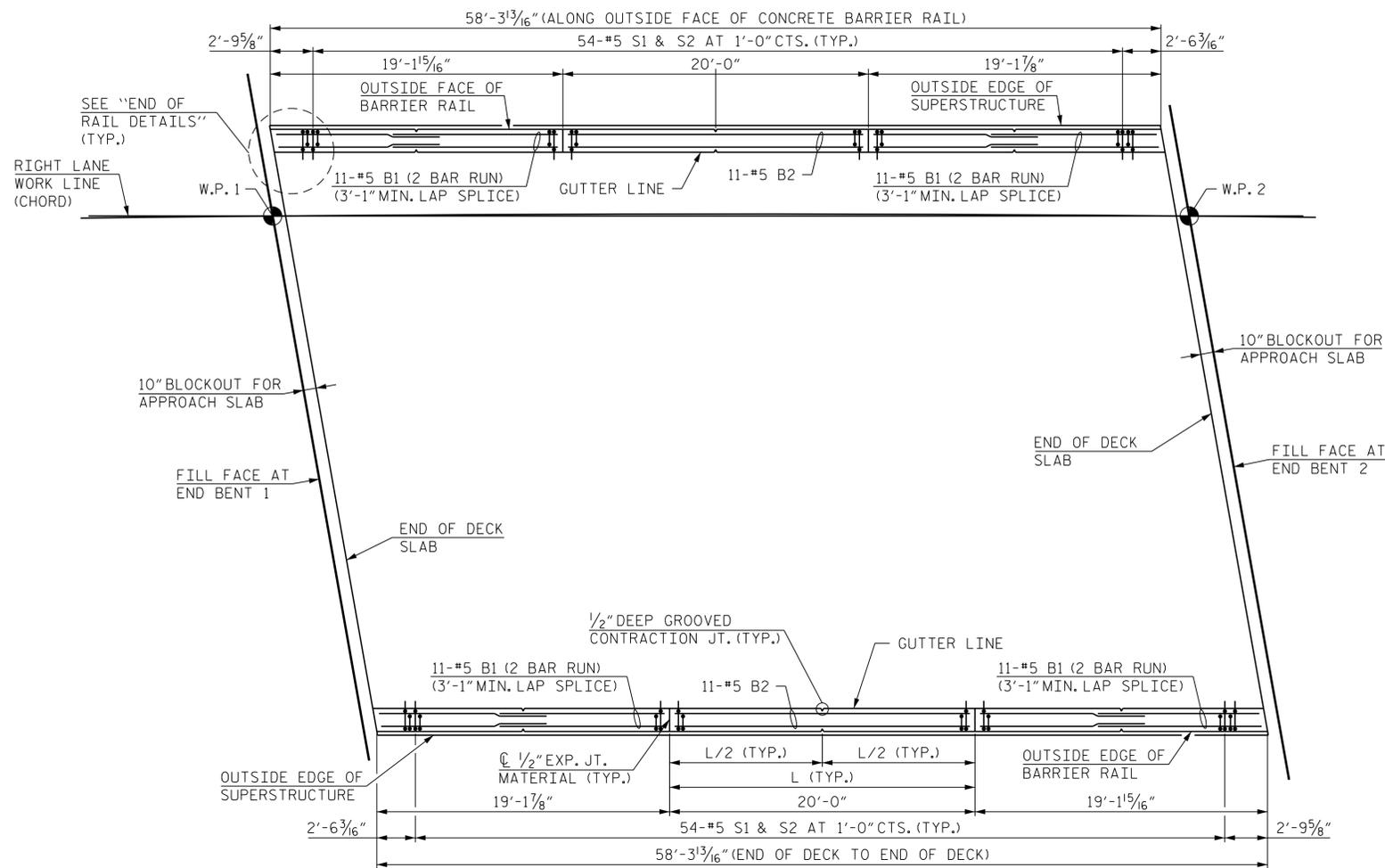
GIRDER CAMBER
 DETAILS

RIGHT LANE

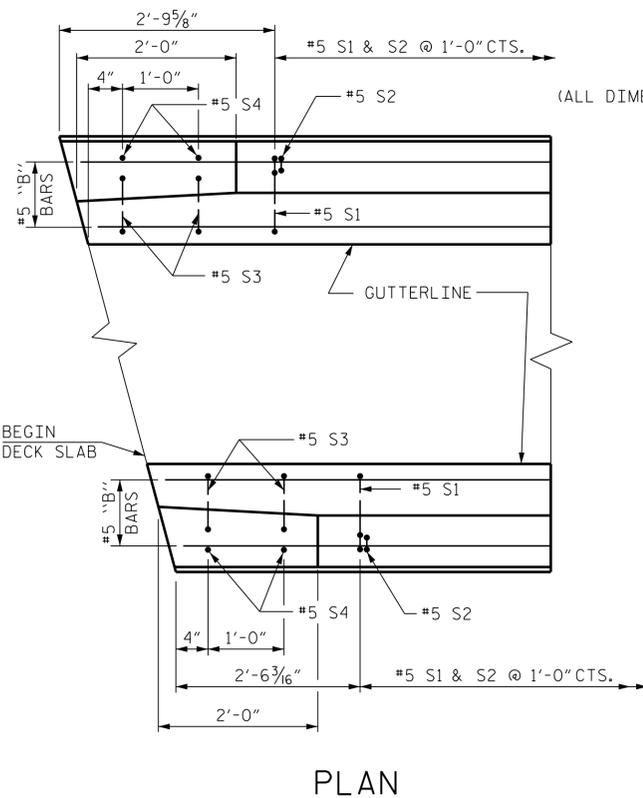
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NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	

TOTAL SHEETS: 26

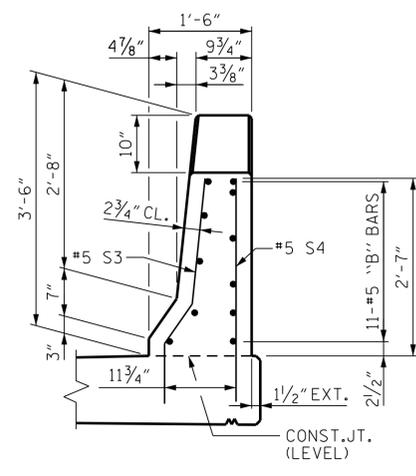
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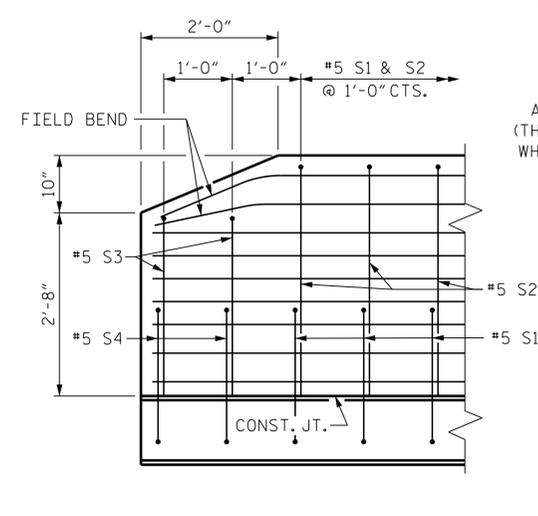
SPAN A
PLAN OF BARRIER RAIL
(ALL DIMENSIONS ARE MEASURED ALONG OUTSIDE FACE OF BARRIER RAIL)



PLAN



END VIEW



SIDE VIEW

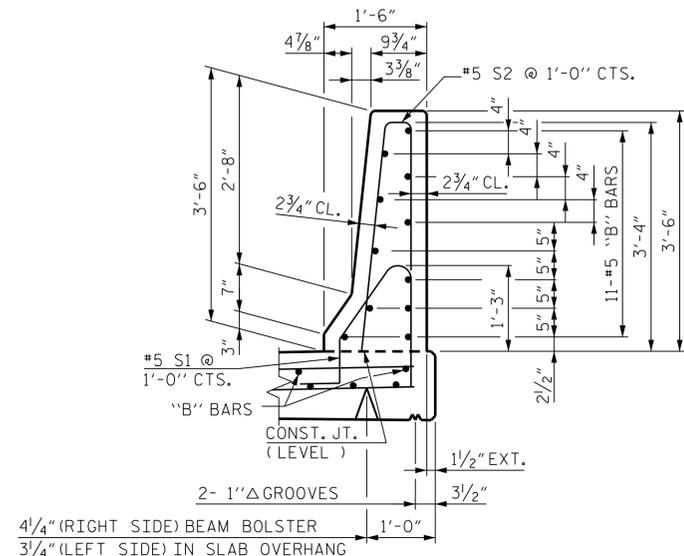
END OF RAIL DETAILS

NOTES:

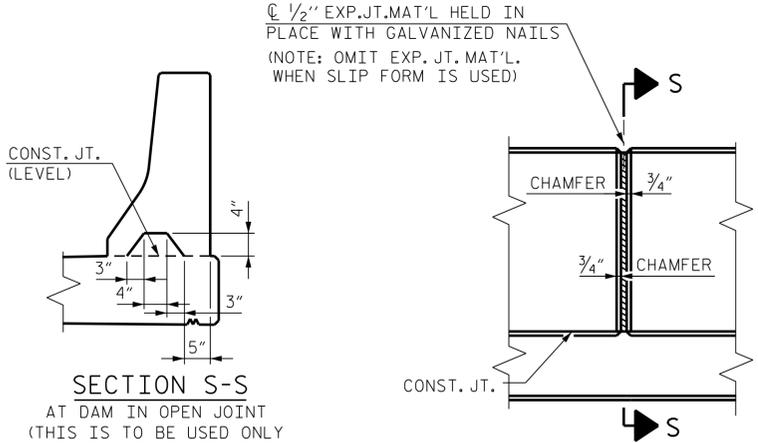
THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS, THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

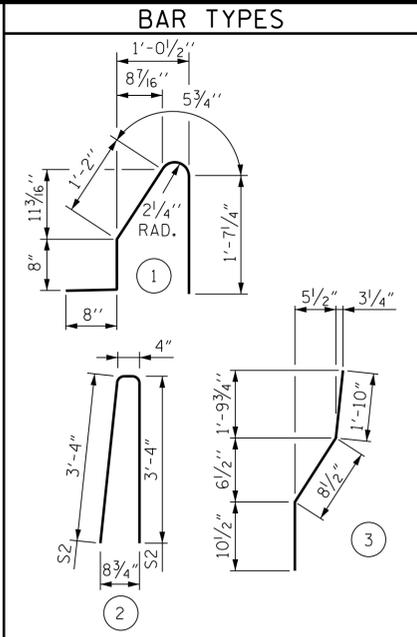


SECTION THRU RAIL



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
*B1	88	#5 STR.	11'-0"	1,010	
*B2	22	#5 STR.	19'-7"	449	
*S1	108	#5	4'-7"	516	
*S2	108	#5	7'-0"	789	
*S3	8	#5	3'-5"	29	
*S4	8	#5 STR.	3'-3"	27	

* EPOXY COATED REINFORCING STEEL	2,820 LBS.
CLASS AA CONCRETE	15.9 CU. YDS.
CONCRETE BARRIER RAIL	116.6 LIN. FT.

PROJECT NO. R-2511
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
CONCRETE BARRIER RAIL
RIGHT LANE

BR. NO. 0371 - RIGHT
SEAL
Professional Engineer
1/28/2022

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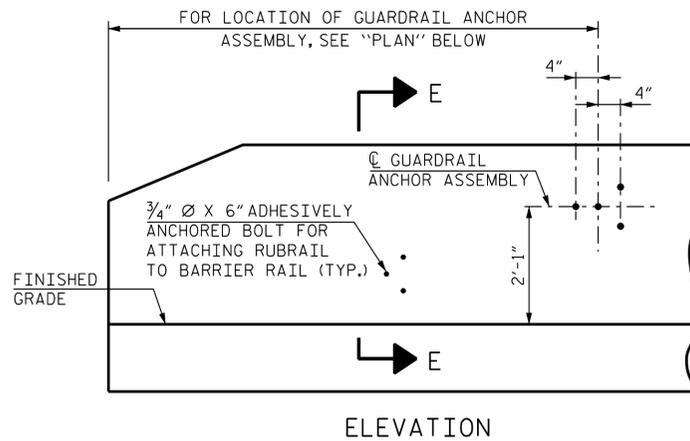
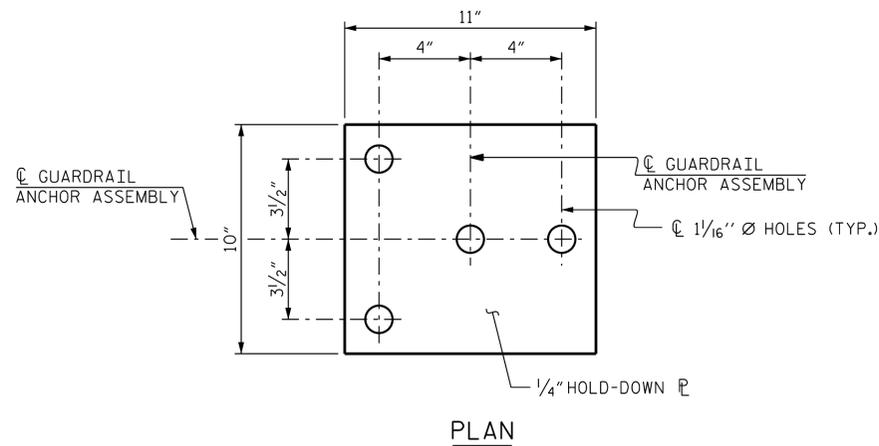
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NO.	BY:	DATE:	NO.	BY:	DATE:
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2			4		

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DESIGN ENGINEER OF RECORD : O. J. PAITEL DATE : JAN 2022



NOTES:

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD-DOWN PLATE AND 4 - 7/8" Ø BOLTS WITH NUTS AND WASHERS, RUBRAIL, AND ADHESIVELY ANCHORED BOLTS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

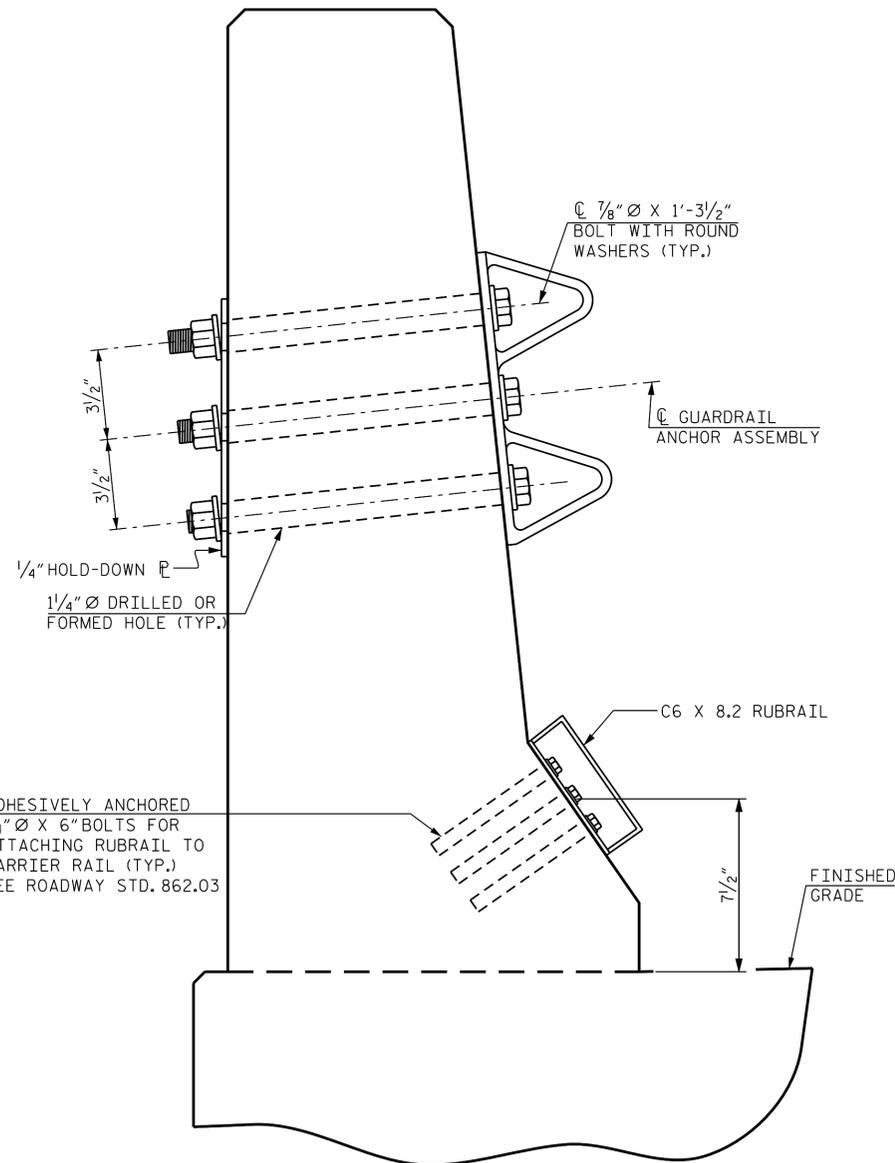
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

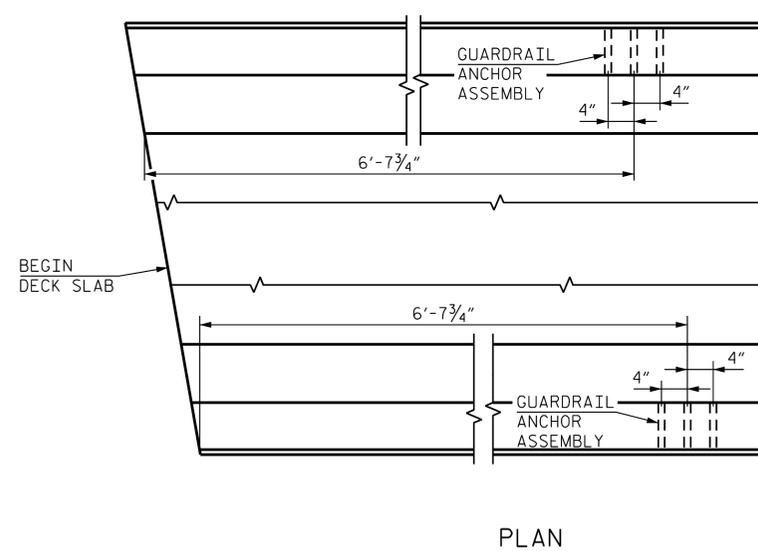
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

THE 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.

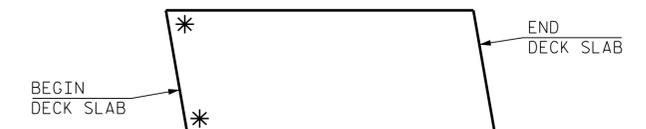


**SECTION E-E
GUARDRAIL ANCHOR ASSEMBLY DETAILS**



LOCATION OF ANCHORS FOR GUARDRAIL

END BENT 1 SHOWN, END BENT 2 SIMILAR.

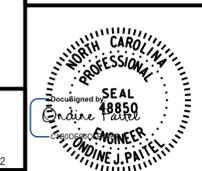


SKETCH SHOWING POINTS OF ATTACHMENTS

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

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GUARDRAIL ANCHORAGE DETAILS

RIGHT LANE

REVISIONS

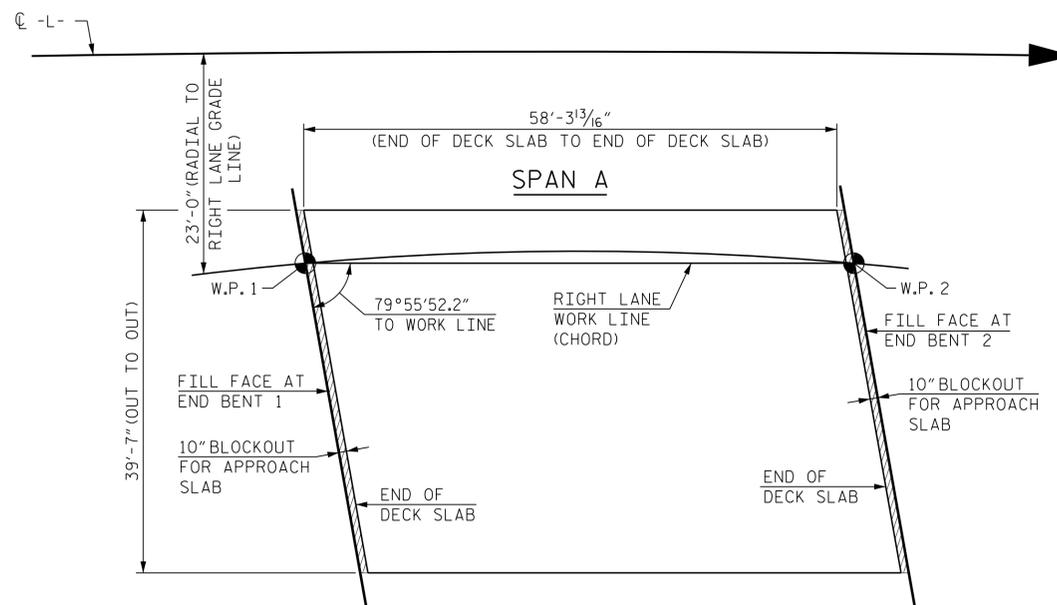
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2			4			TOTAL SHEETS 26



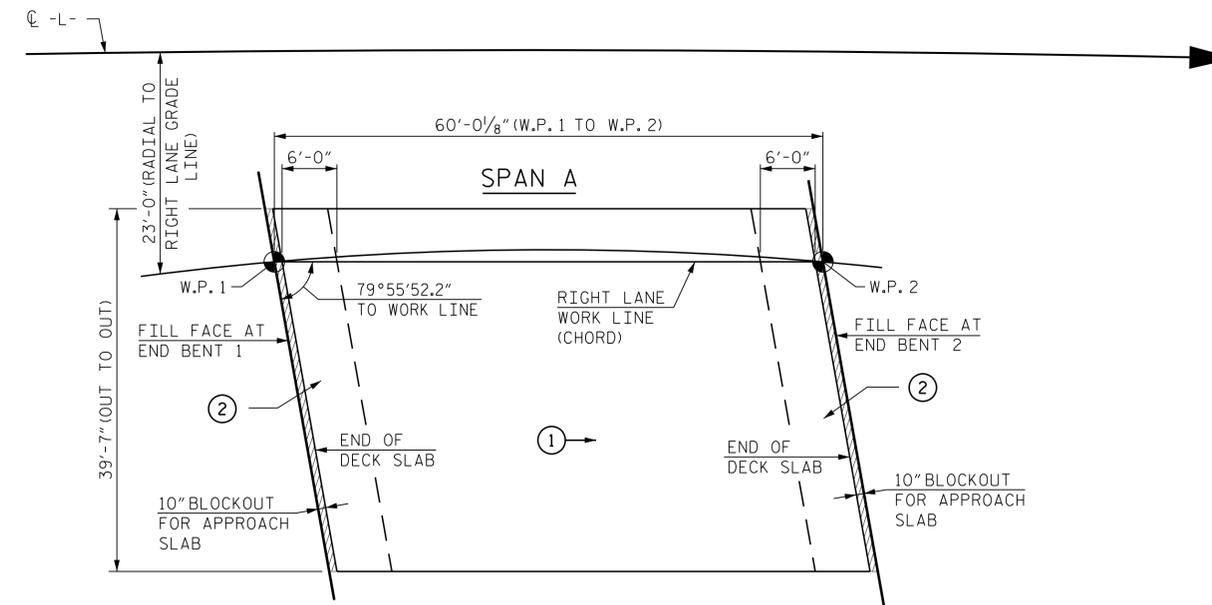
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 DESIGN ENGINEER OF RECORD : O. J. PAITEL DATE : JAN 2022



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 2,308)



POURING SEQUENCE

○ → INDICATES POUR NUMBER AND DIRECTION OF POUR

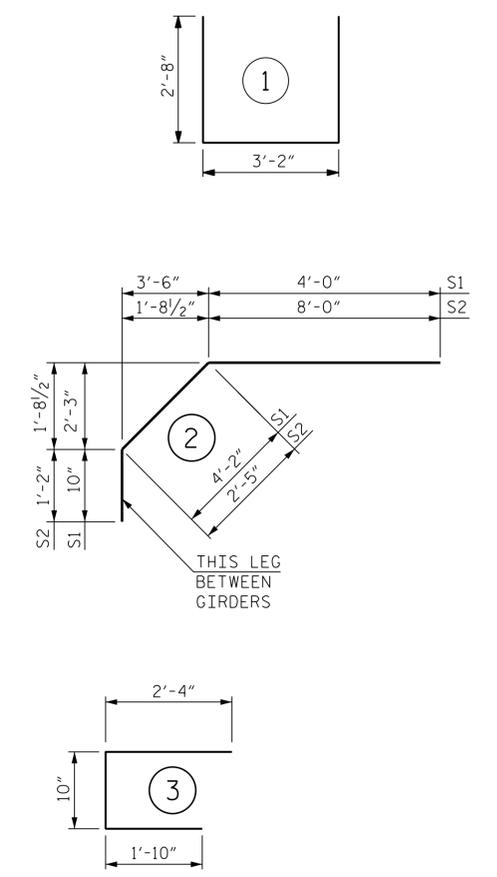
SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPETS, AND BARRIER RAILS		APPROACH SLABS		PARAPETS AND BARRIER RAILS
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	1'-11"	1'-7"	1'-11"	1'-7"	2'-6"
#5	2'-5"	2'-0"	2'-5"	2'-0"	3'-1"
#6	2'-10"	2'-5"	3'-7"	2'-5"	3'-8"
#7	4'-2"	2'-9"			
#8	4'-9"	3'-2"			

REINFORCING BAR SCHEDULE

SPAN A						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
* A1	101	#5	STR	39'-2"	4126	
A2	101	#5	STR	39'-2"	4126	
* A101	2	#5	STR	3'-0"	6	
A201	2	#5	STR	3'-0"	6	
* A102	2	#5	STR	4'-8"	10	
A202	2	#5	STR	4'-8"	10	
* A103	2	#5	STR	7'-6"	16	
A203	2	#5	STR	7'-6"	16	
* A104	2	#5	STR	10'-4"	22	
A204	2	#5	STR	10'-4"	22	
* A105	2	#5	STR	13'-3"	28	
A205	2	#5	STR	13'-3"	28	
* A106	2	#5	STR	16'-1"	34	
A206	2	#5	STR	16'-1"	34	
* A107	2	#5	STR	18'-11"	39	
A207	2	#5	STR	18'-11"	39	
* A108	2	#5	STR	21'-9"	45	
A208	2	#5	STR	21'-9"	45	
* A109	2	#5	STR	24'-8"	51	
A209	2	#5	STR	24'-8"	51	
* A110	2	#5	STR	27'-6"	57	
A210	2	#5	STR	27'-6"	57	
* A111	2	#5	STR	30'-4"	63	
A211	2	#5	STR	30'-4"	63	
* A112	2	#5	STR	33'-3"	69	
A212	2	#5	STR	33'-3"	69	
* A113	2	#5	STR	36'-1"	75	
A213	2	#5	STR	36'-1"	75	
* A114	2	#5	STR	38'-11"	81	
A214	2	#5	STR	38'-11"	81	
* B1	32	#4	STR	38'-6"	823	
B2	50	#5	STR	58'-0"	3025	
* B3	126	#6	STR	12'-0"	2271	
K1	16	#4	STR	20'-3"	216	
K2	8	#4	STR	6'-8"	36	
K3	16	#4	STR	7'-8"	82	
K4	8	#4	STR	7'-2"	38	
K5	8	#4	3	5'-0"	27	
* S1	64	#4	2	9'-0"	385	
* S2	64	#4	2	11'-7"	495	
U1	64	#4	1	8'-6"	363	
REINFORCING STEEL				8,509 LBS.		
* EPOXY COATED REINFORCING STEEL				8,696 LBS.		

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
POUR 1	56.5		
POUR 2	45.0		
TOTALS**	101.5	8,509	8,696

**QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

PROJECT NO. R-2511
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GROOVING BRIDGE FLOORS

APPROACH SLABS	1,623 SQ.FT.
BRIDGE DECK	1,933 SQ.FT.
TOTAL	3,556 SQ.FT.

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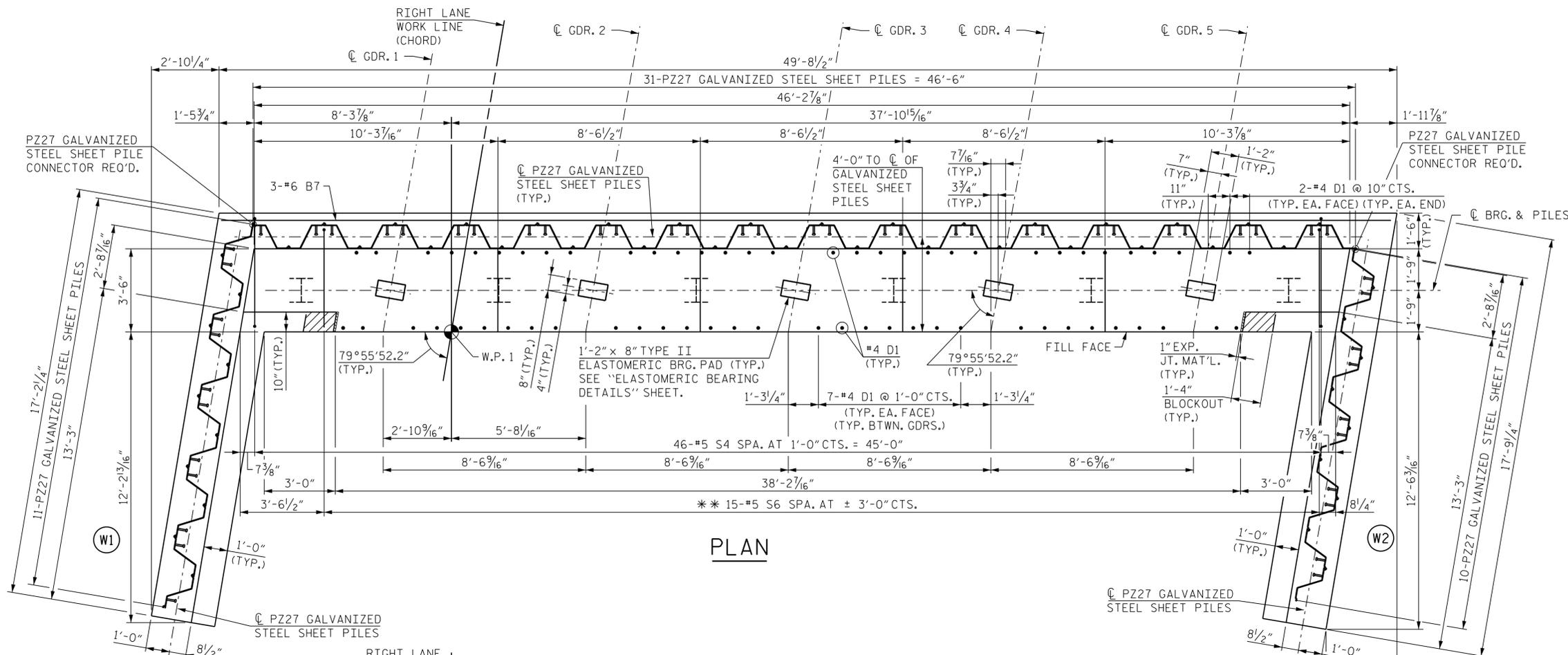
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 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUPERSTRUCTURE
 BILL OF MATERIAL
RIGHT LANE

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 DESIGN ENGINEER OF RECORD : J. J. PAITEL DATE : JAN 2022

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PLAN

NOTES:

FOR SECTION A-A AND SECTION B-B, SEE SHEET 3 OF 3.

FOR PILE SPLICE DETAILS, SEE END BENT 1 SHEET 3 OF 3.

FOR TEMPORARY DRAINAGE, SEE END BENT 2 SHEET 3 OF 3.

STIRRUPS IN THE CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #4 DOWELS.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAILS ARE CAST IF SLIP FORMING IS USED.

THE TOP SURFACE OF THE END BENT CAP AND WINGS, EXCEPT THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4\".

#4 D1 DOWELS MAY BE SHIFTED SLIGHTLY TO AVOID CONFLICTS WITH CAP STEPS.

\"V\" BARS IN WINGWALLS SHALL BE PLACED 2\" CLEAR FROM TOP OF WING.

** #5 S6 SHOULD BE SHIFTED SLIGHTLY TO AVOID CONFLICTS WITH HP 12 x 53 VERTICAL STEEL PILES.

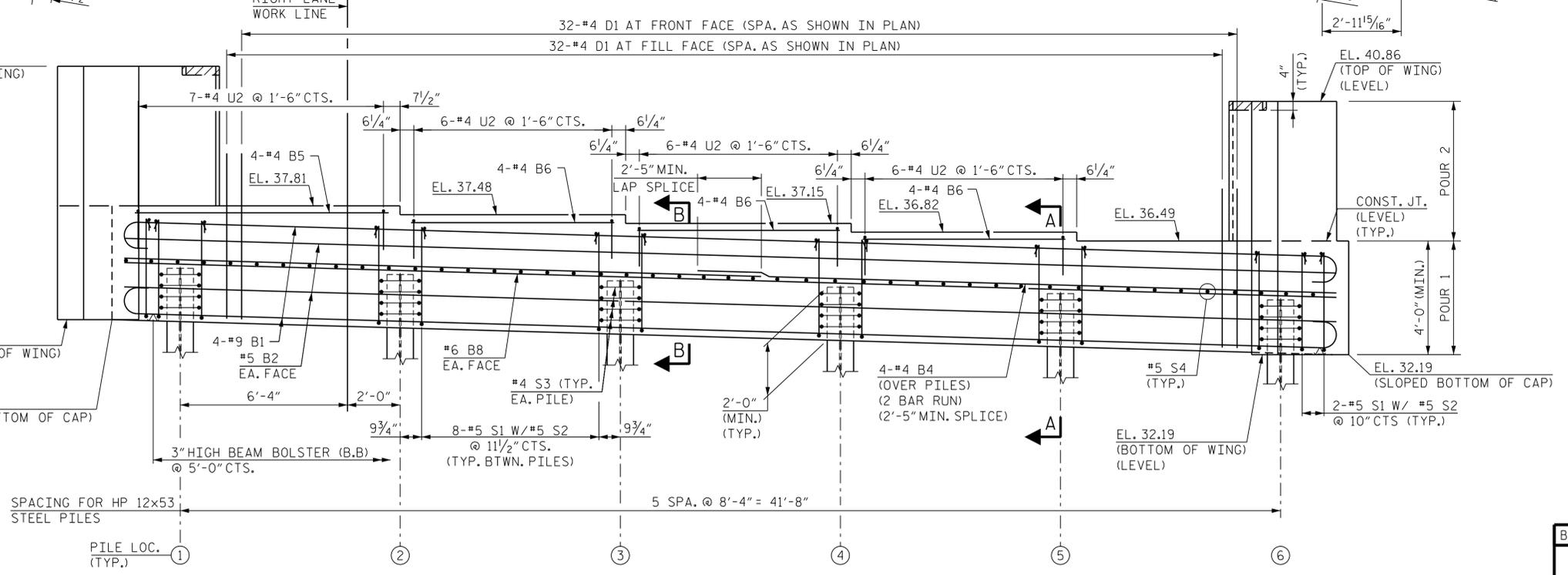
TOP OF PILE ELEVATION TABLE	
NO.	ELEVATION
1	35.45
2	35.21
3	34.97
4	34.74
5	34.50
6	34.26

LEGEND:

HP 12x53 VERTICAL STEEL PILES

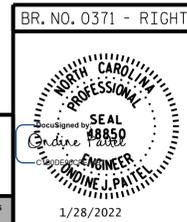
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SHEET 1 OF 3



ELEVATION

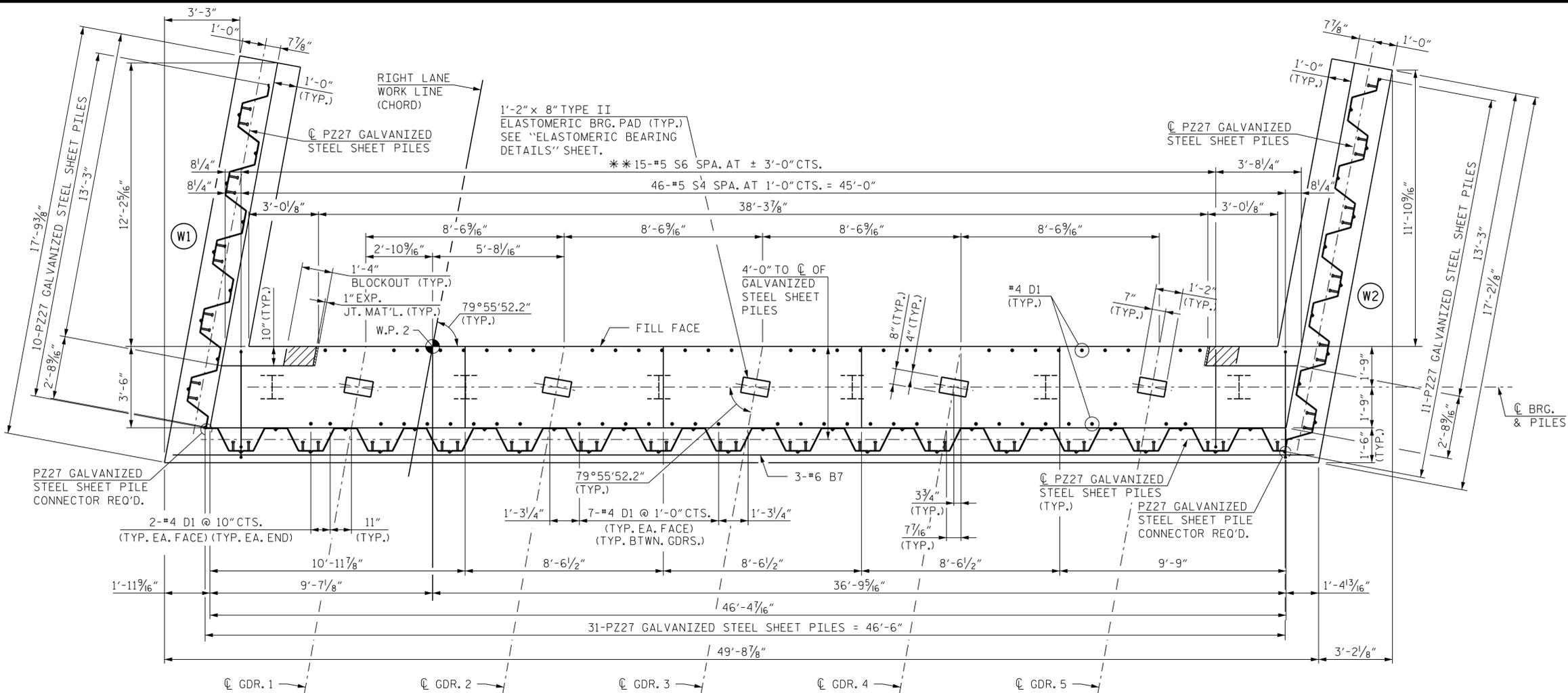
PZ27 GALVANIZED STEEL SHEET PILES AND WINGS NOT SHOWN FOR CLARITY, FOR ADDITIONAL REINFORCING STEEL IN SHEET PILES CAP, SEE SHEETS 2 OF 3 AND 3 OF 3.



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH		SUPERSTRUCTURE			
END BENT 1		PLAN AND ELEVATION			
RIGHT LANE		REVISIONS			
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1			3		
2			4		
SHEET NO. SR-18			TOTAL SHEETS 26		

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PLAN

NOTES:

FOR SECTION A-A AND SECTION B-B, SEE SHEET 3 OF 3.

FOR PILE SPLICE DETAILS, SEE END BENT 1 SHEET 3 OF 3.

FOR TEMPORARY DRAINAGE, SEE END BENT 2 SHEET 3 OF 3.

STIRRUPS IN THE CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #4 DOWELS.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAILS ARE CAST IF SLIP FORMING IS USED.

THE TOP SURFACE OF THE END BENT CAP AND WINGS, EXCEPT THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4\".

#4 D1 DOWELS MAY BE SHIFTED SLIGHTLY TO AVOID CONFLICTS WITH CAP STEPS.

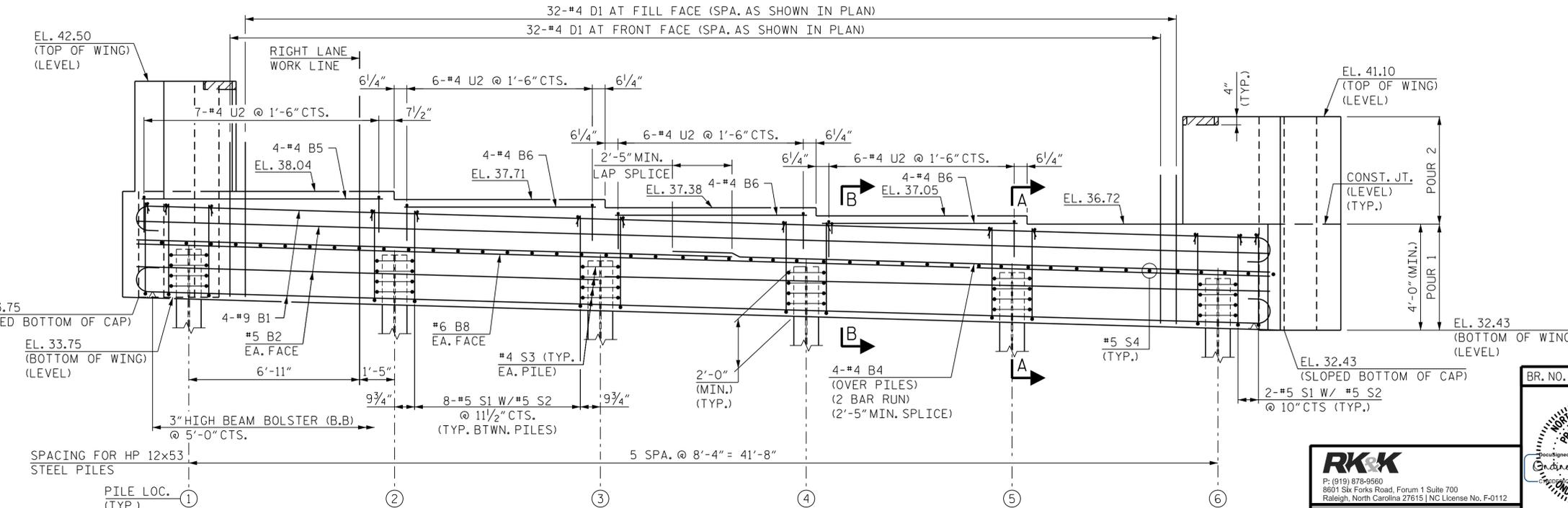
\"V\" BARS IN WINGWALLS SHALL BE PLACED 2\" CLEAR FROM TOP OF WING.

** #5 S6 SHOULD BE SHIFTED SLIGHTLY TO AVOID CONFLICTS WITH HP 12 x 53 VERTICAL STEEL PILES.

TOP OF PILE ELEVATION TABLE	
NO.	ELEVATION
1	35.68
2	35.45
3	35.21
4	34.97
5	34.73
6	34.50

LEGEND:

I HP 12x53 VERTICAL STEEL PILES



ELEVATION

PROJECT NO. R-2511
 BEAUFORT COUNTY
 STATION: 156+55.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE

END BENT 2
 PLAN AND ELEVATION

RIGHT LANE

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 18850
 ENGINEER
 J. PAITEL

1/28/2022

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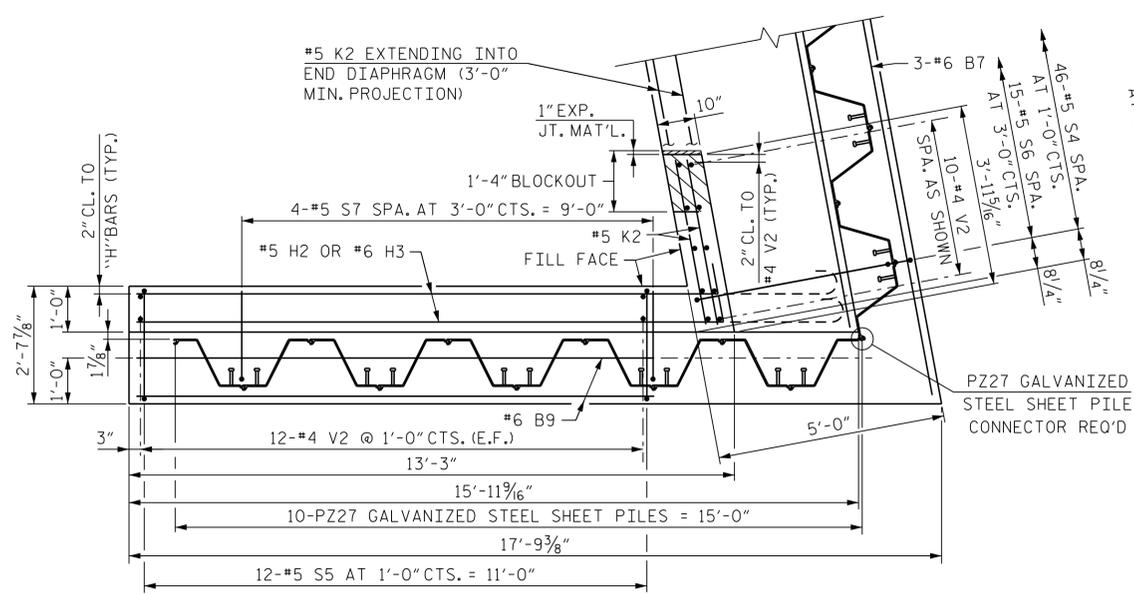
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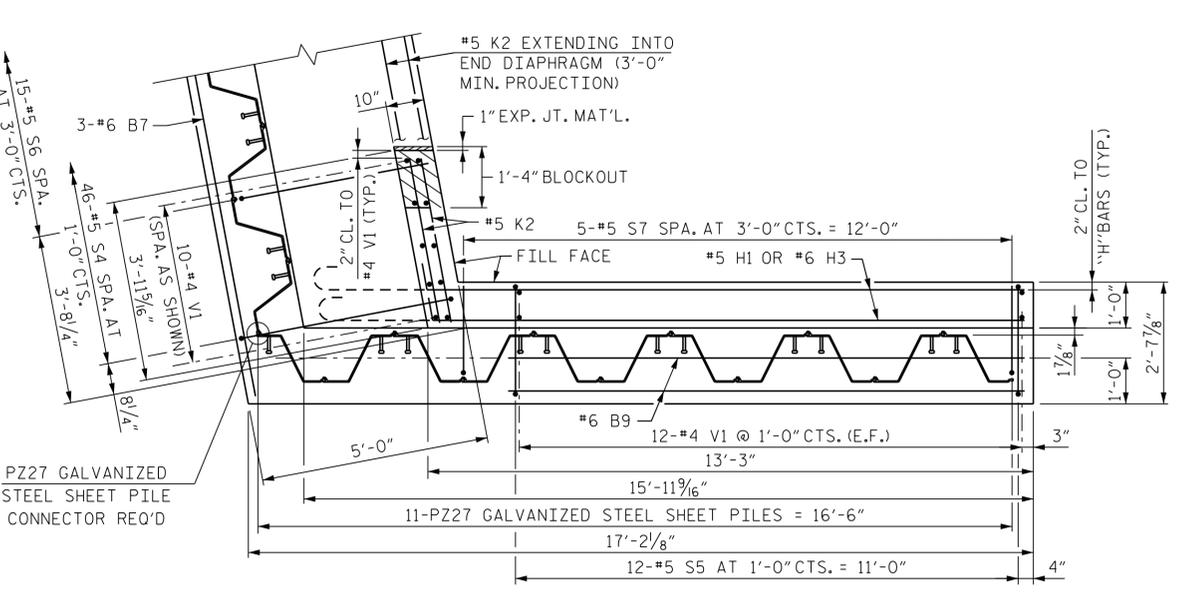
PZ27 GALVANIZED STEEL SHEET PILES AND WINGS NOT SHOWN FOR CLARITY, FOR ADDITIONAL REINFORCING STEEL IN SHEET PILES CAP, SEE SHEETS 2 OF 3 AND 3 OF 3.

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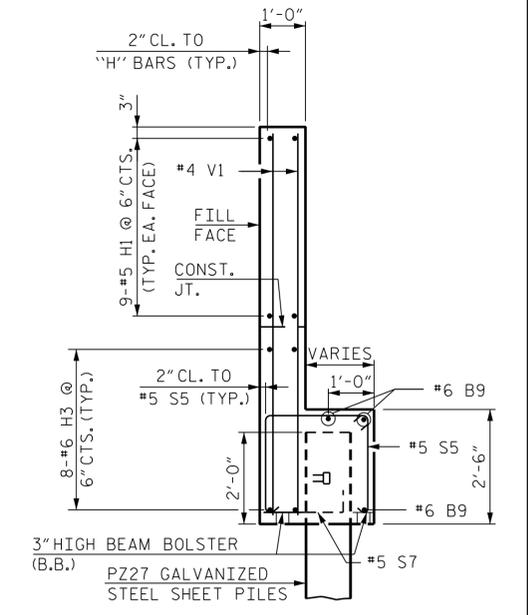
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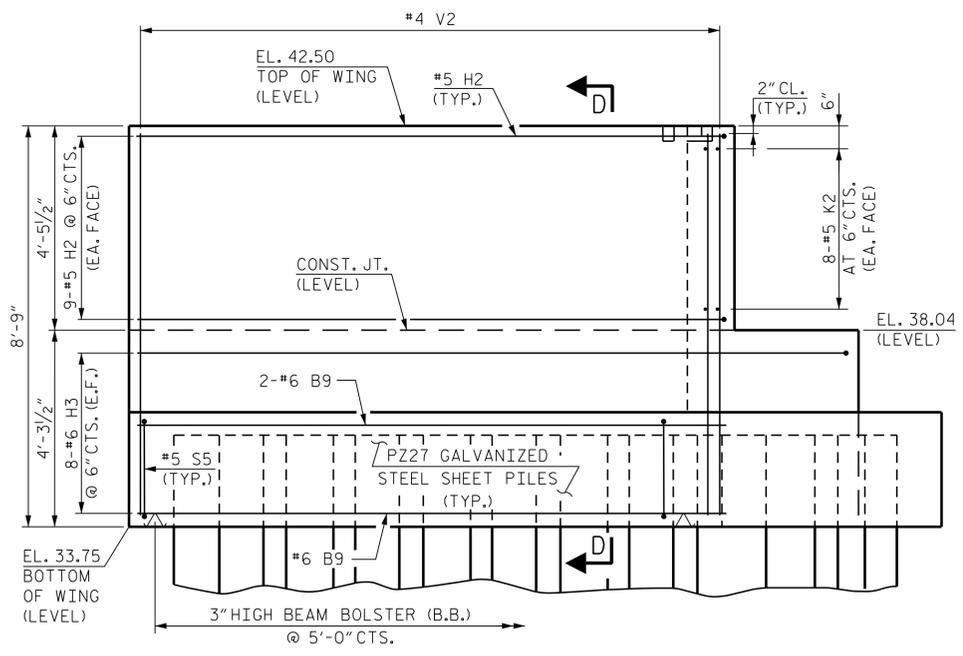
PLAN OF LEFT WINGWALL



PLAN OF RIGHT WINGWALL

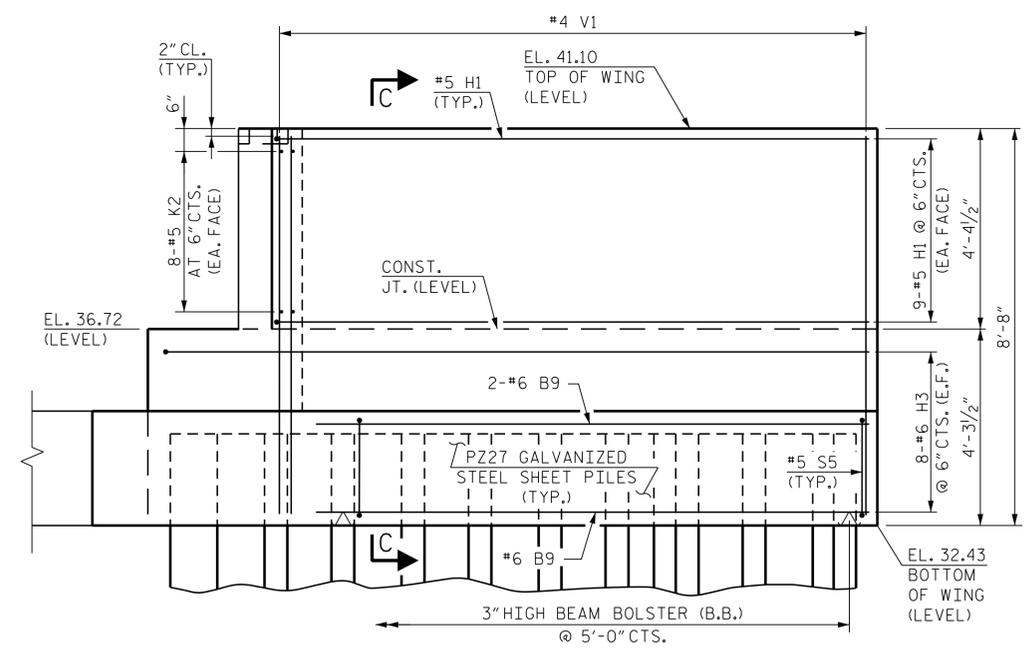


SECTION C-C



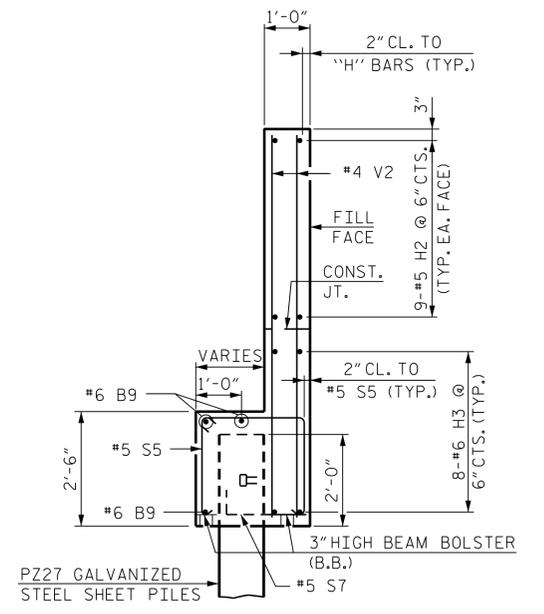
ELEVATION OF LEFT WINGWALL

LEFT WINGWALL DETAILS (W1)



ELEVATION OF RIGHT WINGWALL

RIGHT WINGWALL DETAILS (W2)



SECTION D-D

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SHEET 2 OF 3

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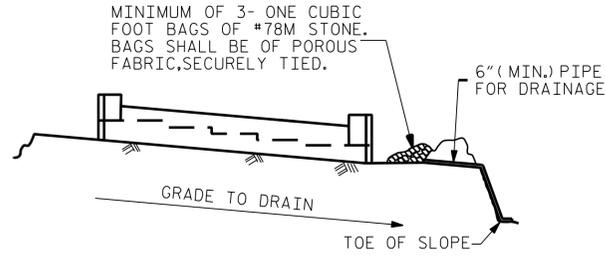
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUBSTRUCTURE
 END BENT 2
 WINGWALL DETAILS
RIGHT LANE

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	SR-22	
1			3			TOTAL SHEETS	
2			4			26	

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1/28/2022 R:\Structures\Bridges\RIGHT\RIGHT\2511_SML\2B_060371R.dgn
 tboyd

DRAWN BY : B. A. HAAG DATE : JAN 2022
 CHECKED BY : M. ZIEHL DATE : JAN 2022
 DESIGN ENGINEER OF RECORD : O. J. PAITEL DATE : JAN 2022

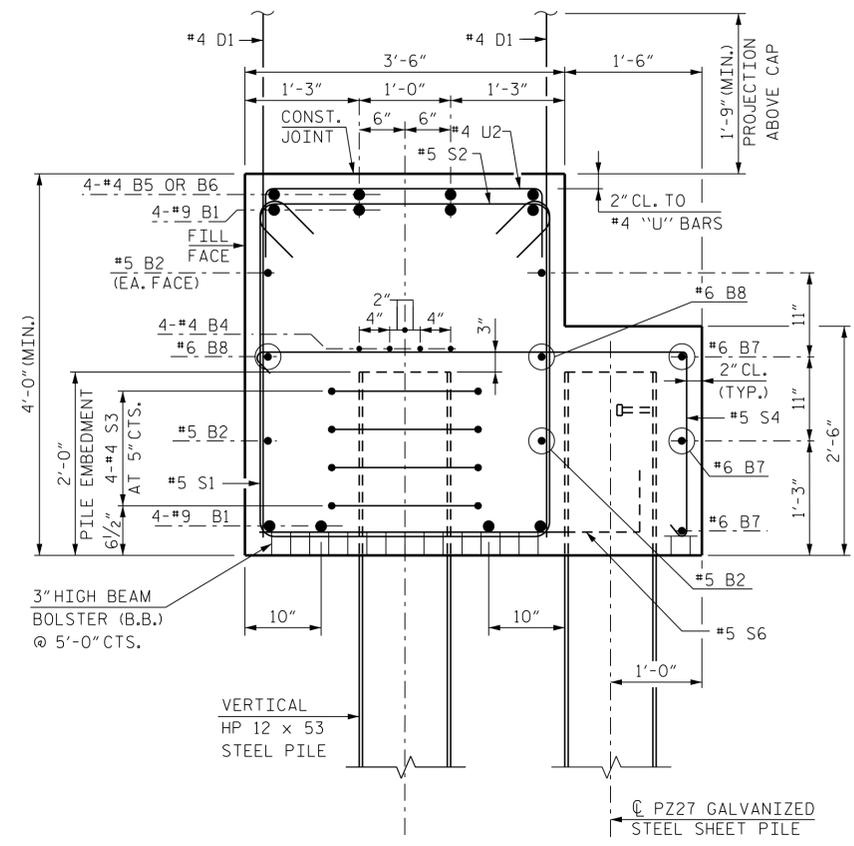


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

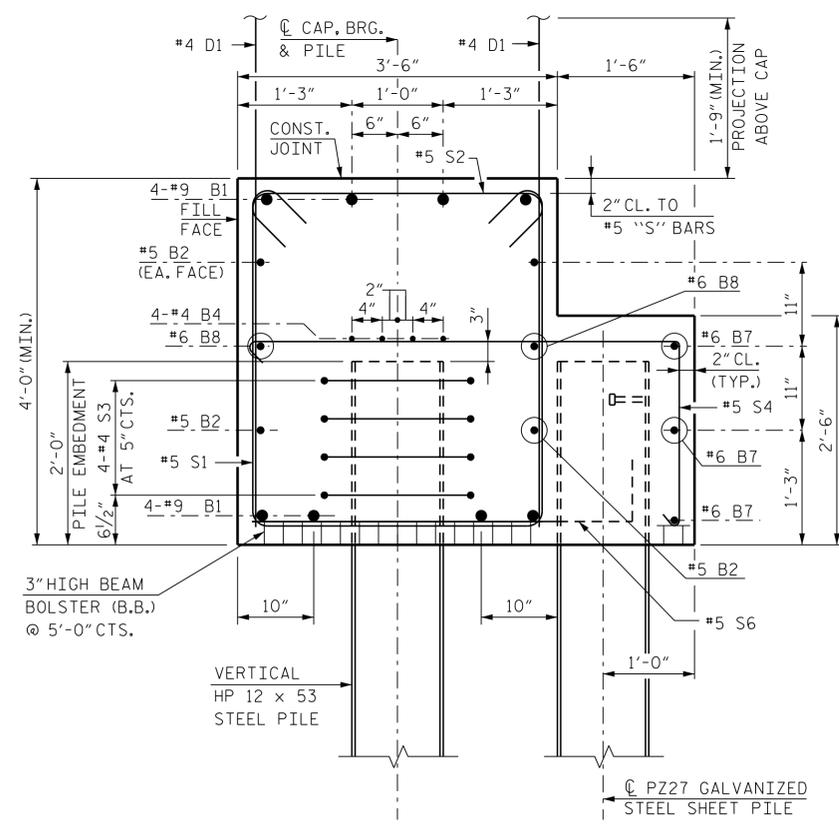
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



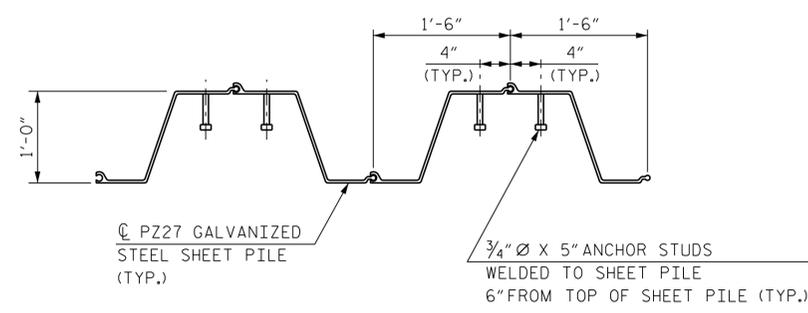
SECTION B-B

(DIMENSIONS SHOWN ARE NORMAL TO THE END BENT)
(SECTION THROUGH CAP STEP)



SECTION A-A

(DIMENSIONS SHOWN ARE NORMAL TO THE END BENT)



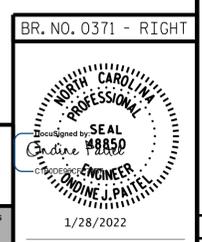
SHEET PILE ANCHOR STUD DETAILS

BAR TYPES		BILL OF MATERIAL				
		END BENT 2				
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	8	#9	1	48'-6"	1,319	
B2	4	#5	STR.	46'-0"	192	
B4	8	#4	STR.	24'-2"	129	
B5	4	#4	STR.	9'-9"	26	
B6	12	#4	STR.	8'-0"	64	
B7	3	#6	STR.	49'-3"	222	
B8	2	#6	STR.	46'-0"	138	
B9	6	#6	STR.	12'-0"	108	
D1	64	#4	STR.	6'-3"	267	
K2	32	#5	STR.	6'-3"	209	
H1	18	#5	7	13'-9"	258	
H2	18	#5	6	13'-7"	255	
H3	32	#6	9	16'-1"	773	
S1	44	#5	3	11'-4"	520	
S2	44	#5	2	4'-1"	187	
S3	24	#4	4	6'-6"	104	
S4	46	#5	8	7'-8"	368	
S5	24	#5	3	7'-4"	184	
S6	15	#5	10	4'-11"	77	
S7	9	#5	10	2'-8"	25	
U2	25	#4	5	6'-2"	103	
V1	32	#4	STR.	8'-4"	178	
V2	32	#4	STR.	8'-5"	180	
REINFORCING STEEL					5,886 LBS.	
CLASS "A" CONCRETE						
POUR 1 (CAP, LOWER WINGS AND COPING)					41.3 C.Y.	
POUR 2 (UPPER WINGS)					5.0 C.Y.	
TOTAL					46.3 C.Y.	
HP 12 x 53 STEEL PILES						
NO.					6	
LIN. FEET					480	
PILE REDRIVES					3 EA.	
PILE DRIVING EQUIPMENT SETUP FOR HP 12 x 53 STEEL PILES					6 EA.	
18" GALVANIZED STEEL SHEET PILES						
NO.					52	
SQ. FEET					3,517	

NOTE: ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. R-2511
BEAUFORT COUNTY
STATION: 156+55.00 -L-

SHEET 3 OF 3



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
END BENT 2
MISCELLANEOUS DETAILS
AND BILL OF MATERIAL
RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	SR-23
1			3			TOTAL SHEETS
2			4			26

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1/28/2022
DRAWN BY : B. A. HAAG
CHECKED BY : M. ZIEHL
DESIGN ENGINEER OF RECORD : J. PAITEL
DATE : JAN 2022
DATE : JAN 2022
DATE : JAN 2022

BILL OF MATERIAL

APPROACH SLAB AT END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	26	#4	STR.	37'-7"	653
A2	26	#4	STR.	37'-7"	653
* B1	75	#5	STR.	24'-2"	1,890
B2	75	#6	STR.	24'-8"	2,779

REINFORCING STEEL 3,432 LBS.

* EPOXY COATED REINFORCING STEEL 2,543 LBS.

CLASS AA CONCRETE 40.9 C. Y.

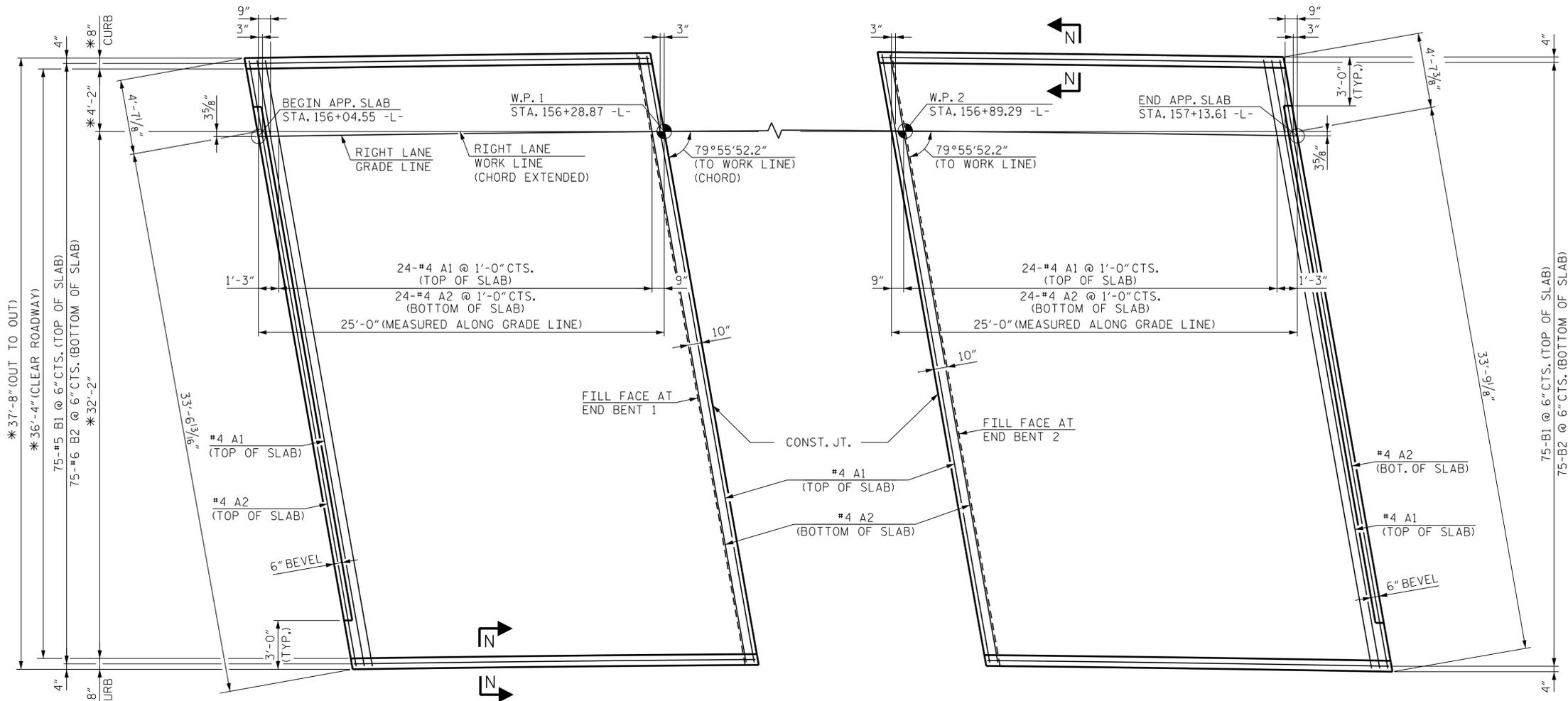
APPROACH SLAB AT END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	26	#4	STR.	37'-11"	659
A2	26	#4	STR.	37'-11"	659
* B1	75	#5	STR.	24'-2"	1,890
B2	75	#6	STR.	24'-8"	2,779

REINFORCING STEEL 3,437 LBS.

* EPOXY COATED REINFORCING STEEL 2,549 LBS.

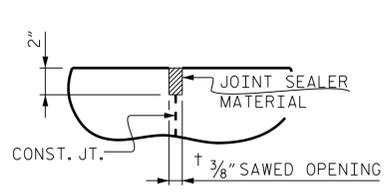
CLASS AA CONCRETE 40.9 C. Y.



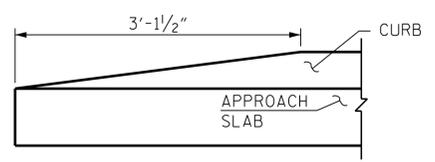
PLAN AT END BENT 1

PLAN AT END BENT 2

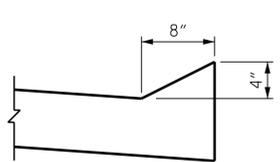
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS
* RADIAL DIMENSIONS



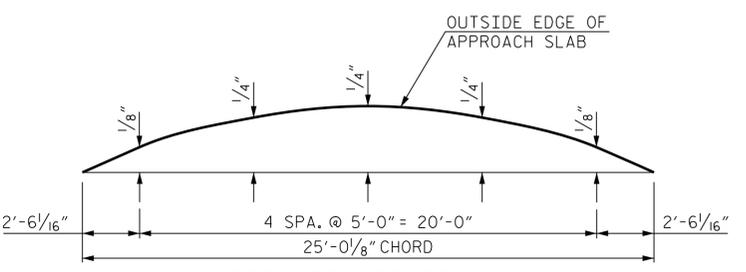
DETAIL "A"



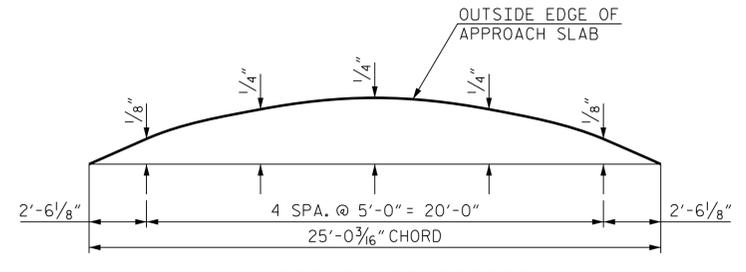
END OF CURB WITHOUT SHOULDER BERM GUTTER



SECTION N-N



LEFT ARC OFFSET
APPROACH SLAB AT END BENT 1 AND 2



RIGHT ARC OFFSET
APPROACH SLAB AT END BENT 1 AND 2

NOTES:

- APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.
- FOR TEMPORARY GEOTEXTILE WALL INCLUDING GEOTEXTILE, 6" Ø DRAINAGE PIPE, WELDED WIRE FORM, AND SELECT MATERIAL, SEE ROADWAY PLANS.
- GEOTEXTILE (TYPE 1 OR TYPE 5) SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.
- SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.
- SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.
- FOR THE 6" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.
- AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.
- THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

SPLICE LENGTHS

BAR SIZE	EPOXY COATED	UNCOATED
#4	1'-11"	1'-7"
#5	2'-5"	2'-0"
#6	3'-7"	2'-5"

PROJECT NO. R-2511
BEAUFORT COUNTY
STATION: 156+55.00 -L-

SHEET 1 OF 2

BR. NO. 0371 - RIGHT



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
MISCELLANEOUS
BRIDGE APPROACH
RIGHT LANE

REVISIONS

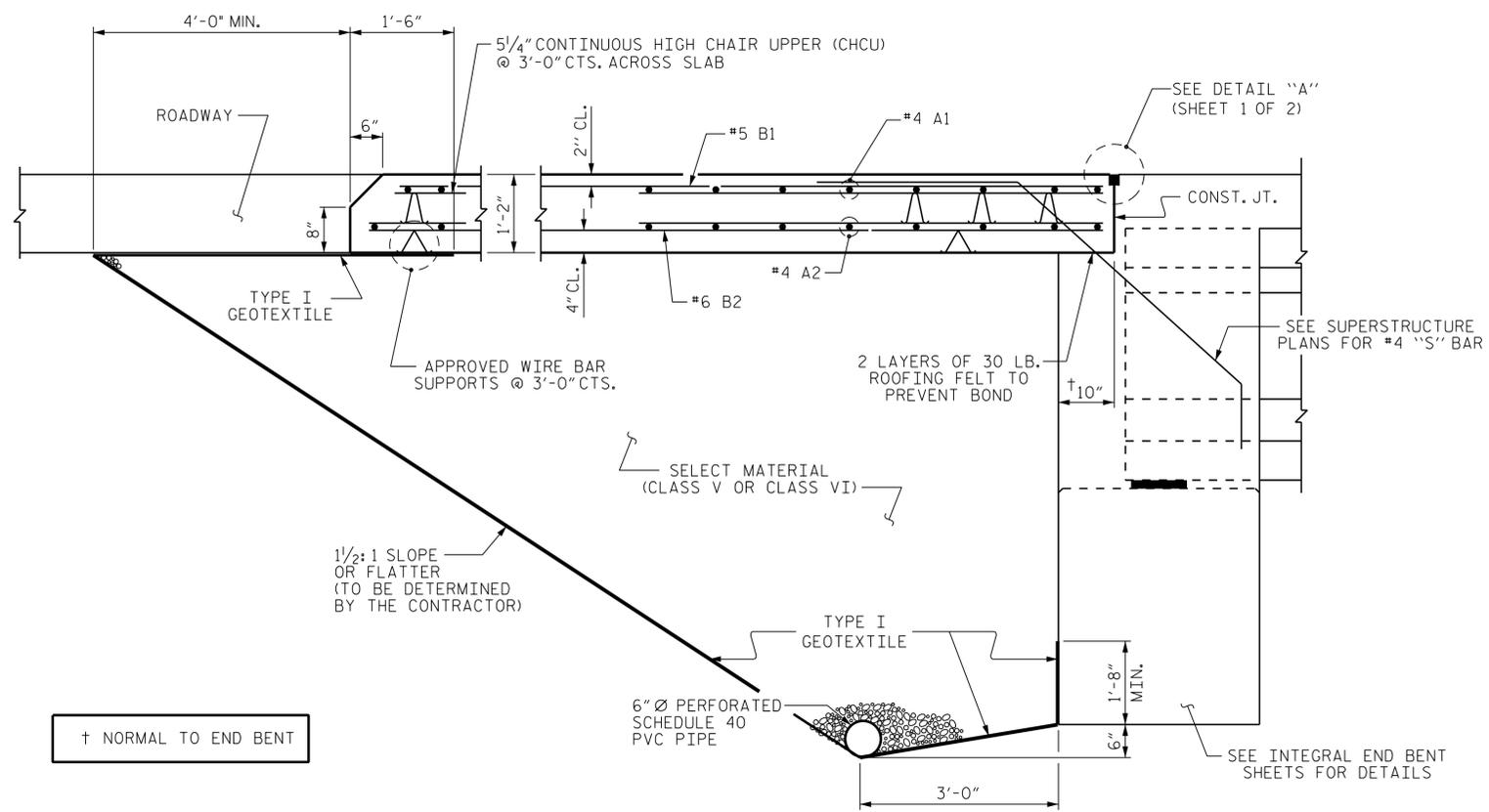
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			SR-24
2			4			TOTAL SHEETS 26



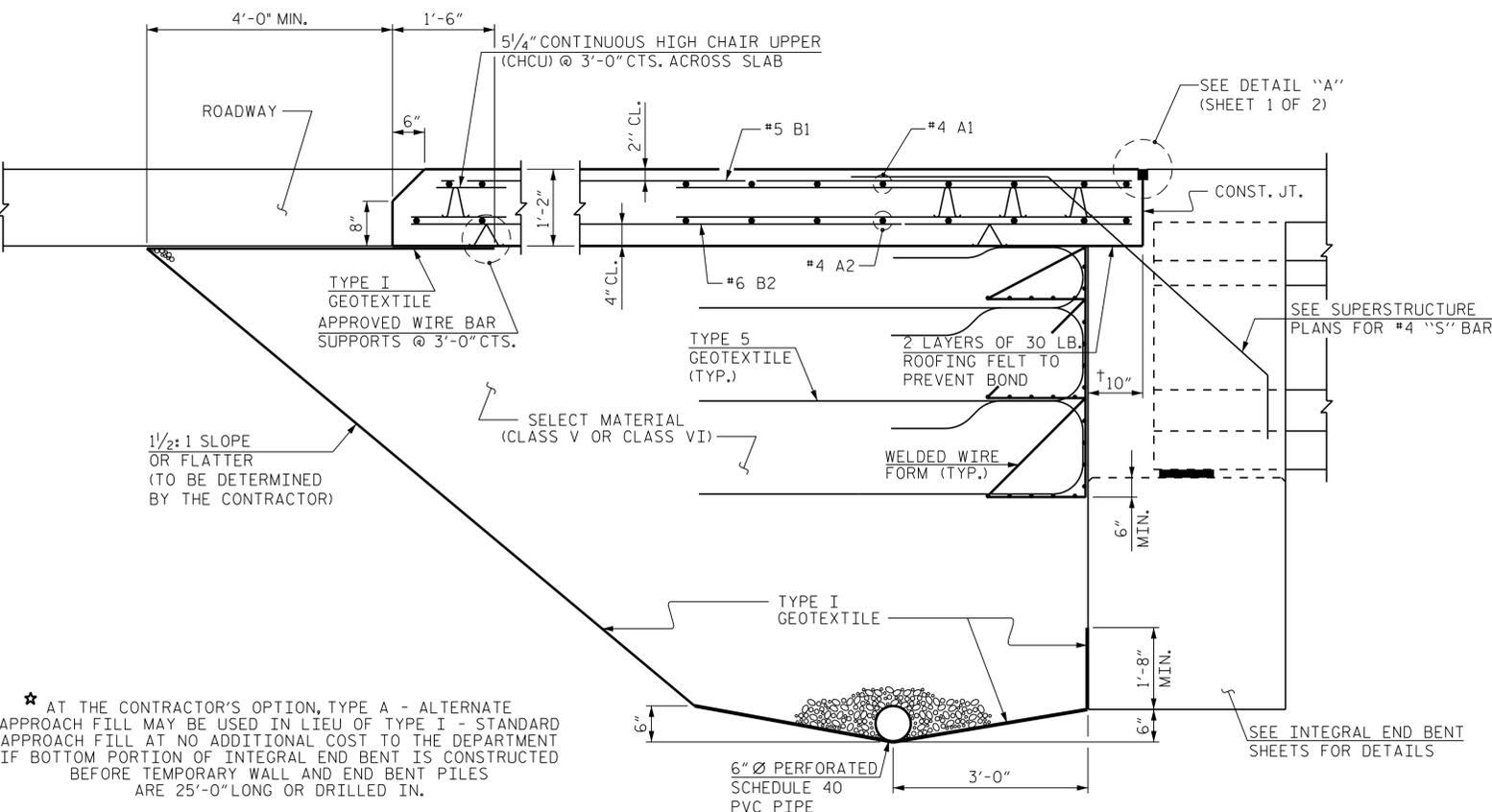
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DRAWN BY : B. A. HAAG DATE : JAN 2022
CHECKED BY : M. ZIEHL DATE : JAN 2022
DESIGN ENGINEER OF RECORD : O. J. PAITEL DATE : JAN 2022



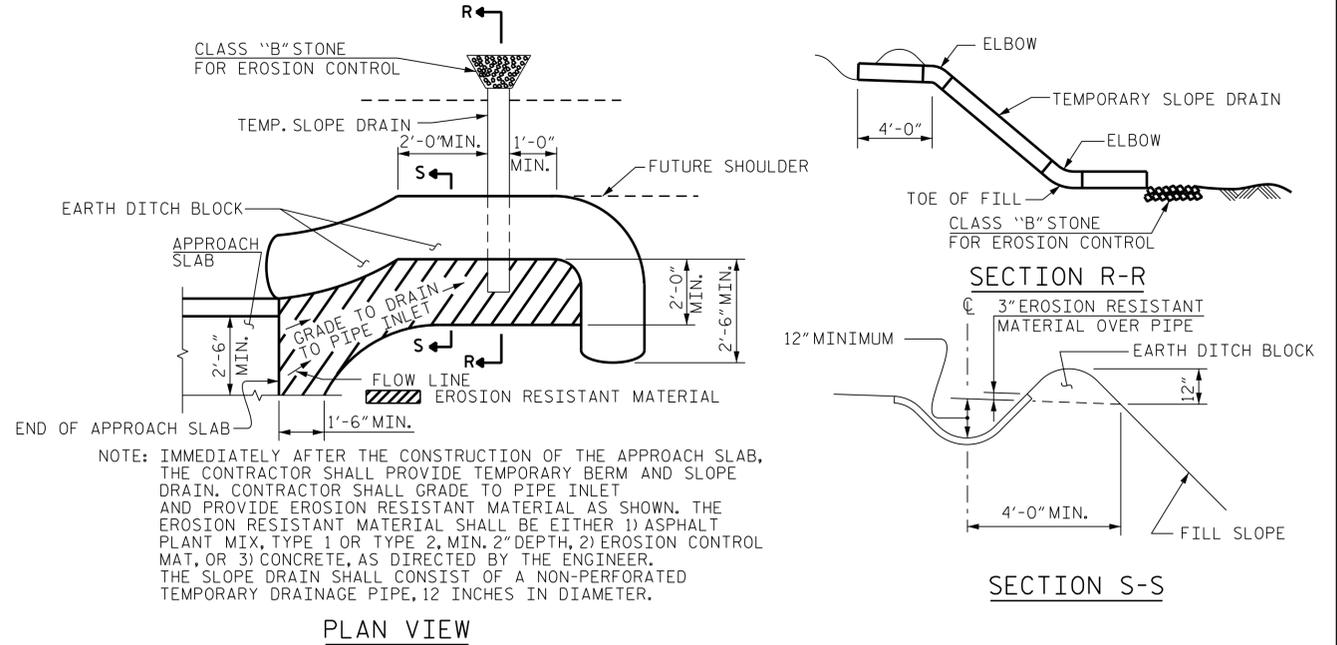
SECTION THRU SLAB
(TYPE I - STANDARD APPROACH FILL)



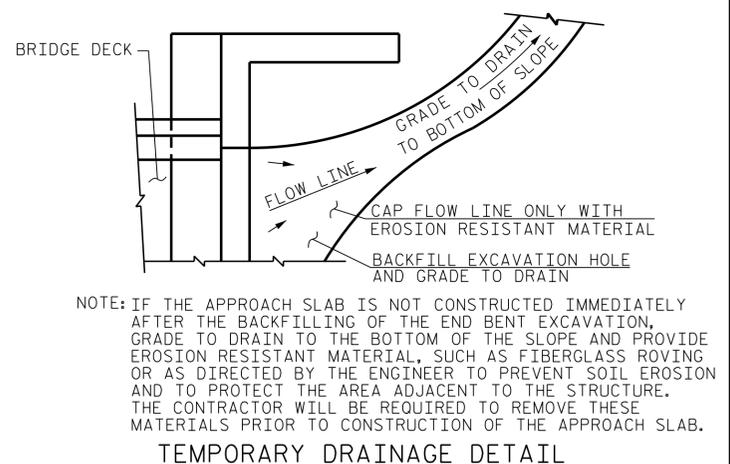
SECTION THRU SLAB
(TYPE A - ALTERNATE APPROACH FILL)

★ AT THE CONTRACTOR'S OPTION, TYPE A - ALTERNATE APPROACH FILL MAY BE USED IN LIEU OF TYPE I - STANDARD APPROACH FILL AT NO ADDITIONAL COST TO THE DEPARTMENT IF BOTTOM PORTION OF INTEGRAL END BENT IS CONSTRUCTED BEFORE TEMPORARY WALL AND END BENT PILES ARE 25'-0" LONG OR DRILLED IN.

DRAWN BY : B. A. HAAG DATE : JAN 2022
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 DESIGN ENGINEER OF RECORD : Q. J. PAITEL DATE : JAN 2022



TEMPORARY BERM AND SLOPE DRAIN DETAILS
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO THE STRUCTURE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE MATERIALS PRIOR TO CONSTRUCTION OF THE APPROACH SLAB.

PROJECT NO. R-2511
 BEAUFORT COUNTY
 STATION: 156+55.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 BRIDGE APPROACH
 SLAB DETAILS
 RIGHT LANE

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2			TOTAL SHEETS 26

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BR. NO. 0371 - RIGHT

SEAL
 Q. J. PAITEL
 PROFESSIONAL ENGINEER
 48850
 1/28/2022

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DESIGN DATA:

DESIGN DATA:

SPECIFICATIONS	-----	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	-----	SEE PLANS
IMPACT ALLOWANCE	-----	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF STRUCTURAL STEEL - AASHTO M270 GRADE 36	--	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	--	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	--	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION - GRADE 60	--	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	-----	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	-----	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR UNTREATED EXTREME FIBER STRESS	---	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	-----	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	-----	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2018 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1 1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 1/4" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A 1/4" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

STANDARD NOTES

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16" INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINISHES AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

PROJECT NO. R-2511
BEAUFORT COUNTY
 STATION: _____

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD					
NOTES					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS

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 Raleigh, North Carolina 27615 | NC License No. F-0112
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SEAL
 Chandine J. Patel
 ENGINEER
 1/28/2022

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DRAWN BY : <u>B. A. HAAG</u>	DATE : <u>JAN 2022</u>
CHECKED BY : <u>M. ZIEHL</u>	DATE : <u>JAN 2022</u>
DESIGN ENGINEER OF RECORD : <u>O. J. PAITEL</u>	DATE : <u>JAN 2022</u>

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09/08/19

TIP PROJECT: R-2511

CONTRACT: C204498

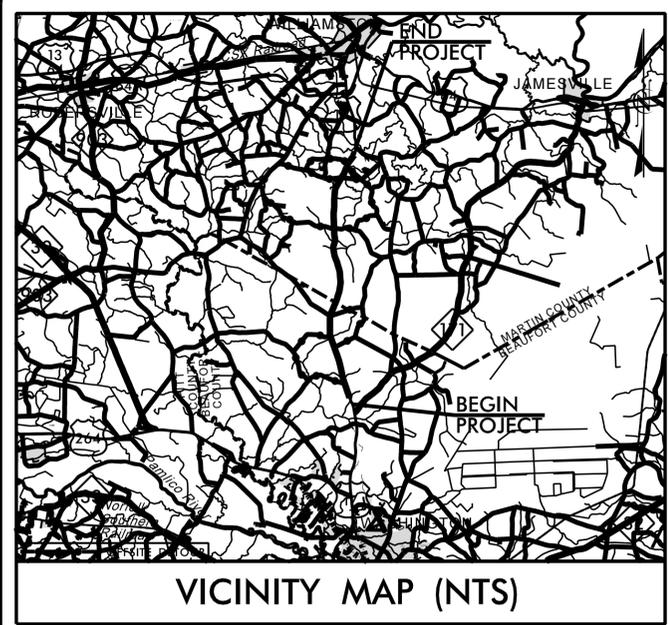
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BEAUFORT & MARTIN COUNTIES

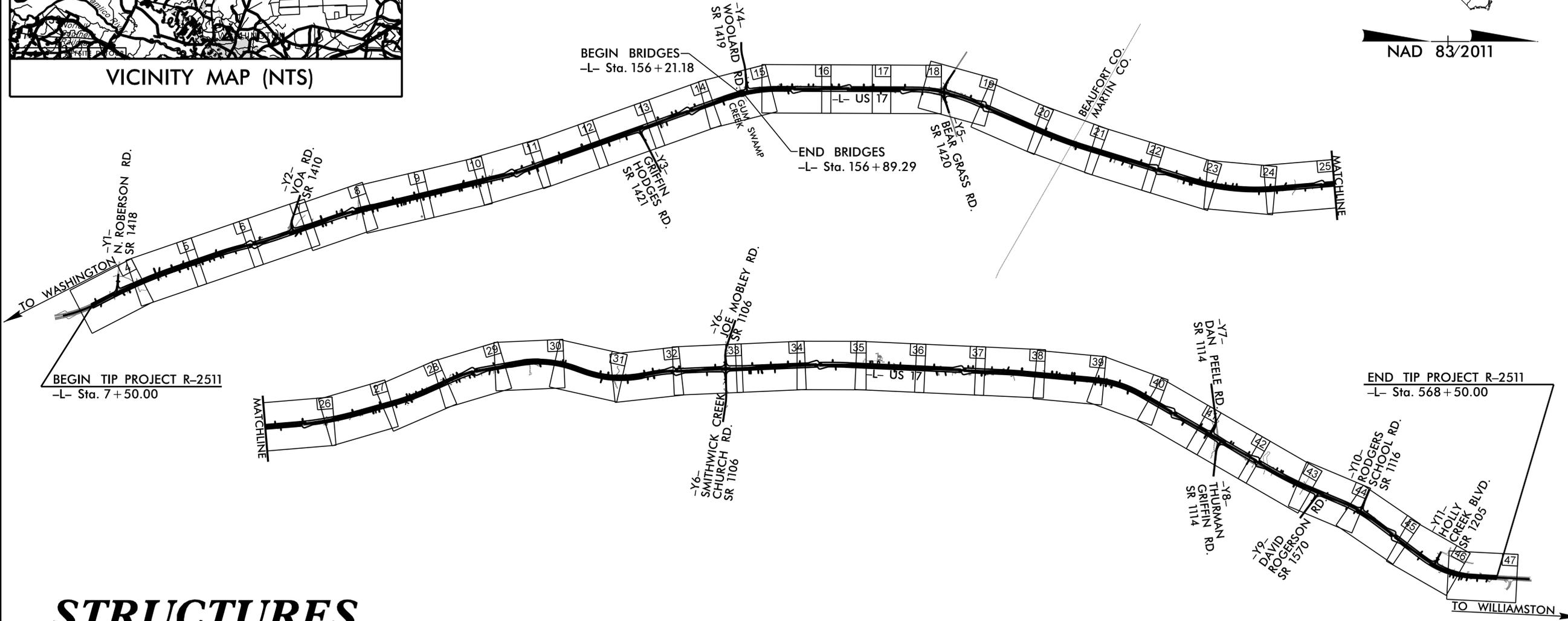
LOCATION: US 17 FROM NORTH OF NC 171 TO EXISTING MULTI-LANES SOUTH OF WILLIAMSTON

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

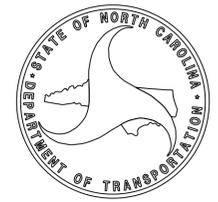
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2511		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
35494.1.1	N/A	PE	
35494.2.1		R/W	
35494.3.1		CONST.	



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DESIGN DATA

ADT 2020 =	9,164
ADT 2040 =	14,284
K =	5%
D =	60%
T =	13% *
V =	60 MPH
* TTST = 8% DUAL 5%	
FUNC CLASS = RURAL ARTERIAL	

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2511.....	10.612 miles
LENGTH STRUCTURE TIP PROJECT R-2511.....	0.013 miles
TOTAL LENGTH OF TIP PROJECT R-2511.....	10.625 miles

PLANS PREPARED BY:

RK&K
RUMMEL, KLEPPER & KAHL, LLP
8601 SIX FORKS ROAD, FORUM 1, SUITE 700
RALEIGH, NORTH CAROLINA 27615-3960
1-888-521-4455 OR 919-878-9560

FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
2018 STANDARD SPECIFICATIONS

MICHAEL T. MERRITT, P.E.
PROJECT ENGINEER

ONDINE J. PAITEL, P.E.
PROJECT STRUCTURES ENGINEER

LETTING DATE:
April 19, 2022

NCDOT CONTACT: **JOHN ABEL, JR.**
PROJECT ENGINEER - DIVISION 1

PLANS PREPARED BY:

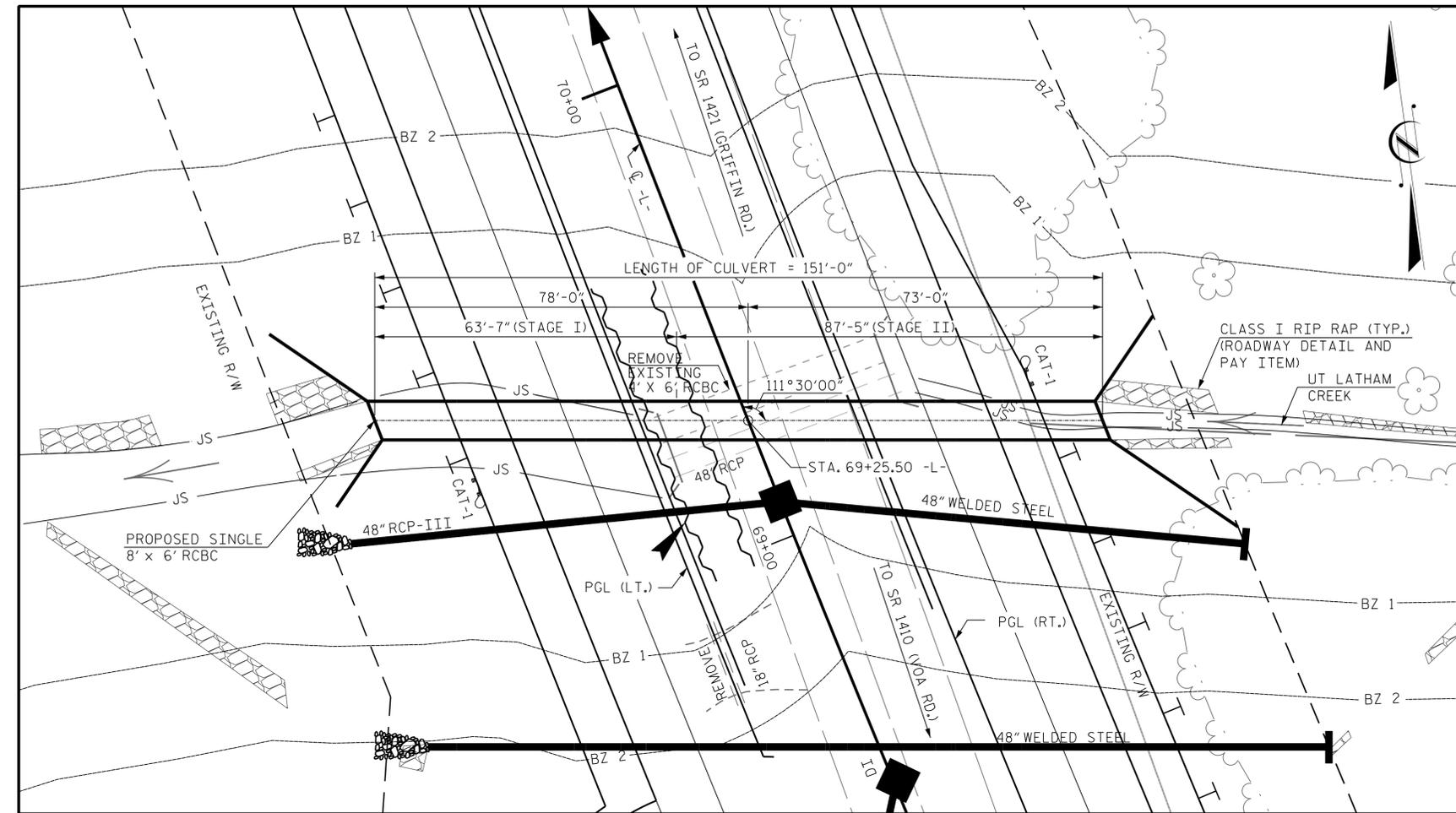
RK&K
RUMMEL, KLEPPER & KAHL, LLP
8601 SIX FORKS ROAD, FORUM 1 SUITE 700
RALEIGH, NC 27615 (919) 878-9560
NC LICENSE NUMBER: F-0112



1/27/2022

1/27/2022
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BENCH MARK: BM #2 -L- STA. 62+82.70, 109.4' RT, RR SPIKE SET IN 20" PINE, N 698481, E 2573081.5; EL. 42.25, NAVD 88



LOCATION SKETCH

STAGE I STRUCTURE QUANTITIES			
CLASS A CONCRETE			
BARREL @ 0.88	CY/FT	55.7	C.Y.
WING ETC.		11.9	C.Y.
SILL		0.3	C.Y.
TOTAL		67.9	C.Y.
REINFORCING STEEL			
BARREL		8,354	LBS.
WINGS ETC.		711	LBS.
TOTAL		9,065	LBS.
CULVERT EXCAVATION	-----	LUMP SUM	
REMOVAL OF EXISTING STRUCTURE	-----	LUMP SUM	
FOUNDATION CONDITIONING MATERIAL	----	60 TONS	

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS
 GRADE POINT ELEVATIONS AT STA. 69+25.50 -L- ARE 42.94 (L.T.) AND 42.93 (RT.)
 BED ELEVATION AT STA. 69+25.50 -L- = 32.87
 ROADWAY SLOPES = 3:1

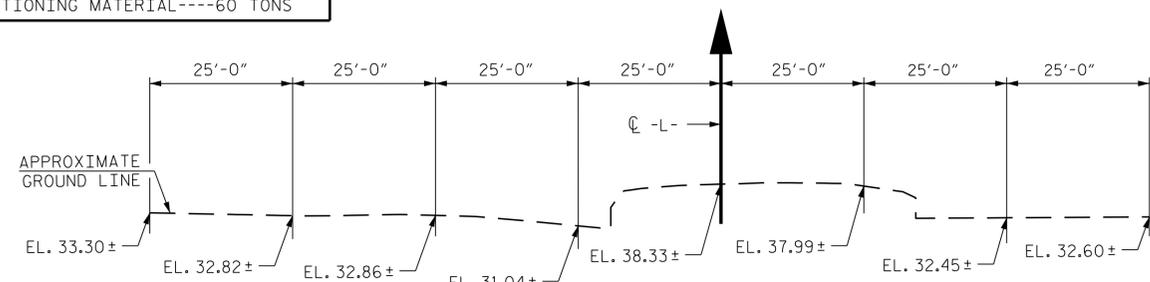
HYDRAULIC DATA

DESIGN DISCHARGE-----260 C.F.S.
 FREQUENCY OF DESIGN FLOOD-----50 YR.
 DESIGN HIGH WATER ELEVATION-----37.7
 DRAINAGE AREA-----0.7 SQ. MI.
 BASE DISCHARGE (Q100)-----320 C.F.S.
 BASE HIGH WATER ELEVATION-----38.1

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE-----733 C.F.S.
 FREQUENCY OF OVERTOPPING FLOOD-----500 YR. +
 OVERTOPPING FLOOD ELEVATION-----42.9

STAGE II STRUCTURE QUANTITIES			
CLASS A CONCRETE			
BARREL @ 0.88	CY/FT	76.6	C.Y.
WING ETC.		11.9	C.Y.
SILL		0.3	C.Y.
TOTAL		88.8	C.Y.
REINFORCING STEEL			
BARREL		11,317	LBS.
WINGS ETC.		711	LBS.
TOTAL		12,028	LBS.
CULVERT EXCAVATION	-----	LUMP SUM	
FOUNDATION CONDITIONING MATERIAL	----	82 TONS	



PROFILE ALONG CULVERT

DRAWN BY : B. H. GONFA DATE : JAN 2022
 CHECKED BY : M. ZIEHL DATE : JAN 2022
 DESIGN ENGINEER OF RECORD : R. V. KEITH DATE : JAN 2022

NOTES:

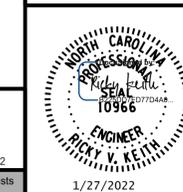
- ASSUMED LIVE LOAD ----- HL-93 OR ALTERNATE LOADING.
- DESIGN FILL----- 5.0 FT. (MAX.), 2.5 FT. (MIN.)
- 3"Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
- FOR OTHER DESIGN DATA AND NOTES, SEE STANDARD NOTE SHEET.
- CONCRETE IN STAGE I CULVERT TO BE POURED IN THE FOLLOWING ORDER:
 1. STAGE I WING FOOTINGS, CURTAIN WALL, AND FLOOR SLAB INCLUDING 4" OF STAGE I VERTICAL WALLS.
 2. THE REMAINING PORTIONS OF STAGE I WALLS AND STAGE I WINGS FOR FULL HEIGHT.
 3. STAGE I ROOF SLAB, HEADWALL, AND SILL.
- CONCRETE IN STAGE II CULVERT TO BE POURED IN THE FOLLOWING ORDER:
 1. STAGE II WING FOOTINGS, CURTAIN WALL, AND FLOOR SLAB INCLUDING 4" OF STAGE II VERTICAL WALLS.
 2. THE REMAINING PORTION OF STAGE II WALLS TO THE PERMITTED CONSTRUCTION JOINT AND STAGE II WINGS FOR FULL HEIGHT.
 3. STAGE II ROOF SLAB, HEADWALL, AND SILL.
- THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN IT WILL PROPERLY TAKE CARE OF THE FILL.
- DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.
- AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF THE EXTERIOR WALL ABOVE THE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.
- A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WINGS COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- THE EXISTING STRUCTURE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COSTS INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING STRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

- NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.
- FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.
- EXCAVATE A MINIMUM OF 1 FOOT BELOW CULVERT BEARING ELEVATION AND REPLACE WITH FOUNDATION CONDITIONING MATERIAL (SELECT MATERIAL CLASS VI).
- GEOTEXTILE FOR SOIL STABILIZATION IS REQUIRED BELOW THE FOUNDATION CONDITIONING MATERIAL. UNDERCUT ANY SOFT/LOOSE ALLUVIAL SOILS THAT MAY BE ENCOUNTERED BENEATH THE BOTTOM OF THE FOUNDATION CONDITIONING MATERIAL. BACKFILL UNDERCUT AREA WITH FOUNDATION CONDITIONING MATERIAL.
- TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FEET. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
- THE EXISTING STRUCTURE CONSISTING OF SINGLE BARREL 4 FT X 6 FT RCBC WITH CONCRETE ENDWALLS LOCATED AT THE PROPOSED CULVERT SITE SHALL BE REMOVED.

PROJECT NO. R-2511
BEAUFORT COUNTY
 STATION: 69+25.50 -L-

SHEET 1 OF 7

CULVERT NO. 047



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SINGLE 8 FT. X 6 FT.
 CONCRETE BOX CULVERT
 111° 30' 00" SKEW**



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1/27/2022

REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

TOTAL SHEETS: 7

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

**LOAD AND RESISTANCE FACTOR RATING (LRFR)
SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS**

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE								COMMENT NUMBER		
						LIVE-LOAD FACTORS (γ _{LL})	MOMENT				SHEAR					
							RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE		DISTANCE FROM LEFT END OF ELEMENT (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	1	1.04	--	1.75	1.04	1	BOTTOM SLAB	4.0	1.49	1	BOTTOM SLAB	0.1		
	HL-93 (OPERATING)	N/A		1.35	--	1.35	1.35	1	BOTTOM SLAB	4.0	1.93	1	BOTTOM SLAB	0.1		
	HS-20 (INVENTORY)	36,000	2	1.22	43.92	1.75	1.22	1	TOP SLAB	4.0	1.80	1	TOP SLAB	0.1		
	HS-20 (OPERATING)	36,000		1.59	57.24	1.35	1.59	1	TOP SLAB	4.0	2.34	1	TOP SLAB	0.1		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH		2.67	36.05	1.40	2.67	1	TOP SLAB	4.0	3.94	1	TOP SLAB	0.1		
		SNGARBS2	20,000		2.50	50.00	1.40	2.50	1	TOP SLAB	4.0	3.69	1	TOP SLAB	0.1	
		SNAGRIS2	22,000		2.67	58.74	1.40	2.67	1	TOP SLAB	4.0	3.94	1	TOP SLAB	0.1	
		SNCOTTS3	27,250	3	1.70	46.33	1.40	1.70	1	BOTTOM SLAB	4.0	2.43	1	BOTTOM SLAB	0.1	
		SNAGGRS4	34,925		2.01	70.20	1.40	2.01	1	BOTTOM SLAB	4.0	2.81	1	BOTTOM SLAB	0.1	
		SNS5A	35,550		1.93	68.61	1.40	1.93	1	BOTTOM SLAB	4.0	2.72	1	BOTTOM SLAB	0.1	
		SNS6A	39,950		1.93	77.10	1.40	1.93	1	BOTTOM SLAB	4.0	2.71	1	BOTTOM SLAB	0.1	
		SNS7B	42,000		1.93	81.06	1.40	1.93	1	BOTTOM SLAB	4.0	2.71	1	BOTTOM SLAB	0.1	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33,000		2.67	88.11	1.40	2.67	1	TOP SLAB	4.0	3.95	1	TOP SLAB	0.1	
		TNT4A	33,075		2.03	67.14	1.40	2.03	1	BOTTOM SLAB	4.0	2.90	1	BOTTOM SLAB	0.1	
		TNT6A	41,600		1.93	80.29	1.40	1.93	1	BOTTOM SLAB	4.0	2.72	1	BOTTOM SLAB	0.1	
		TNT7A	42,000		1.99	83.58	1.40	1.99	1	BOTTOM SLAB	4.0	2.81	1	BOTTOM SLAB	0.1	
		TNT7B	42,000		1.93	81.06	1.40	1.93	1	BOTTOM SLAB	4.0	2.72	1	BOTTOM SLAB	0.1	
		TNAGRIT4	43,000		2.03	87.29	1.40	2.03	1	BOTTOM SLAB	4.0	2.90	1	BOTTOM SLAB	0.1	
TNAGT5A	45,000		2.03	91.35	1.40	2.03	1	BOTTOM SLAB	4.0	2.90	1	BOTTOM SLAB	0.1			
TNAGT5B	45,000		2.03	91.35	1.40	2.03	1	BOTTOM SLAB	4.0	2.90	1	BOTTOM SLAB	0.1			

LOAD FACTORS:

DESIGN LOAD RATING FACTORS

LOAD TYPE	MAX FACTOR	MIN FACTOR
DC	1.25	0.90
DW	1.50	0.65
EV	1.30	0.90
EH	1.35	0.90
ES	1.35	0.90
LS	1.75	--
WA	1.00	--

NOTE:

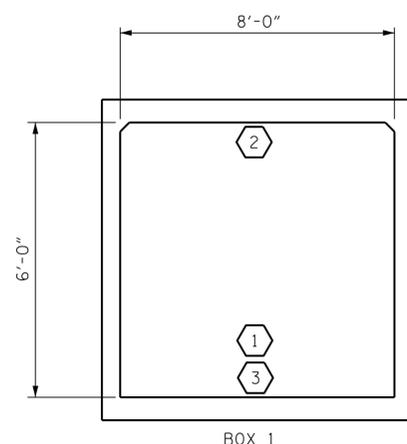
RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

1. CULVERT RATING AT STA. 69+25.50 -L-

- 2.
- 3.
- 4.

#	CONTROLLING LOAD RATING
1	DESIGN LOAD RATING (HL-93)
2	DESIGN LOAD RATING (HS-20)
3	LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	



LRFR SUMMARY
(LOOKING DOWNSTREAM)

PROJECT NO. R-2511
BEAUFORT COUNTY
 STATION: 69+25.50 -L-

SHEET 2 OF 7

CULVERT NO. 047

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
STANDARD
 LRFR SUMMARY FOR
 REINFORCED CONCRETE
 BOX CULVERTS
 (NON-INTERSTATE TRAFFIC)

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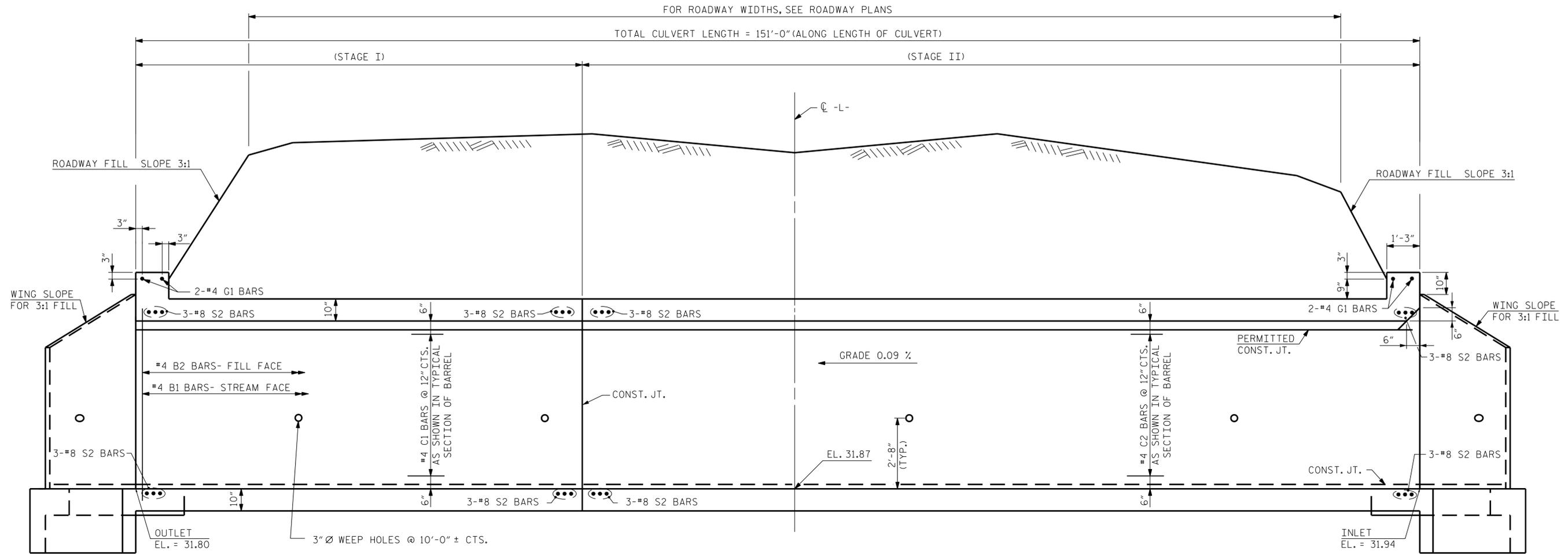
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NO.	BY:	DATE:	NO.	DATE:
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TOTAL SHEETS
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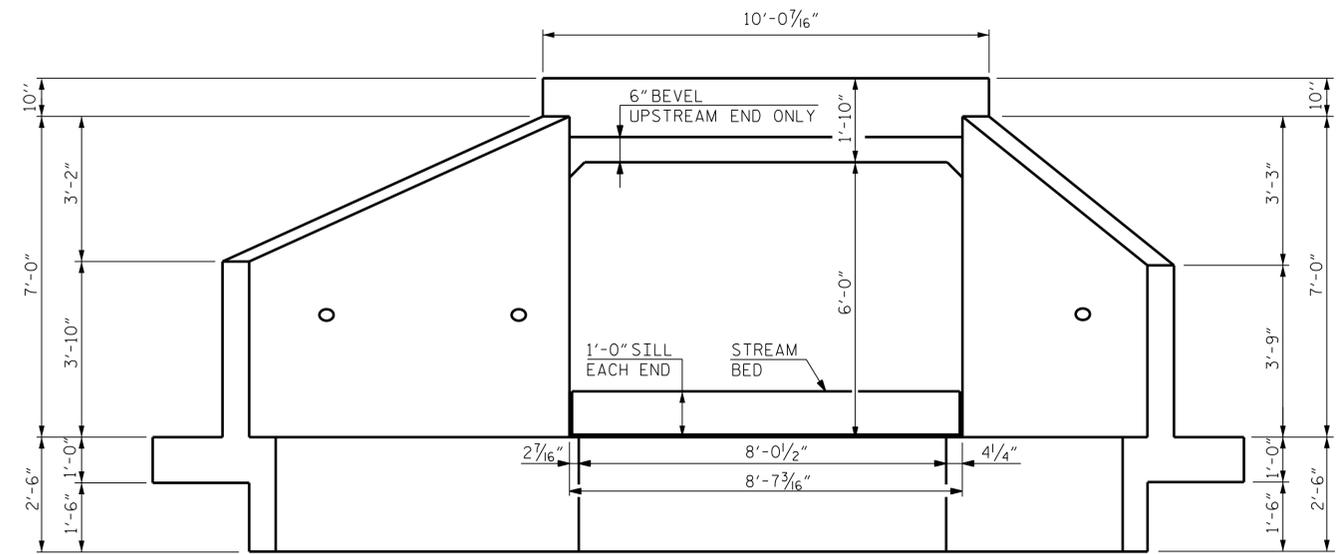
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DRAWN BY : B. H. GONFA DATE : JAN 2022
 CHECKED BY : M. ZIEHL DATE : JAN 2022
 DESIGN ENGINEER OF RECORD : R. V. KEITH DATE : JAN 2022



CULVERT SECTION NORMAL TO ROADWAY
(LOOKING UPSTATION)



END ELEVATION NORMAL TO SKEW

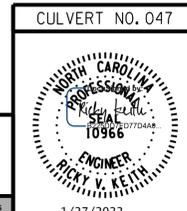
PROJECT NO. R-2511
BEAUFORT COUNTY
STATION: 69+25.50 -L-

SHEET 3 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CULVERT NO. 047

SINGLE 8 FT. X 6 FT.
CONCRETE BOX CULVERT
111° 30' 00" SKEW



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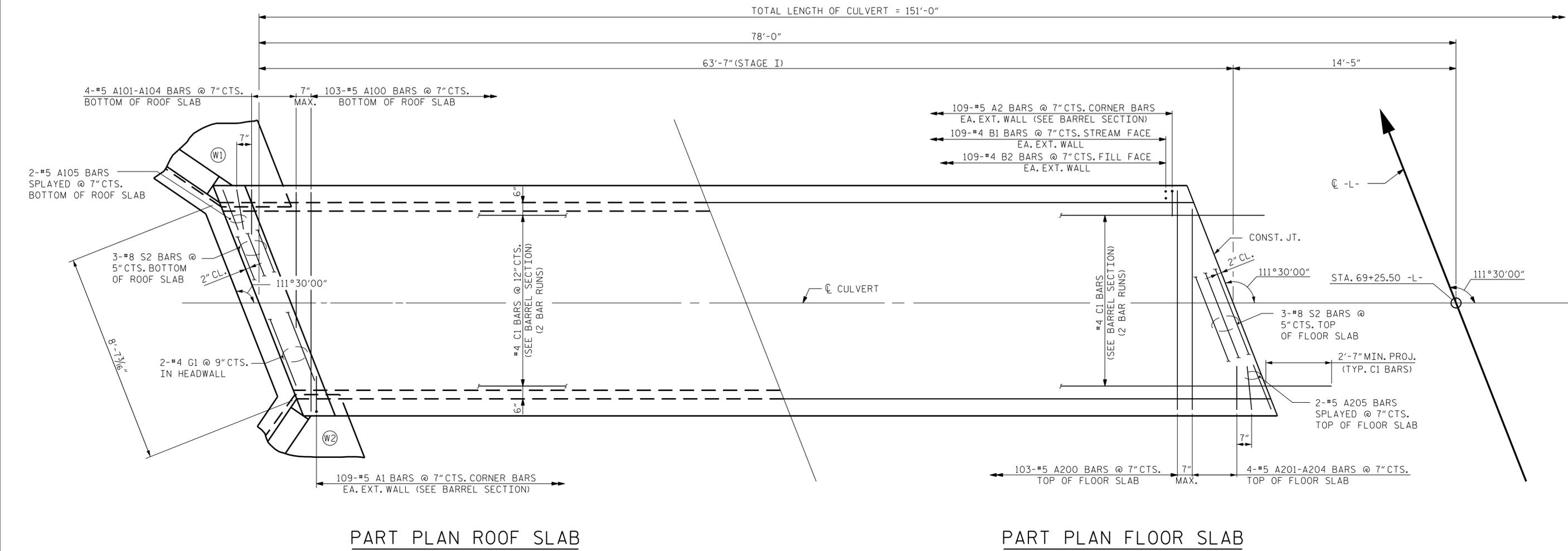
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DESIGN ENGINEER OF RECORD : R. V. KEITH DATE : JAN 2022

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PART PLAN ROOF SLAB

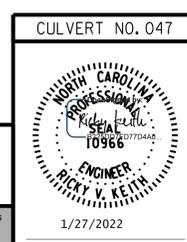
PART PLAN FLOOR SLAB

STAGE I

NOTE:
 3-#8 S2 BARS AT 5"CTS. BOTTOM ROOF SLAB
 AT CONSTRUCTION JOINT, SEE SHEET CU_47-3
 CULVERT SECTION NORMAL TO ROADWAY

PROJECT NO. R-2511
BEAUFORT COUNTY
 STATION: 69+25.50 -L-

SHEET 4 OF 7



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

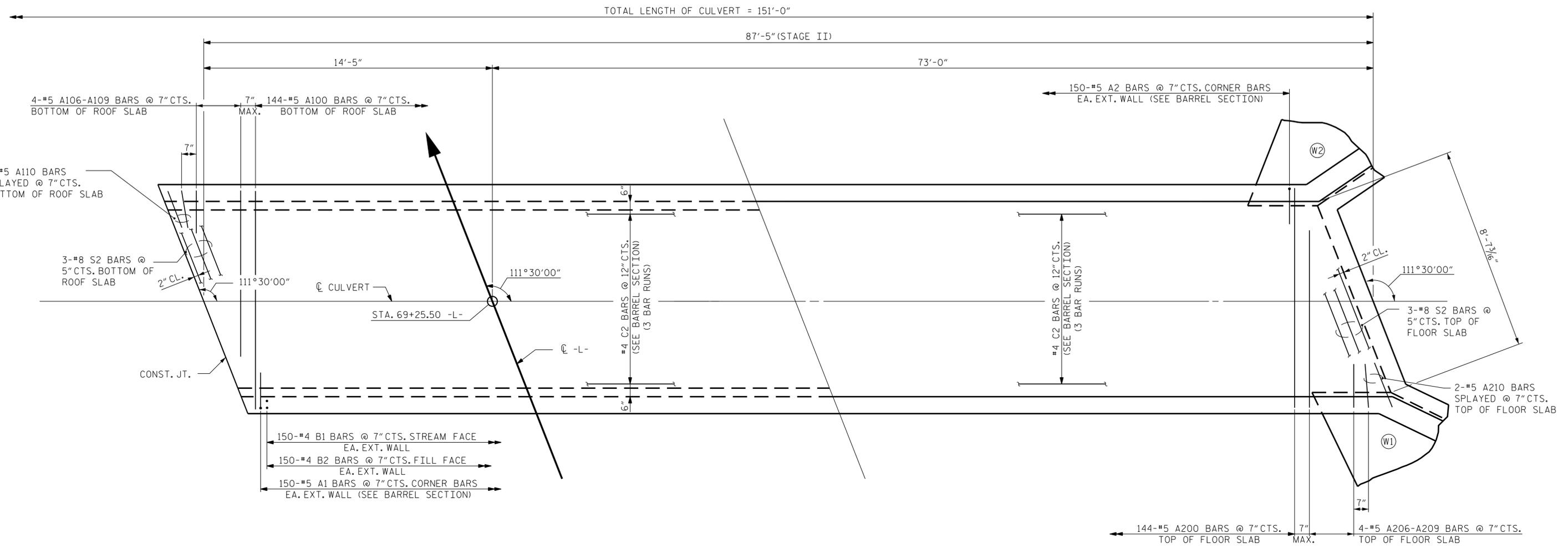
**SINGLE 8 FT. X 6 FT.
 CONCRETE BOX CULVERT
 STAGE I
 111° 30' 00" SKEW**

DRAWN BY : B. H. GONFA DATE : JAN 2022
 CHECKED BY : M. ZIEHL DATE : JAN 2022
 DESIGN ENGINEER OF RECORD : R. V. KEITH DATE : JAN 2022

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PART PLAN ROOF SLAB

PART PLAN FLOOR SLAB

STAGE II

NOTE:
 3-#8 S2 BARS @ 5"CTS. BOTTOM OF ROOF SLAB
 AT CONSTRUCTION JOINT, SEE SHEET CU.47-3
 CULVERT SECTION NORMAL TO ROADWAY

PROJECT NO. R-2511
BEAUFORT COUNTY
 STATION: 69+25.50 -L-

SHEET 5 OF 7

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SINGLE 8 FT. X 6 FT.
 CONCRETE BOX CULVERT
 STAGE II
 111°30'00" SKEW**

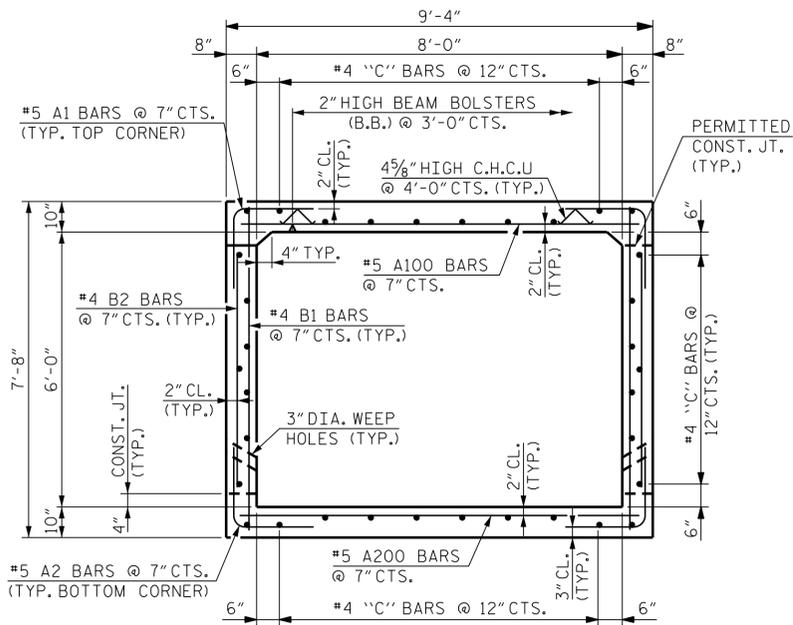
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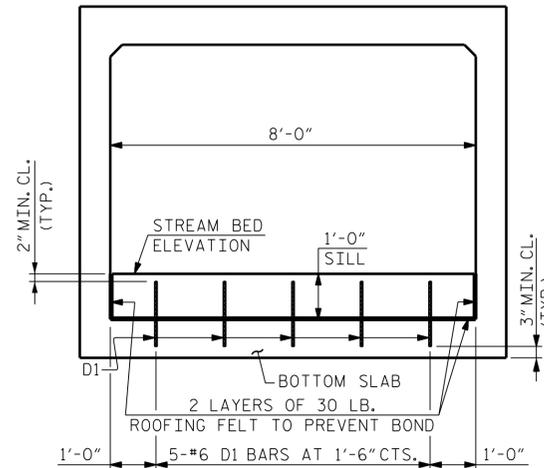
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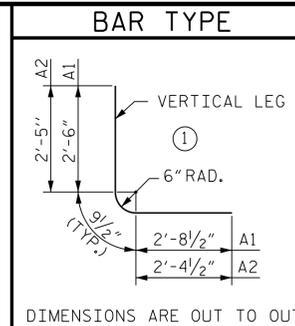


RIGHT ANGLE SECTION OF BARREL
(THERE ARE 34 "C" BARS IN SECTION OF BARREL)

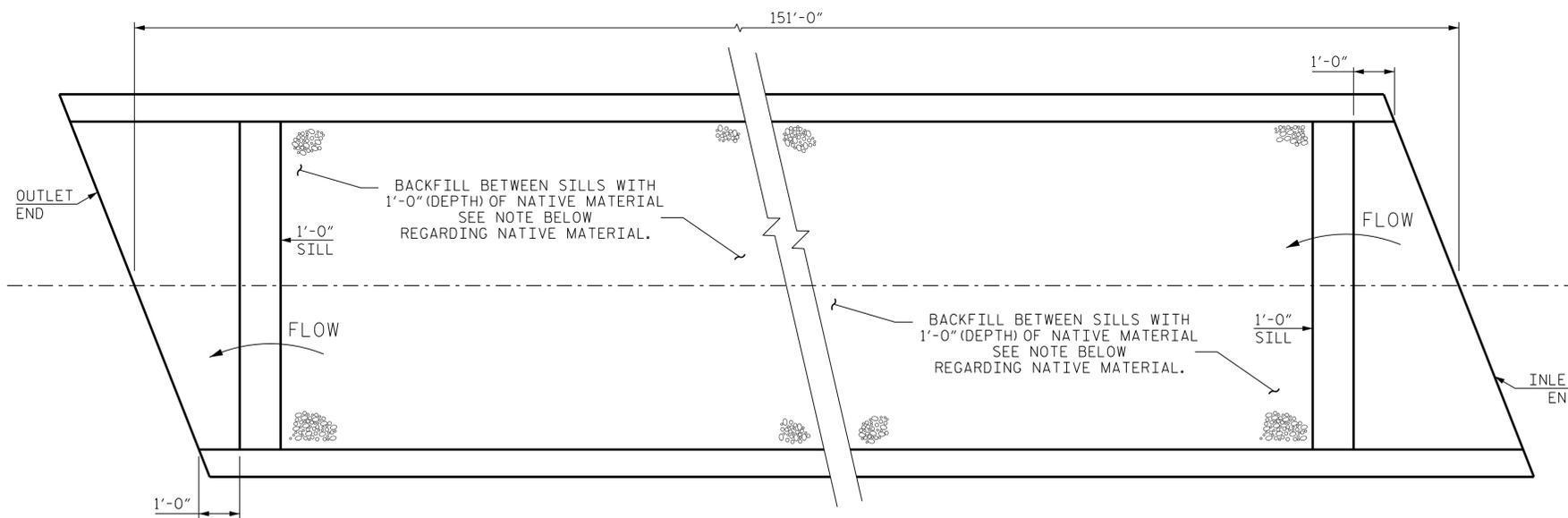
SPLICE LENGTHS		
BAR	SIZE	SPLICE LENGTHS
B1	#4	1'-10"
B2	#4	1'-10"
C1	#4	2'-5"
C2	#4	2'-5"



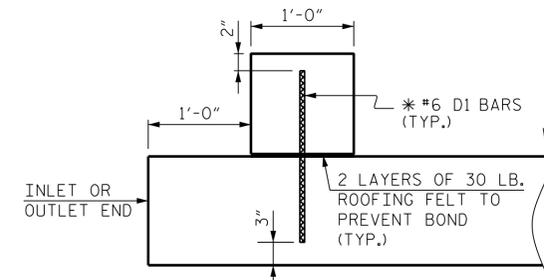
SILL ELEVATION
DOWEL SPACING SHOWN PERPENDICULAR TO CULVERT BARREL



BILL OF MATERIAL (STAGE I)						BILL OF MATERIAL (STAGE II)							
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT		
A1	218	#5	1	6'-0"	1,364	A1	300	#5	1	6'-0"	1,877		
A2	218	#5	1	5'-7"	1,270	A2	300	#5	1	5'-7"	1,747		
A100	103	#5	STR.	9'-0"	967	A100	144	#5	STR.	9'-0"	1,352		
A101	2	#5	STR.	7'-8"	16	A106	2	#5	STR.	7'-6"	16		
A102	2	#5	STR.	6'-2"	13	A107	2	#5	STR.	6'-1"	13		
A103	2	#5	STR.	4'-8"	10	A108	2	#5	STR.	4'-7"	10		
A104	2	#5	STR.	3'-2"	7	A109	2	#5	STR.	3'-1"	6		
A105	4	#5	STR.	2'-4"	10	A110	4	#5	STR.	2'-4"	10		
A200	103	#5	STR.	9'-0"	967	A200	144	#5	STR.	9'-0"	1,352		
A201	2	#5	STR.	7'-8"	16	A206	2	#5	STR.	7'-6"	16		
A202	2	#5	STR.	6'-2"	13	A207	2	#5	STR.	6'-1"	13		
A203	2	#5	STR.	4'-8"	10	A208	2	#5	STR.	4'-7"	10		
A204	2	#5	STR.	3'-2"	7	A209	2	#5	STR.	3'-1"	6		
A205	4	#5	STR.	2'-4"	10	A210	4	#5	STR.	2'-4"	10		
B1	218	#4	STR.	7'-3"	1,056	B1	300	#4	STR.	7'-3"	1,453		
B2	218	#4	STR.	5'-0"	728	B2	300	#4	STR.	5'-0"	1,002		
C1	68	#4	STR.	34'-3"	1,556	C2	102	#4	STR.	30'-8"	2,090		
D1	5	#6	STR.	1'-5"	11	D1	5	#6	STR.	1'-5"	11		
G1	2	#4	STR.	9'-8"	13	G1	2	#4	STR.	9'-8"	13		
S2	12	#8	STR.	9'-8"	310	S2	12	#8	STR.	9'-8"	310		
					REINFORCING STEEL	8,354 LBS.						REINFORCING STEEL	11,317 LBS.



SILL PLAN



SECTION THROUGH SILL
* DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED.

NOTES:

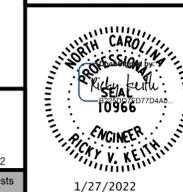
NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAMBED MAY BE USED TO LINE THE BOTTOM OF THE CULVERT BARREL.

NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

PROJECT NO. R-2511
BEAUFORT COUNTY
STATION: 69+25.50 -L-

SHEET 6 OF 7

CULVERT NO. 047



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**SINGLE 8 FT. X 6 FT.
CONCRETE BOX CULVERT
111° 30' 00" SKEW**

REVISIONS

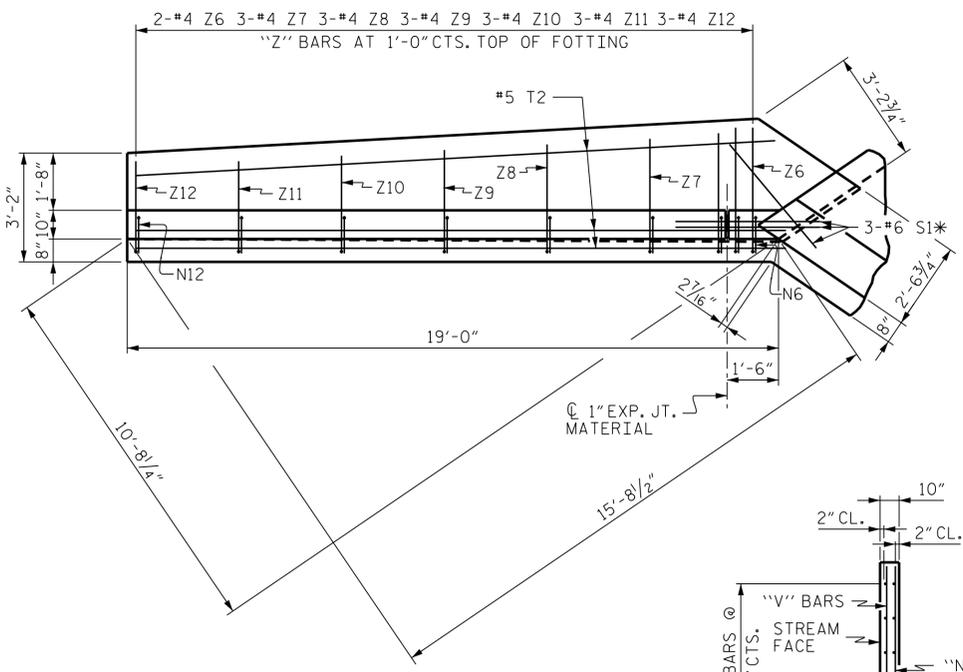
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2			4			TOTAL SHEETS 7

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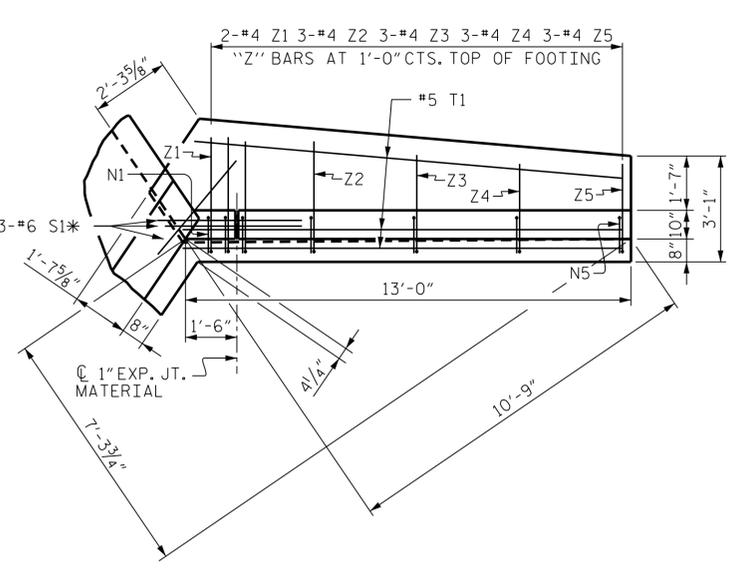
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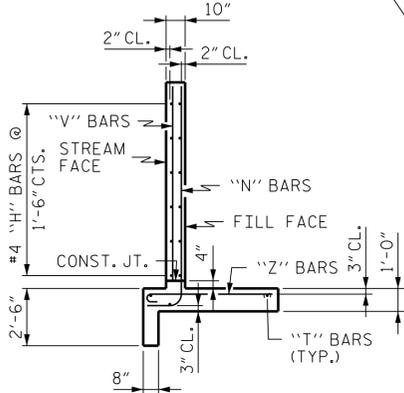
DRAWN BY : B. H. GONFA DATE : JAN 2022
CHECKED BY : M. ZIEHL DATE : JAN 2022
DESIGN ENGINEER OF RECORD : R. V. KEITH DATE : JAN 2022



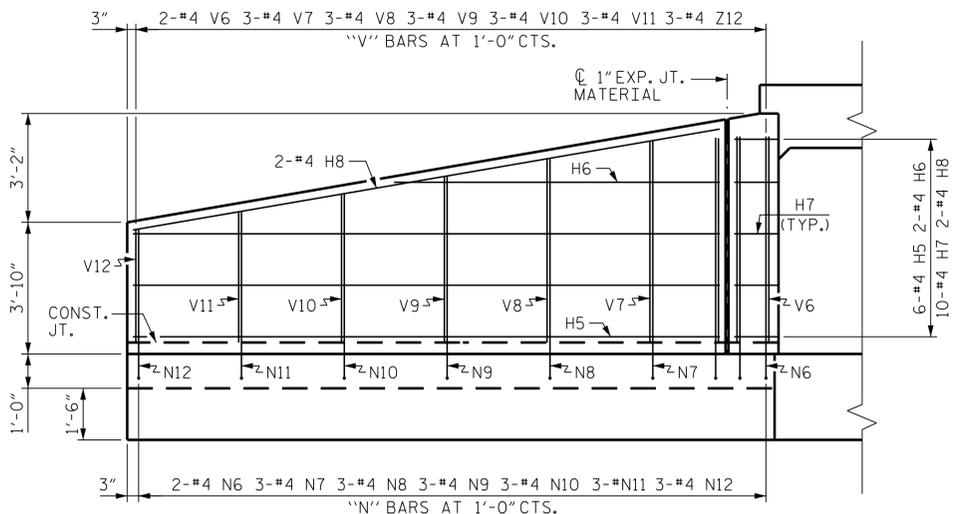
PLAN W1



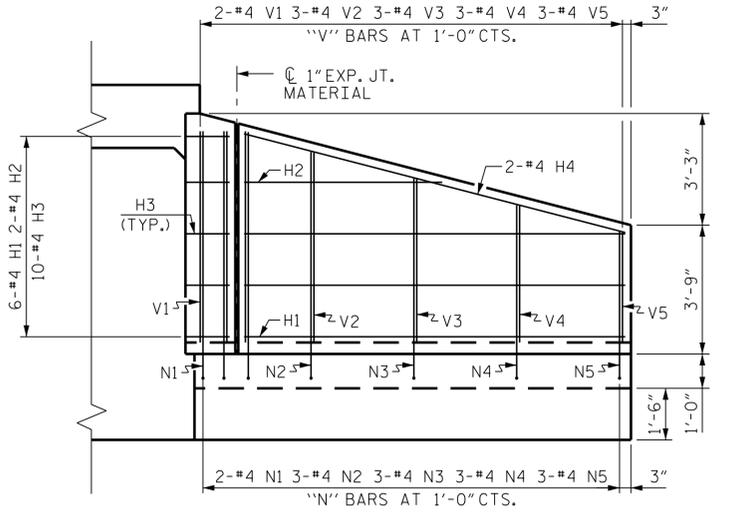
PLAN W2



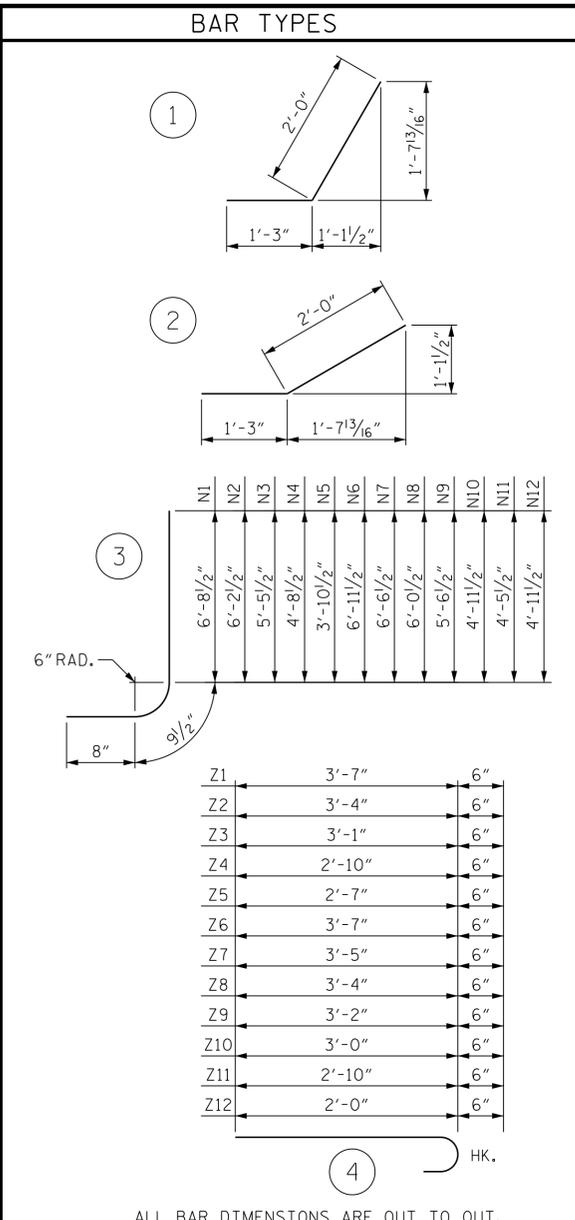
TYPICAL WING SECTION



ELEVATION W1



ELEVATION W2



ALL BAR DIMENSIONS ARE OUT TO OUT.

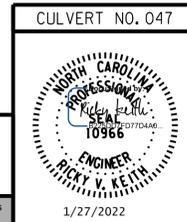
STAGE I CONSTRUCTION REINFORCING STEEL FOR 2 WINGS	711 LBS
CLASS A CONCRETE	5.4 CY
2 WINGS	0.5 CY
1 HEADWALL	1.5 CY
1 END CURTAIN WALL	11.9 CY
TOTAL	
STAGE II CONSTRUCTION REINFORCING STEEL FOR 2 WINGS	711 LBS
CLASS A CONCRETE	5.4 CY
2 WINGS	0.5 CY
1 HEADWALL	3.0 CY
1 END CURTAIN WALL	11.9 CY
TOTAL	

BILL OF MATERIAL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	6	#4	STR.	11'-1"	44
H2	2	#4	STR.	5'-9"	8
H3	10	#4	1	3'-3"	22
H4	2	#4	STR.	11'-5"	15
H5	6	#4	STR.	17'-1"	68
H6	2	#4	STR.	9'-6"	13
H7	10	#4	2	3'-3"	22
H8	2	#4	STR.	17'-4"	23
N1	2	#4	3	8'-2"	11
N2	3	#4	3	7'-8"	15
N3	3	#4	3	6'-11"	14
N4	3	#4	3	6'-2"	12
N5	3	#4	3	5'-4"	11
N6	2	#4	3	8'-5"	11
N7	3	#4	3	8'-0"	16
N8	3	#4	3	7'-6"	15
N9	3	#4	3	7'-0"	14
N10	3	#4	3	6'-5"	13
N11	3	#4	3	5'-11"	12
N12	3	#4	3	5'-5"	11
S1	6	#6	STR.	6'-0"	54
T1	3	#5	STR.	12'-6"	39
T2	3	#5	STR.	18'-8"	58
V1	2	#4	STR.	6'-1"	8
V2	3	#4	STR.	5'-7"	11
V3	3	#4	STR.	4'-10"	10
V4	3	#4	STR.	4'-1"	8
V5	3	#4	STR.	3'-3"	7
V6	2	#4	STR.	6'-4"	8
V7	3	#4	STR.	5'-11"	12
V8	3	#4	STR.	5'-5"	11
V9	3	#4	STR.	4'-11"	10
V10	3	#4	STR.	4'-4"	9
V11	3	#4	STR.	3'-10"	8
V12	3	#4	STR.	3'-4"	7
Z1	2	#4	4	4'-1"	5
Z2	3	#4	4	3'-10"	8
Z3	3	#4	4	3'-7"	7
Z4	3	#4	4	3'-4"	7
Z5	3	#4	4	3'-1"	6
Z6	2	#4	4	4'-1"	5
Z7	3	#4	4	3'-11"	8
Z8	3	#4	4	3'-10"	8
Z9	3	#4	4	3'-8"	7
Z10	3	#4	4	3'-6"	7
Z11	3	#4	4	3'-4"	7
Z12	3	#4	4	3'-2"	6

PROJECT NO. R-2511
 BEAUFORT COUNTY
 STATION: 69+25.50 -L-

SHEET 7 OF 7

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 WINGS FOR
 CONCRETE BOX CULVERT
 H = 6'-0" SLOPE : 3:1
 111°30' 00" SKEW



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 tboyd

DRAWN BY : B. H. GONFA DATE : JAN 2022
 CHECKED BY : M. ZIEHL DATE : JAN 2022
 DESIGN ENGINEER OF RECORD : R. V. KEITH DATE : JAN 2022

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	-----	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	-----	SEE PLANS
IMPACT ALLOWANCE	-----	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF STRUCTURAL STEEL - AASHTO M270 GRADE 36	--	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	--	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	--	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION - GRADE 60	---	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	-----	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	-----	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR UNTREATED EXTREME FIBER STRESS	---	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	-----	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	-----	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2018 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1 1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 1/4" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A 1/4" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16" INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINISHES AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

PROJECT NO. R-2511
 BEAUFORT COUNTY
STATION: 69+25.50 -L-

SHEET 8 OF 8

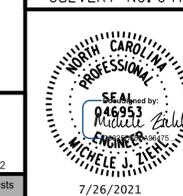
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
NOTES

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CULVERT NO. 047



7/26/2021

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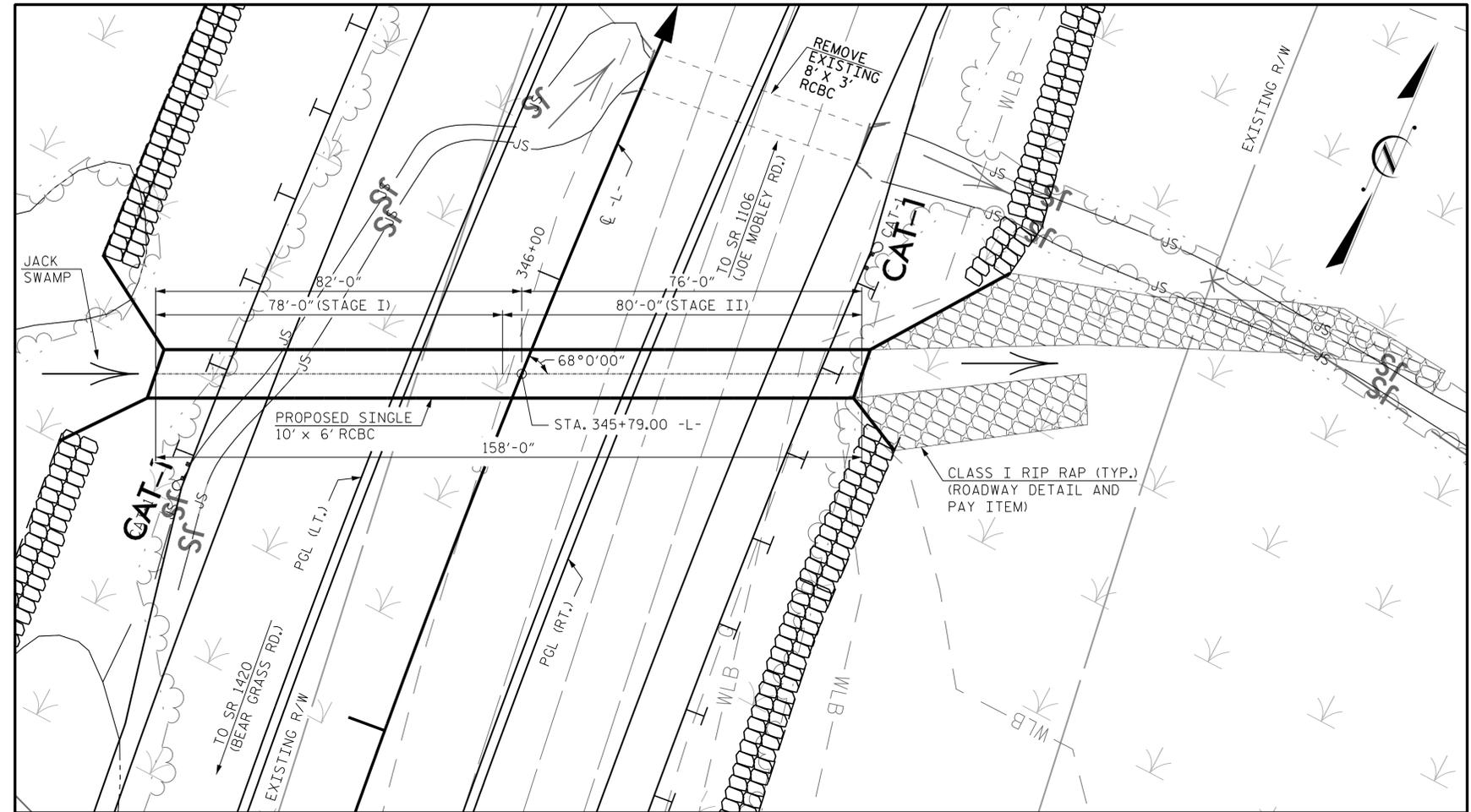
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DRAWN BY : B. H. GONFA DATE : JUN 2021
CHECKED BY : M. ZIEHL DATE : JUN 2021
DESIGN ENGINEER OF RECORD : M. ZIEHL DATE : JUN 2021

BENCH MARK: BM #13 STA. 330+93.30 -L-, 74.4' LT, RR SPIKE SET IN PP, N 724268, E 2571063; EL. 53.04, NAVD 88



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS
 GRADE POINT ELEVATION FOR CULVERT AT STA. 345+79.00 -L- ARE 49.86' LT AND 49.97' RT
 BED ELEVATION AT STA. 345+79.00 = 39.3'
 ROADWAY SLOPES = 3:1

HYDRAULIC DATA

DESIGN DISCHARGE-----780 C.F.S.
 FREQUENCY OF DESIGN FLOOD-----50 YR.
 DESIGN HIGH WATER ELEVATION-----42.6
 DRAINAGE AREA-----1.53 SQ. MI.
 BASE DISCHARGE (Q100)-----950 C.F.S.
 BASE HIGH WATER ELEVATION-----43.20

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE-----2,200 C.F.S.
 FREQUENCY OF OVERTOPPING FLOOD-----500 YR. +
 OVERTOPPING FLOOD ELEVATION-----46.90

STAGE I STRUCTURE QUANTITIES

CLASS A CONCRETE		
BARREL @ 1.11	CY/FT	86.6 C.Y.
WING ETC.	12.7	C.Y.
SILLS	0.4	C.Y.
TOTAL	99.7	C.Y.

REINFORCING STEEL		
BARREL	15,973	LBS.
WINGS ETC.	747	LBS.
TOTAL	16,720	LBS.

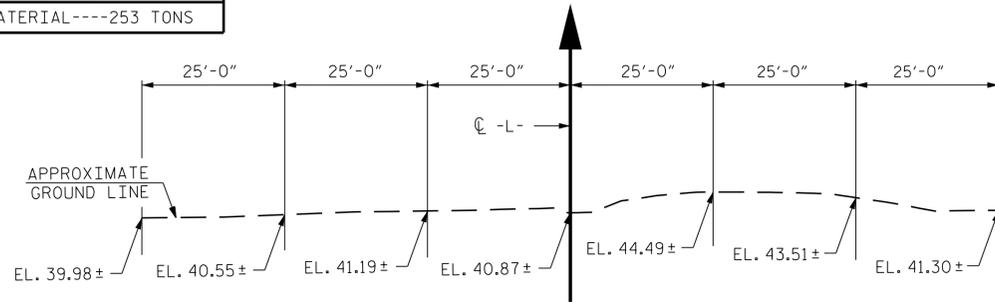
CULVERT EXCAVATION	-----	LUMP SUM
REMOVAL OF EXISTING STRUCTURE	-----	LUMP SUM
FOUNDATION CONDITIONING MATERIAL	----	253 TONS

STAGE II STRUCTURE QUANTITIES

CLASS A CONCRETE		
BARREL @ 1.11	CY/FT	88.8 C.Y.
WING ETC.	12.7	C.Y.
SILLS	0.4	C.Y.
TOTAL	101.9	C.Y.

REINFORCING STEEL		
BARREL	16,342	LBS.
WINGS ETC.	747	LBS.
TOTAL	17,089	LBS.

CULVERT EXCAVATION	-----	LUMP SUM
FOUNDATION CONDITIONING MATERIAL	----	260 TONS



PROFILE ALONG CULVERT

DRAWN BY : B. H. GONFA DATE : JAN 2022
 CHECKED BY : K. HAWKINS DATE : JAN 2022
 DESIGN ENGINEER OF RECORD : K. HAWKINS DATE : JAN 2022

NOTES:

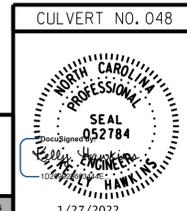
- ASSUMED LIVE LOAD ----- HL-93 OR ALTERNATE LOADING.
- DESIGN FILL----- 5.7 FT. (MAX.), 1.2 FT. (MIN.)
- 3"Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
- FOR OTHER DESIGN DATA AND NOTES, SEE STANDARD NOTE SHEET.
- CONCRETE IN STAGE I CULVERT TO BE POURED IN THE FOLLOWING ORDER:
 1. STAGE I WING FOOTINGS, CURTAIN WALL, AND FLOOR SLAB INCLUDING 4" OF STAGE I VERTICAL WALLS.
 2. THE REMAINING PORTIONS OF STAGE I WALLS TO THE PERMITTED CONSTRUCTION JOINT AND STAGE I WINGS FOR FULL HEIGHT.
 3. STAGE I ROOF SLAB, HEADWALL, AND SILL.
- CONCRETE IN STAGE II CULVERT TO BE POURED IN THE FOLLOWING ORDER:
 1. STAGE II WING FOOTINGS, CURTAIN WALL, AND FLOOR SLAB INCLUDING 4" OF STAGE II VERTICAL WALLS.
 2. THE REMAINING PORTION OF STAGE II WALLS TO THE PERMITTED CONSTRUCTION JOINT AND STAGE II WINGS FOR FULL HEIGHT.
 3. STAGE II ROOF SLAB, HEADWALL, AND SILL.
- THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN IT WILL PROPERLY TAKE CARE OF THE FILL.
- DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.
- AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF THE EXTERIOR WALL ABOVE THE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.
- A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WINGS COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

THE EXISTING STRUCTURE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COSTS INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING STRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

- NO PRECAST BOX CULVERT OPTION WILL BE ALLOWED.
- FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.
- EXCAVATE 1 FOOT BELOW CULVERT BEARING ELEVATION AND REPLACE WITH FOUNDATION CONDITIONING MATERIAL (SELECT MATERIAL, CLASS VI). UNDERCUT AN ADDITIONAL 2 FEET AND REPLACE WITH FOUNDATION CONDITIONING MATERIAL.
- GEOTEXTILE FOR SOIL STABILIZATION IS REQUIRED BELOW THE FOUNDATION CONDITIONING MATERIAL. UNDERCUT ANY SOFT/LOOSE ALLUVIAL SOILS THAT MAY BE ENCOUNTERED BENEATH THE BOTTOM OF THE FOUNDATION CONDITIONING MATERIAL. BACKFILL UNDERCUT AREA WITH FOUNDATION CONDITIONING MATERIAL.
- TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FEET. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
- THE EXISTING STRUCTURE CONSISTING OF SINGLE BARREL 8 FT X 3 FT RCBC WITH CONCRETE ENDWALLS LOCATED AT THE PROPOSED CULVERT SITE SHALL BE REMOVED.

PROJECT NO. R-2511
MARTIN COUNTY
 STATION: 345+79.00 -L-

SHEET 1 OF 7



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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

CULVERT NO. 048

SINGLE 10 FT. X 6 FT.
 CONCRETE BOX CULVERT
 68°00' 00" SKEW

REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
TOTAL SHEETS					7

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**LOAD AND RESISTANCE FACTOR RATING (LRFR)
SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS**

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE								COMMENT NUMBER		
						LIVE-LOAD FACTORS (γ _{LL})	MOMENT				SHEAR					
							RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE		DISTANCE FROM LEFT END OF ELEMENT (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.24	--	1.75	1.3	1	BOTTOM SLAB	5.0	1.24	1	TOP SLAB	0.1		
	HL-93 (OPERATING)	N/A		1.6	--	1.35	1.69	1	BOTTOM SLAB	5.0	1.6	1	TOP SLAB	0.1		
	HS-20 (INVENTORY)	36.000	②	1.32	47.52	1.75	1.32	1	TOP SLAB	5.0	1.55	1	TOP SLAB	0.1		
	HS-20 (OPERATING)	36.000		1.71	61.56	1.35	1.71	1	TOP SLAB	5.0	2.01	1	TOP SLAB	0.1		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH		3.45	46.58	1.40	3.45	1	TOP SLAB	5.0	5.12	1	TOP SLAB	0.1		
		SNGARBS2	20.000		3.23	64.60	1.40	3.23	1	TOP SLAB	5.0	4.69	1	TOP SLAB	0.1	
		SNAGRIS2	22.000		3.45	75.90	1.40	3.45	1	TOP SLAB	5.0	5.12	1	TOP SLAB	0.1	
		SNCOTTS3	27.250		2.34	63.77	1.40	2.34	1	BOTTOM SLAB	5.0	2.43	1	TOP SLAB	0.1	
		SNAGGRS4	34.925	③	2.25	78.58	1.40	2.25	1	BOTTOM SLAB	5.0	2.59	1	BOTTOM SLAB	0.1	
		SNS5A	35.550		2.37	84.25	1.40	2.37	1	BOTTOM SLAB	5.0	2.82	1	BOTTOM SLAB	0.1	
		SNS6A	39.950		2.37	94.68	1.40	2.37	1	BOTTOM SLAB	5.0	2.81	1	BOTTOM SLAB	0.1	
		SNS7B	42.000		2.37	99.54	1.40	2.37	1	BOTTOM SLAB	5.0	2.81	1	BOTTOM SLAB	0.1	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.9	95.70	1.40	2.9	1	BOTTOM SLAB	5.0	3.36	1	BOTTOM SLAB	0.1	
		TNT4A	33.075		2.79	92.28	1.40	2.79	1	BOTTOM SLAB	5.0	3.12	1	TOP SLAB	0.1	
		TNT6A	41.600		2.38	99.01	1.40	2.38	1	BOTTOM SLAB	5.0	2.84	1	BOTTOM SLAB	0.1	
		TNT7A	42.000		2.58	108.36	1.40	2.58	1	BOTTOM SLAB	5.0	3.08	1	TOP SLAB	0.1	
		TNT7B	42.000		2.37	99.54	1.40	2.37	1	BOTTOM SLAB	5.0	2.82	1	BOTTOM SLAB	0.1	
		TNAGRIT4	43.000		2.79	119.97	1.40	2.79	1	BOTTOM SLAB	5.0	3.1	1	TOP SLAB	0.1	
TNAGT5A	45.000		2.79	125.55	1.40	2.79	1	BOTTOM SLAB	5.0	3.13	1	TOP SLAB	0.1			
TNAGT5B	45.000		2.79	125.55	1.40	2.79	1	BOTTOM SLAB	5.0	3.11	1	TOP SLAB	0.1			

LOAD FACTORS:

DESIGN LOAD RATING FACTORS

LOAD TYPE	MAX FACTOR	MIN FACTOR
DC	1.25	0.90
DW	1.50	0.65
EV	1.30	0.90
EH	1.35	0.90
ES	1.35	0.90
LS	1.75	--
WA	1.00	--

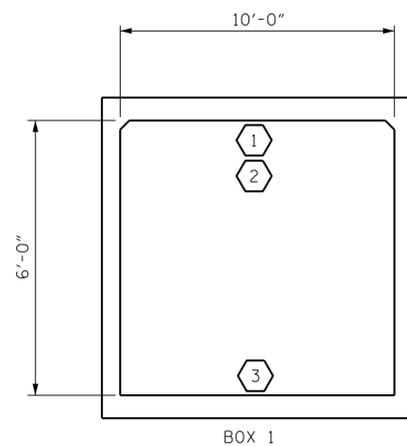
NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

- CULVERT RATING AT 345+79.00 -L-
-
-
-

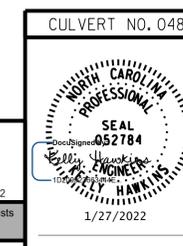
①	CONTROLLING LOAD RATING
①	DESIGN LOAD RATING (HL-93)
②	DESIGN LOAD RATING (HS-20)
③	LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	



LRFR SUMMARY
(LOOKING DOWNSTREAM)

PROJECT NO. R-2511
MARTIN COUNTY
 STATION: 345+79.00 -L-

SHEET 2 OF 7

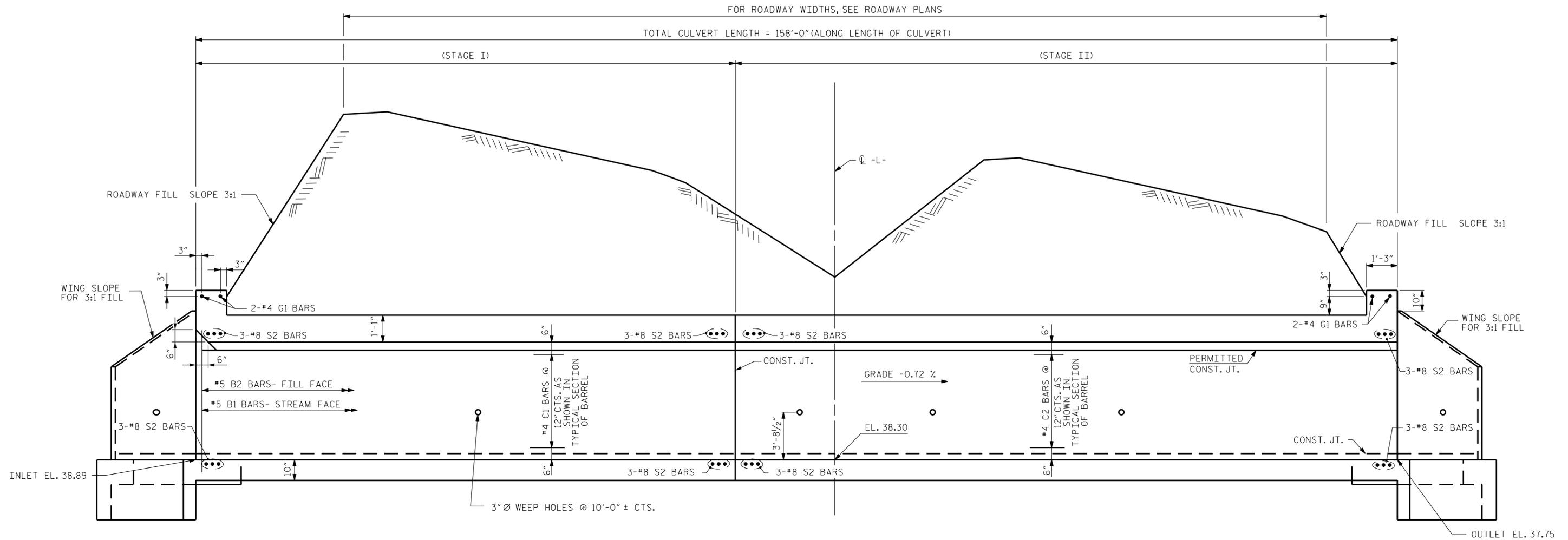


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

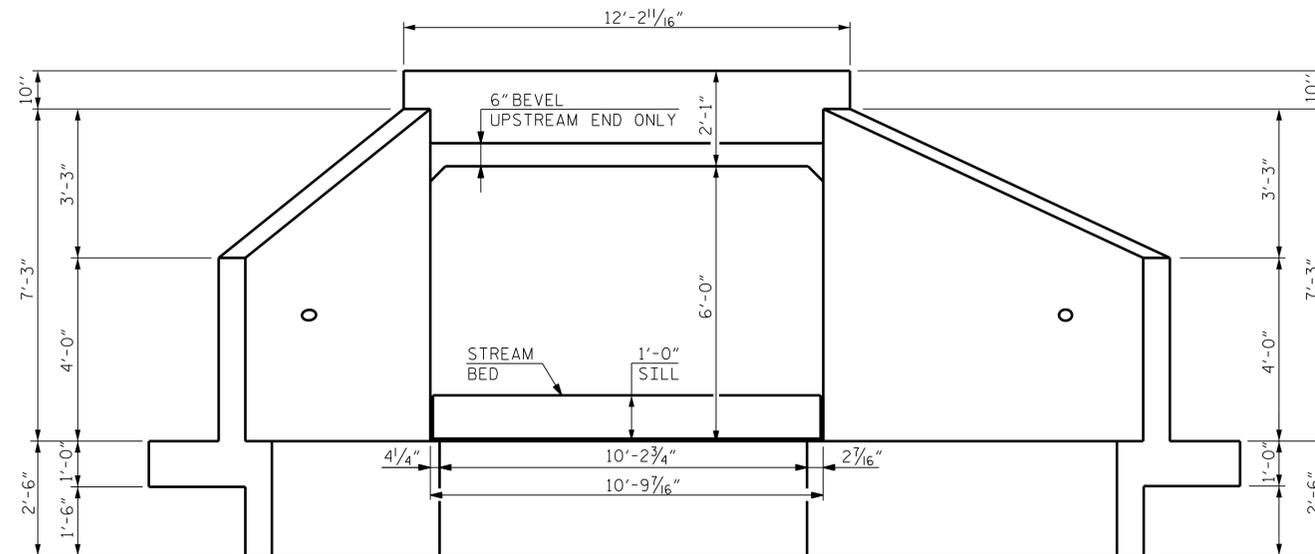
STANDARD
 LRFR SUMMARY FOR
 REINFORCED CONCRETE
 BOX CULVERTS
 (NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	CU-48-2
1			3			TOTAL SHEETS
2			4			7

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UNLESS ALL SIGNATURES COMPLETED**



CULVERT SECTION NORMAL TO ROADWAY
(FOR SILL LOCATION, SEE SHEET 6 OF 8)



END ELEVATION NORMAL TO SKEW

PROJECT NO. R-2511
MARTIN COUNTY
 STATION: 345+79.00 -L-

SHEET 3 OF 7

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SINGLE 10 FT. X 6 FT.
 CONCRETE BOX CULVERT
 68°00' 00" SKEW

CULVERT NO. 048



1/27/2022

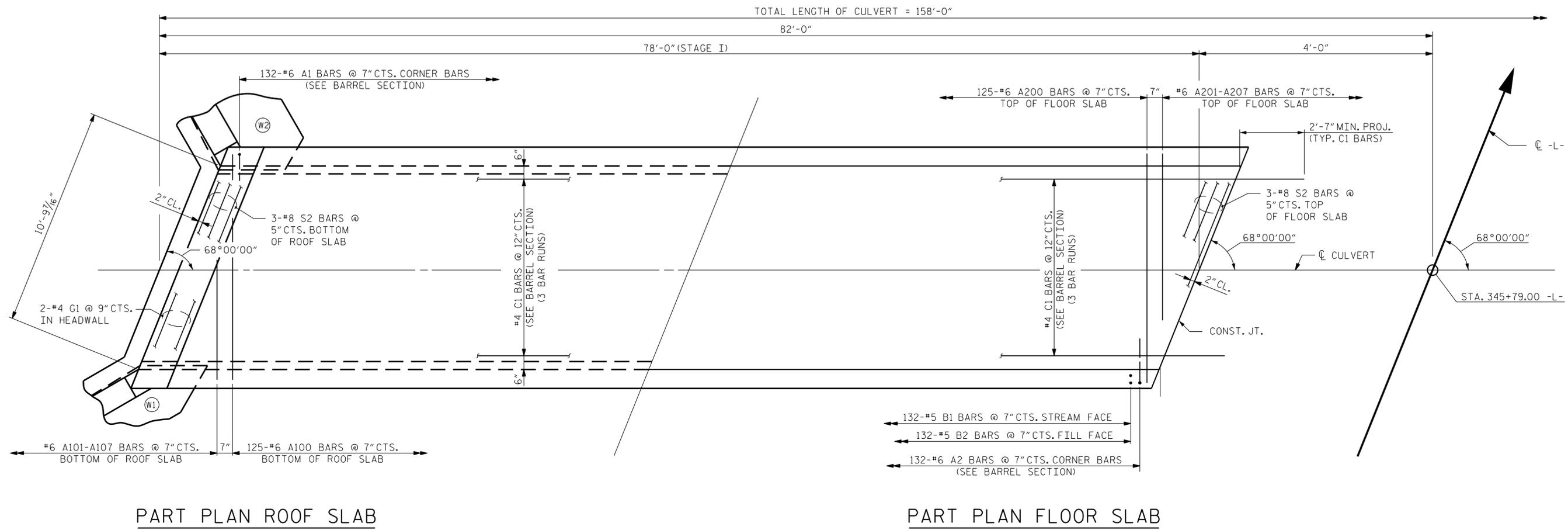


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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	CU_48-3
1			3			TOTAL SHEETS
2			4			7

1/27/2022 R:\Structures\Culvert\VDGN\Culvert_48\Final\NR2511_SMU_CU_48-3_060000.dgn

DRAWN BY : B. H. GONFA DATE : JAN 2022
 CHECKED BY : K. HAWKINS DATE : JAN 2022
 DESIGN ENGINEER OF RECORD : K. HAWKINS DATE : JAN 2022



PART PLAN ROOF SLAB

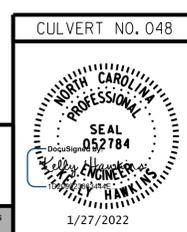
PART PLAN FLOOR SLAB

STAGE I

NOTE:
 3-#8 S2 BARS AT 5" CTS. BOTTOM ROOF SLAB AT
 CONST. JT., SEE CU_48.3 CULVERT SECTION
 NORMAL TO ROADWAY.

PROJECT NO. R-2511
MARTIN COUNTY
 STATION: 345+79.00 -L-

SHEET 4 OF 7



RK&K
 P: (919) 878-9560
 8601 Six Forks Road, Forum 1 Suite 700
 Raleigh, North Carolina 27615 | NC License No. F-0112
 Engineers | Construction Managers | Planners | Scientists
 www.rkk.com
 Responsive People | Creative Solutions

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SINGLE 10 FT. X 6 FT.
 CONCRETE BOX CULVERT
 STAGE I
 68°00'00" SKEW

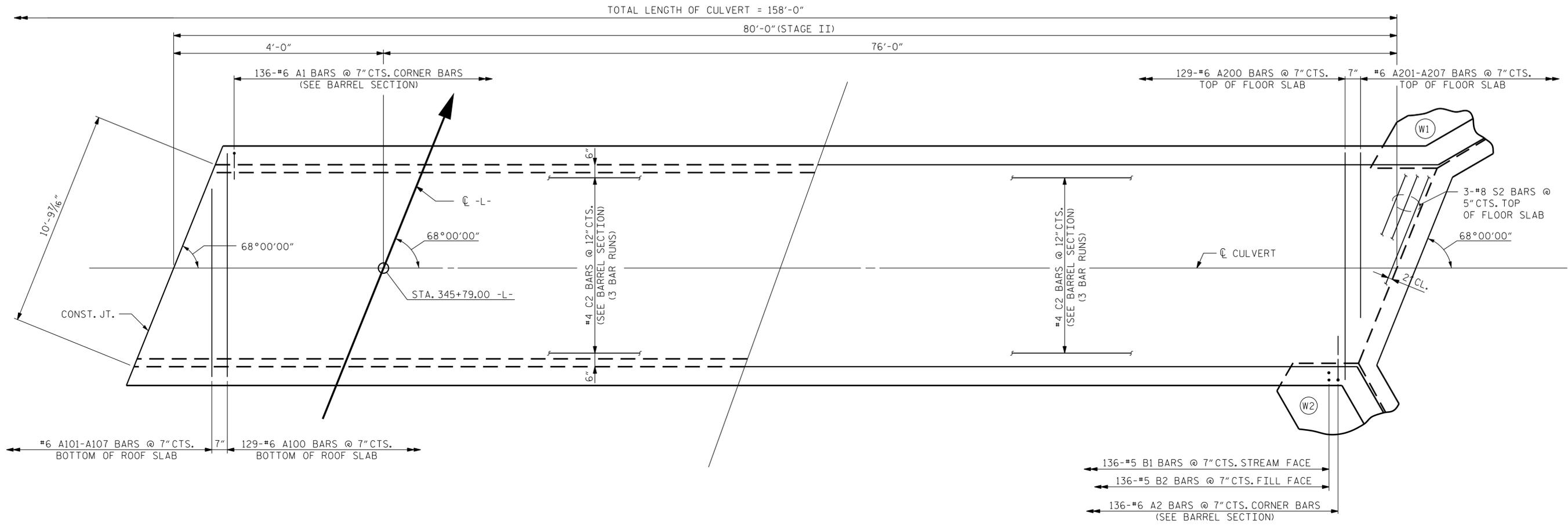
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	CU_48-4
1			3			TOTAL SHEETS
2			4			7

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PART PLAN ROOF SLAB

PART PLAN FLOOR SLAB

STAGE II

NOTE:
 3-#8 S2 BARS AT 5"CTS. BOTTOM ROOF SLAB AT
 CONST. JT., SEE CU_48.3 CULVERT SECTION
 NORMAL TO ROADWAY.

PROJECT NO. R-2511
MARTIN COUNTY
 STATION: 345+79.00 -L-

SHEET 5 OF 7

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

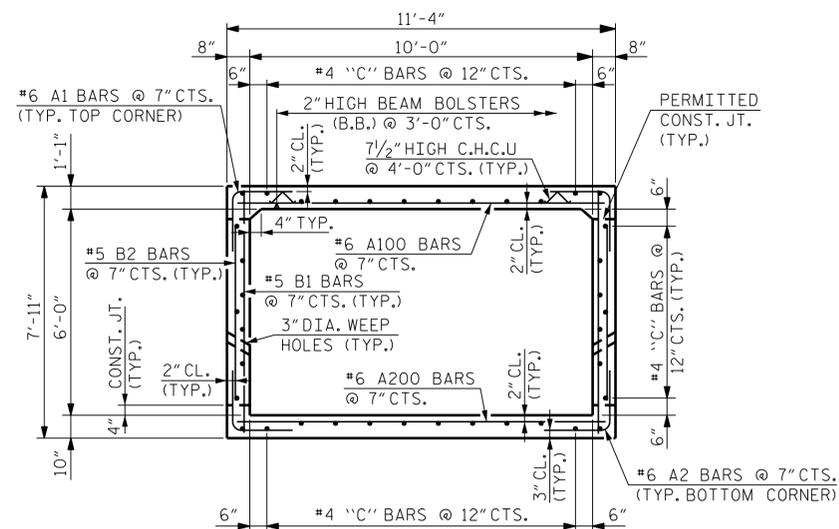
SINGLE 10 FT. X 6 FT.
 CONCRETE BOX CULVERT
 STAGE II
 68°00' 00" SKEW

CULVERT NO. 048

DRAWN BY : <u>B. H. GONFA</u>	DATE : <u>JAN 2022</u>
CHECKED BY : <u>K. HAWKINS</u>	DATE : <u>JAN 2022</u>
DESIGN ENGINEER OF RECORD : <u>K. HAWKINS</u>	DATE : <u>JAN 2022</u>

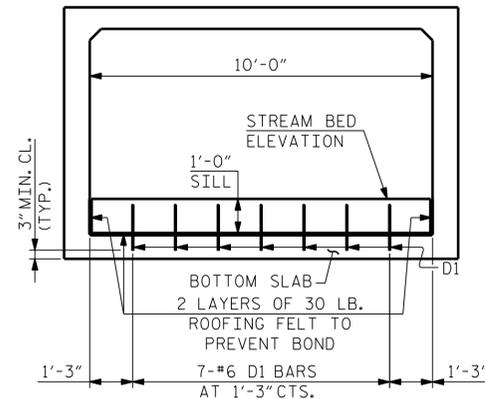
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	CU_48-5
1			3			TOTAL SHEETS
2			4			7

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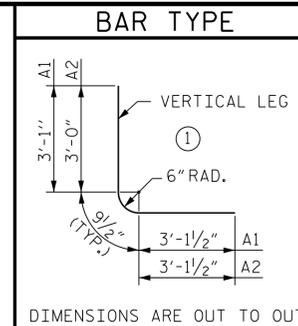
RIGHT ANGLE SECTION OF BARREL

(THERE ARE 38 "C" BARS IN SECTION OF BARREL)



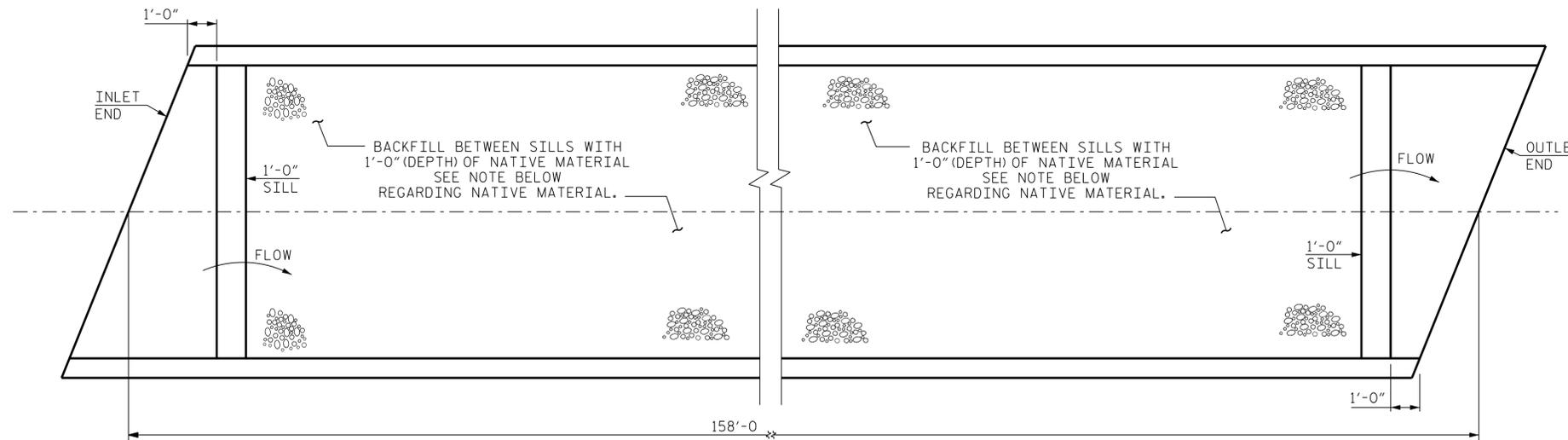
SILL ELEVATION

DOWEL SPACING SHOWN PERPENDICULAR TO CULVERT BARREL

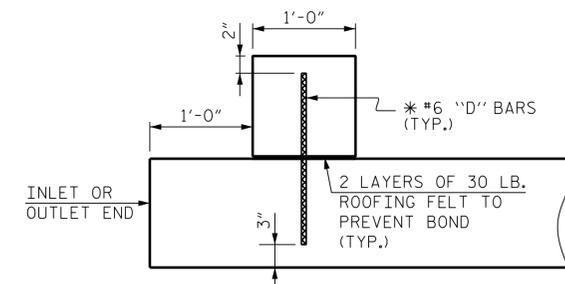


BILL OF MATERIAL (STAGE I)						BILL OF MATERIAL (STAGE II)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	264	#6	1	7'-0"	2,776	A1	272	#6	1	7'-0"	2,860
A2	264	#6	1	6'-11"	2,743	A2	272	#6	1	6'-11"	2,826
A100	125	#6	STR.	11'-0"	2,065	A100	129	#6	STR.	11'-0"	2,131
A101	2	#6	STR.	10'-7"	32	A101	2	#6	STR.	10'-2"	31
A102	2	#6	STR.	9'-2"	27	A102	2	#6	STR.	8'-9"	26
A103	2	#6	STR.	7'-8"	23	A103	2	#6	STR.	7'-3"	22
A104	2	#6	STR.	6'-3"	19	A104	2	#6	STR.	5'-10"	17
A105	2	#6	STR.	4'-10"	14	A105	2	#6	STR.	4'-5"	13
A106	2	#6	STR.	3'-4"	10	A106	2	#6	STR.	2'-11"	9
A107	2	#6	STR.	1'-11"	6	A107	2	#6	STR.	1'-6"	4
A200	125	#6	STR.	11'-0"	2,065	A200	129	#6	STR.	11'-0"	2,131
A201	2	#6	STR.	10'-7"	32	A201	2	#6	STR.	10'-2"	31
A202	2	#6	STR.	9'-2"	27	A202	2	#6	STR.	8'-9"	26
A203	2	#6	STR.	7'-8"	23	A203	2	#6	STR.	7'-3"	22
A204	2	#6	STR.	6'-3"	19	A204	2	#6	STR.	5'-10"	17
A205	2	#6	STR.	4'-10"	14	A205	2	#6	STR.	4'-5"	13
A206	2	#6	STR.	3'-4"	10	A206	2	#6	STR.	2'-11"	9
A207	2	#6	STR.	1'-11"	6	A207	2	#6	STR.	1'-6"	4
B1	264	#5	STR.	7'-6"	2,065	B1	272	#5	STR.	7'-6"	2,128
B2	264	#5	STR.	5'-2"	1,423	B2	272	#5	STR.	5'-2"	1,466
C1	114	#4	STR.	28'-5"	2,164	C2	114	#4	STR.	28'-2"	2,145
D1	7	#6	STR.	1'-5"	15	D1	7	#6	STR.	1'-5"	15
G1	2	#4	STR.	11'-10"	16	G1	2	#4	STR.	11'-10"	16
S2	12	#8	STR.	11'-10"	379	S2	12	#8	STR.	11'-10"	380
REINFORCING STEEL					15,973 LBS.	REINFORCING STEEL					16,342 LBS.

SPLICE LENGTHS		
BAR	SIZE	SPLICE LENGTHS
B1	#5	2'-4"
B2	#5	2'-4"
C1	#4	2'-5"
C2	#4	2'-5"



SILL PLAN

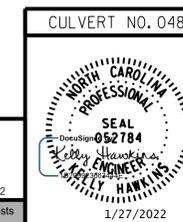


SECTION THROUGH SILL

* DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED.

PROJECT NO. R-2511
MARTIN COUNTY
 STATION: 345+79.00 -L-

SHEET 6 OF 7



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SINGLE 10 FT. X 6 FT. CONCRETE BOX CULVERT
 68°00' 00" SKEW

CULVERT NO. 048

REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS
					7

NOTE:
 NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAMBED MAY BE USED TO LINE THE BOTTOM OF THE CULVERT BARREL.

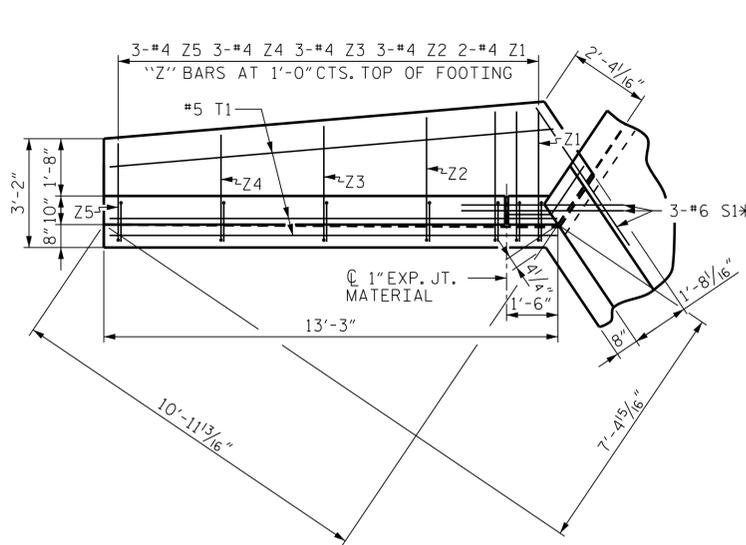
NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

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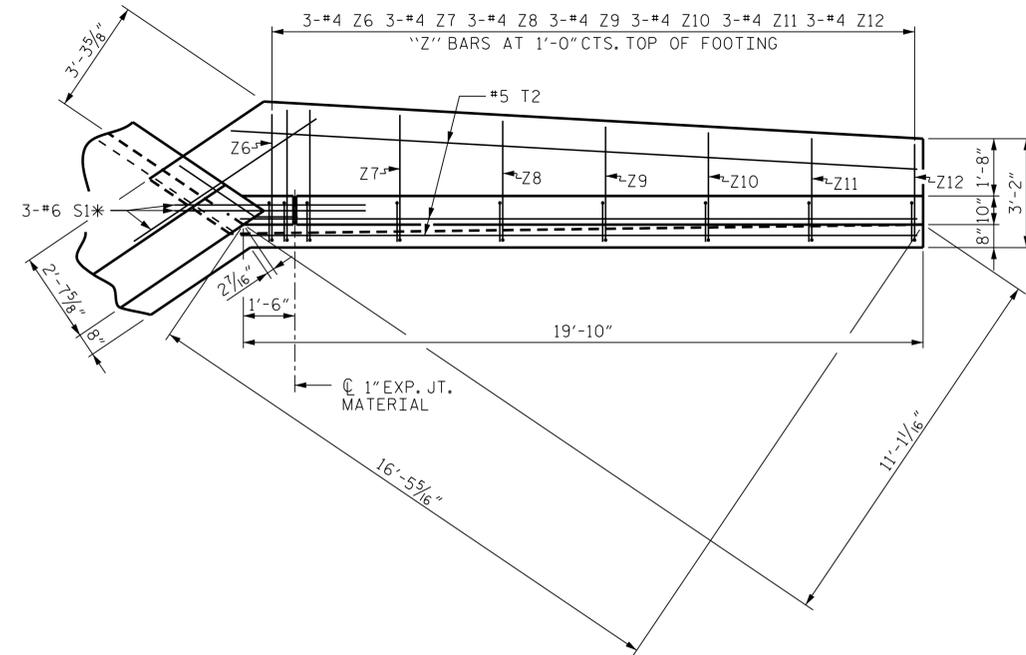
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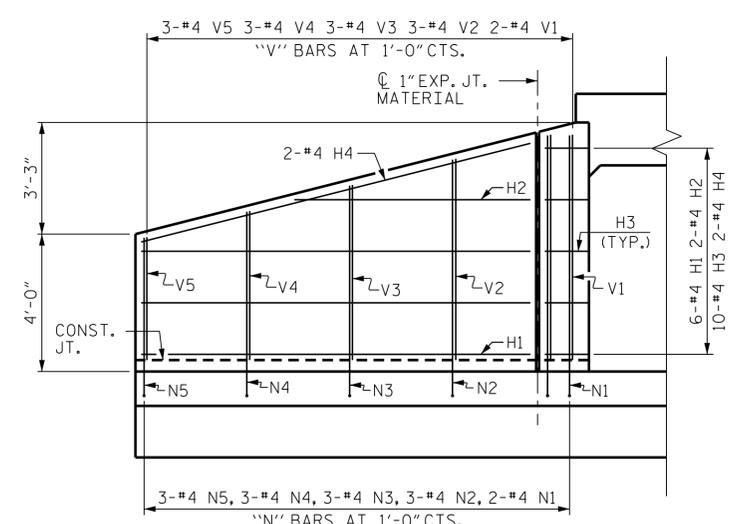
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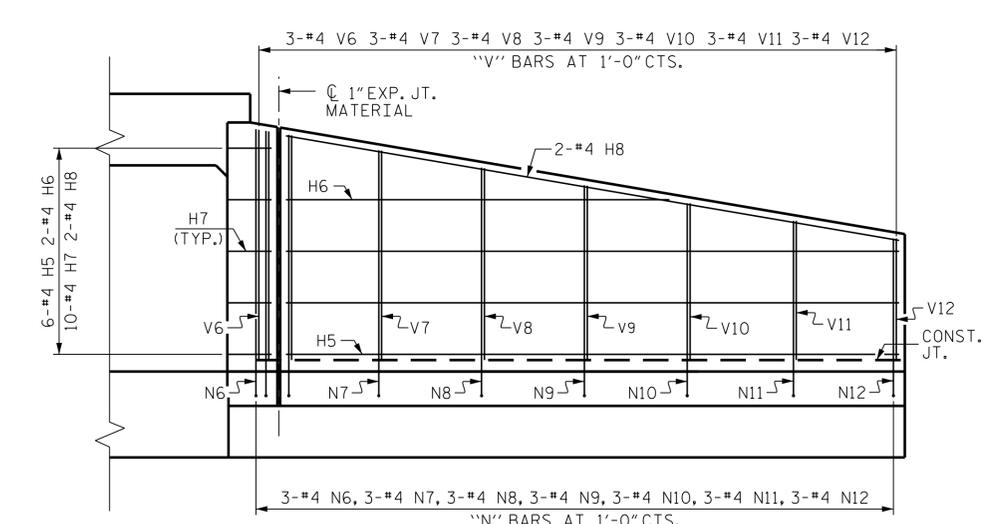
PLAN W1



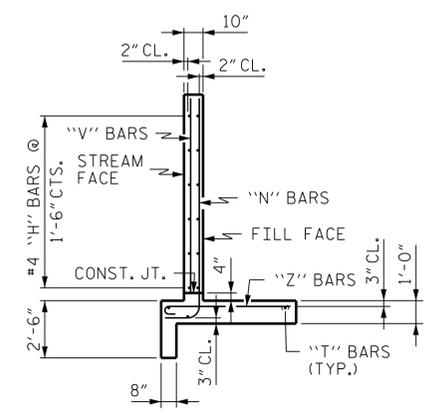
PLAN W2



ELEVATION W1

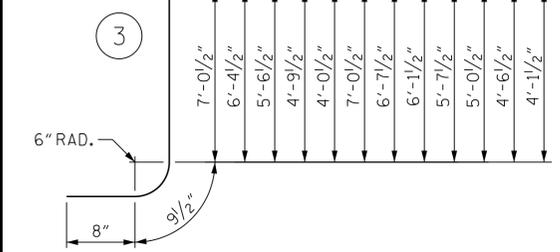


ELEVATION W2



TYPICAL WING SECTION

BAR TYPES		BILL OF MATERIAL							
NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	SIZE	TYPE	LENGTH	WEIGHT
1	#4	STR	11'-4"	91	H1	12	#4	STR	11'-4"
			6'-10"	18	H2	4	#4	STR	6'-10"
			3'-3"	43	H3	20	#4	STR	3'-3"
			11'-8"	31	H4	4	#4	STR	11'-8"
			17'-10"	143	H5	12	#4	STR	17'-10"
			11'-2"	30	H6	4	#4	STR	11'-2"
			3'-3"	44	H7	20	#4	STR	3'-3"
			18'-1"	48	H8	4	#4	STR	18'-1"
					N1	4	#4	3	8'-6"
					N2	6	#4	3	7'-10"
					N3	6	#4	3	7'-0"
					N4	6	#4	3	6'-3"
					N5	6	#4	3	5'-6"
					N6	6	#4	3	8'-6"
					N7	6	#4	3	8'-1"
					N8	6	#4	3	7'-7"
					N9	6	#4	3	7'-1"
					N10	6	#4	3	6'-6"
					N11	6	#4	3	6'-0"
					N12	6	#4	3	5'-7"
					S1	12	#6	STR	6'-0"
					T1	6	#5	STR	13'-0"
					T2	6	#5	STR	19'-9"
					V1	4	#4	STR	6'-6"
					V2	6	#4	STR	5'-10"
					V3	6	#4	STR	5'-1"
					V4	6	#4	STR	4'-4"
					V5	6	#4	STR	3'-6"
					V6	6	#4	STR	6'-6"
					V7	6	#4	STR	6'-1"
					V8	6	#4	STR	5'-7"
					V9	6	#4	STR	5'-0"
					V10	6	#4	STR	4'-6"
					V11	6	#4	STR	4'-0"
					V12	6	#4	STR	3'-6"
					Z1	4	#4	4	4'-4"
					Z2	6	#4	4	4'-1"
					Z3	6	#4	4	3'-10"
					Z4	6	#4	4	3'-7"
					Z5	6	#4	4	3'-4"
					Z6	6	#4	4	3'-3"
					Z7	6	#4	4	4'-2"
					Z8	6	#4	4	4'-0"
					Z9	6	#4	4	3'-10"
					Z10	6	#4	4	3'-8"
					Z11	6	#4	4	3'-6"
					Z12	6	#4	4	3'-4"



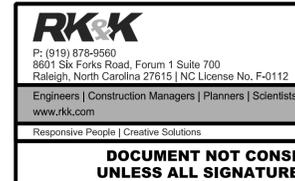
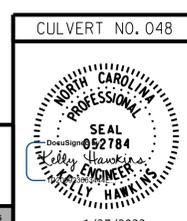
Z1	3'-10"	6"
Z2	3'-7"	6"
Z3	3'-4"	6"
Z4	3'-1"	6"
Z5	2'-10"	6"
Z6	3'-10"	6"
Z7	3'-8"	6"
Z8	3'-6"	6"
Z9	3'-4"	6"
Z10	3'-2"	6"
Z11	3'-0"	6"
Z12	2'-10"	6"

ALL BAR DIMENSIONS ARE OUT TO OUT.

REINFORCING STEEL		1,494 LBS
FOR 4 WINGS		
CLASS A CONCRETE		
4 WINGS		23.0 CY
2 HEADWALLS		1.1 CY
2 END CURTAIN WALLS		1.3 CY
TOTAL		25.4 CY

PROJECT NO. R-2511
MARTIN COUNTY
 STATION: 345+79.00 -L-

SHEET 7 OF 7



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 WINGS FOR
 CONCRETE BOX CULVERT
 H = 6'-0" SLOPE : 3:1
 68°00' 00" SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	CU-48-7
1			3			TOTAL SHEETS
2			4			7

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STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	-----	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	-----	SEE PLANS
IMPACT ALLOWANCE	-----	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF STRUCTURAL STEEL - AASHTO M270 GRADE 36	--	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	--	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	--	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION - GRADE 60	----	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	-----	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	-----	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR UNTREATED EXTREME FIBER STRESS	----	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	-----	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	-----	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2018 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1 1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 1/4" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A 1/4" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16" INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINIS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

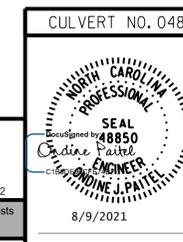
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PROJECT NO. R-2511
MARTIN COUNTY
 STATION: 345+79.00 -L-

SHEET 8 OF 8

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 NOTES

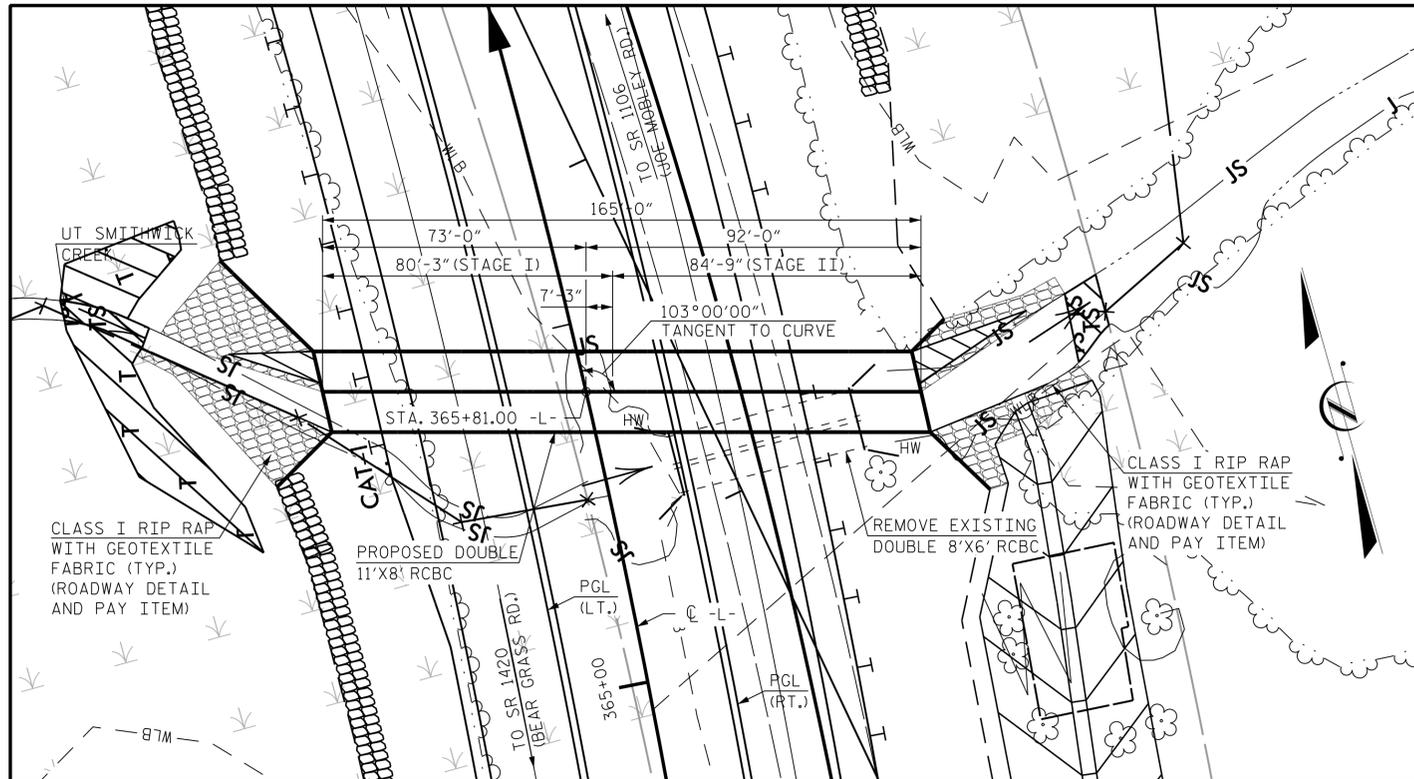


DRAWN BY : B. H. GONFA DATE : AUG 2021
 CHECKED BY : K. HAWKINS DATE : AUG 2021
 DESIGN ENGINEER OF RECORD : K. HAWKINS DATE : AUG 2021

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	CU_48-8
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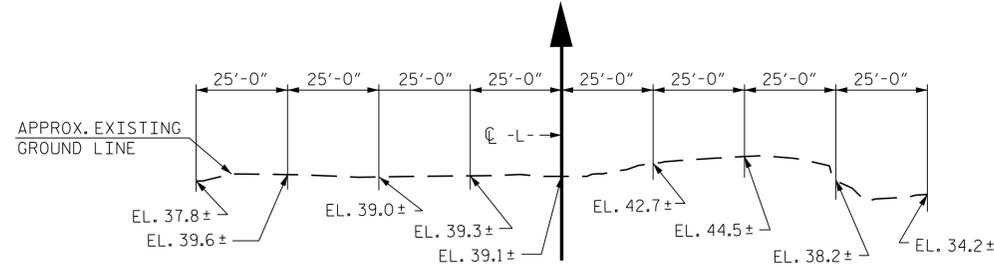
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BENCH MARK: BM #14 -L- STA. 364+74.83, 190.9' RT, RR SPIKE SET IN 14" GUM TREE, N 727581.3, E 2571343.4; EL. 42.80, NAVD 88



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS
 GRADE POINT ELEVATIONS AT STA. 365+81.00 -L- ARE 51.0 (LT.) & 50.9 (RT.)
 BED ELEVATION AT STA. 365+81.00 -L- = 34.9
 ROADWAY SLOPES = 3:1



PROFILE ALONG CULVERT

STAGE I STRUCTURE QUANTITIES			
CLASS A CONCRETE			
BARREL @	2.82	CY/FT	226.5 C.Y.
WING ETC.	19.8		C.Y.
SILLS/BAFFLES	4.9		C.Y.
TOTAL	251.2		C.Y.
REINFORCING STEEL			
BARREL	27,900		LBS.
WINGS ETC.	1,169		LBS.
TOTAL	29,069		LBS.
CULVERT EXCAVATION ----- LUMP SUM			
REMOVAL OF EXISTING STRUCTURE ----- LUMP SUM			
FOUNDATION CONDITIONING MATERIAL----158 TONS			

STAGE II STRUCTURE QUANTITIES			
CLASS A CONCRETE			
BARREL @	2.82	CY/FT	239.3 C.Y.
WING ETC.	19.8		C.Y.
SILLS/BAFFLES	4.9		C.Y.
TOTAL	264.0		C.Y.
REINFORCING STEEL			
BARREL	29,222		LBS.
WINGS ETC.	1,169		LBS.
TOTAL	30,391		LBS.
CULVERT EXCAVATION ----- LUMP SUM			
FOUNDATION CONDITIONING MATERIAL----167 TONS			

HYDRAULIC DATA

DESIGN DISCHARGE-----780 C.F.S.
 FREQUENCY OF DESIGN FLOOD-----50 YR.
 DESIGN HIGH WATER ELEVATION-----42.6
 DRAINAGE AREA-----3.18 SQ. MI.
 BASE DISCHARGE (Q100)-----950 C.F.S.
 BASE HIGH WATER ELEVATION-----43.2

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE-----2,200 C.F.S.
 FREQUENCY OF OVERTOPPING FLOOD-----500 YR. +
 OVERTOPPING FLOOD ELEVATION-----46.9

NOTES:

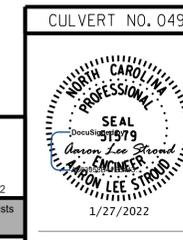
- ASSUMED LIVE LOAD ----- HL-93 OR ALTERNATE LOADING.
- DESIGN FILL----- 11.1 FT. (MAX.), 5.2 FT. (MIN.)
- 3" Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
- FOR OTHER DESIGN DATA AND NOTES, SEE STANDARD NOTE SHEET.
- CONCRETE IN STAGE I CULVERT TO BE POURED IN THE FOLLOWING ORDER:
 - STAGE I WING FOOTINGS, CURTAIN WALL, AND FLOOR SLAB INCLUDING 4" OF STAGE I VERTICAL WALLS.
 - THE REMAINING PORTIONS OF STAGE I WALLS TO THE PERMITTED CONSTRUCTION JOINT AND STAGE I WINGS FOR FULL HEIGHT.
 - STAGE I ROOF SLAB, HEADWALL, AND SILLS/BAFFLES.
- CONCRETE IN STAGE II CULVERT TO BE POURED IN THE FOLLOWING ORDER:
 - STAGE II WING FOOTINGS, CURTAIN WALL, AND FLOOR SLAB INCLUDING 4" OF STAGE II VERTICAL WALLS.
 - THE REMAINING PORTION OF STAGE II WALLS TO THE PERMITTED CONSTRUCTION JOINT AND STAGE II WINGS FOR FULL HEIGHT.
 - STAGE II ROOF SLAB, HEADWALL, AND SILLS/BAFFLES.
- THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN IT WILL PROPERLY TAKE CARE OF THE FILL.
- DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.
- AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF THE EXTERIOR WALL ABOVE THE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.
- A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WINGS COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- THE EXISTING STRUCTURE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COSTS INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING STRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.
- NO PRECAST BOX CULVERT OPTION WILL BE ALLOWED.
- FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.
- EXCAVATE A MINIMUM OF 1 FOOT BELOW CULVERT BEARING ELEVATION AND REPLACE WITH FOUNDATION CONDITIONING MATERIAL PER SECTION 414 OF THE STANDARD SPECIFICATIONS (SELECT MATERIAL, CLASS VI).
- GEOTEXTILE FOR SOIL STABILIZATION IS REQUIRED BELOW THE FOUNDATION CONDITIONING MATERIAL. UNDERCUT ANY SOFT/LOOSE SOILS THAT MAY BE ENCOUNTERED BENEATH THE BOTTOM OF THE FOUNDATION CONDITIONING MATERIAL. BACKFILL UNDERCUT AREAS WITH FOUNDATION CONDITIONING MATERIAL.
- TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FEET. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
- TRAFFIC SHALL BE MAINTAINED. IN ORDER TO MAINTAIN TRAFFIC THE CULVERT SHALL BE CONSTRUCTED IN STAGES. SEE TRANSPORTATION MANAGEMENT PLANS.
- THE ENTIRE COST OF WORK REQUIRED TO PLACE EXCAVATED OR SUPPLEMENTAL MATERIAL AS SHOWN ON THE PLANS SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR CULVERT EXCAVATION.
- THE EXISTING STRUCTURE CONSISTING OF DOUBLE BARREL 8 FT X 6 FT RCBC WITH CONCRETE ENDWALLS LOCATED AT THE PROPOSED CULVERT SITE SHALL BE REMOVED.

PROJECT NO. R-2511
MARTIN COUNTY
 STATION: 365+81.00 -L-

SHEET 1 OF 9

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DOUBLE 11 FT. X 8 FT.
 CONCRETE BOX CULVERT
 103°00' 00" SKEW



REVISIONS				SHEET NO.	
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DRAWN BY : B. H. GONFA DATE : JAN 2022
 CHECKED BY : A. L. STROUD DATE : JAN 2022
 DESIGN ENGINEER OF RECORD : A. L. STROUD DATE : JAN 2022

TOTAL SHEETS
 9

LOAD FACTORS:

DESIGN LOAD RATING FACTORS

LOAD TYPE	MAX FACTOR	MIN FACTOR
DC	1.25	0.90
DW	1.50	0.65
EV	1.30	0.90
EH	1.35	0.90
ES	1.35	0.90
LS	1.75	--
WA	1.00	--

NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

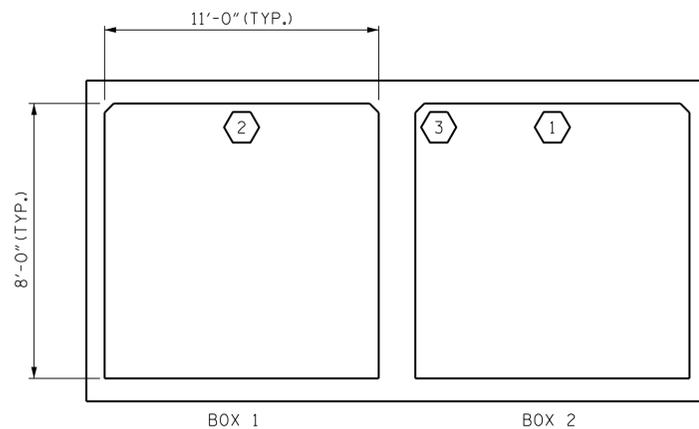
COMMENTS:

1. CULVERT RATING AT -L- 365+81.00

- 2.
- 3.
- 4.

#	CONTROLLING LOAD RATING
1	DESIGN LOAD RATING (HL-93)
2	DESIGN LOAD RATING (HS-20)
3	LEGAL LOAD RATING **
**	SEE CHART FOR VEHICLE TYPE

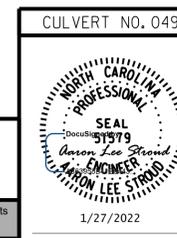
LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS																
LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE								COMMENT NUMBER		
						LIVE-LOAD FACTORS (γ _{LL})	MOMENT				SHEAR					
							RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE		DISTANCE FROM LEFT END OF ELEMENT (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	1	1.41	--	1.75	1.41	2	TOP SLAB	5.5	1.41	2	TOP SLAB	5.5		
	HL-93 (OPERATING)	N/A		1.83	--	1.35	1.83	2	TOP SLAB	5.5	1.83	2	TOP SLAB	0.1		
	HS-20 (INVENTORY)	36.000	2	1.79	64.44	1.75	1.79	1	TOP SLAB	5.5	1.89	2	TOP SLAB	0.1		
	HS-20 (OPERATING)	36.000		2.32	83.52	1.35	2.32	1	TOP SLAB	5.5	2.45	2	TOP SLAB	0.1		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		4.70	63.45	1.40	4.70	1	TOP SLAB	5.5	5.09	2	TOP SLAB	0.1	
		SNGARBS2	20.000		4.40	88.00	1.40	4.40	1	TOP SLAB	5.5	4.68	2	TOP SLAB	0.1	
		SNAGRIS2	22.000		4.70	103.40	1.40	4.70	1	TOP SLAB	5.5	4.93	2	TOP SLAB	0.1	
		SNCOTTS3	27.250		2.50	68.13	1.40	2.55	1	TOP SLAB	5.5	2.50	2	TOP SLAB	0.1	
		SNAGGRS4	34.925		2.52	88.01	1.40	3.00	2	BOTTOM SLAB	0.1	2.52	2	TOP SLAB	0.1	
		SNS5A	35.550		2.43	86.39	1.40	2.90	1	TOP SLAB	5.5	2.43	2	TOP SLAB	0.1	
		SNS6A	39.950		2.41	96.28	1.40	2.77	2	BOTTOM SLAB	0.1	2.41	2	TOP SLAB	0.1	
		SNS7B	42.000		2.34	98.28	1.40	2.70	2	BOTTOM SLAB	0.1	2.34	2	TOP SLAB	0.1	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		3.45	113.85	1.40	3.52	1	BOTTOM SLAB	11	3.45	2	TOP SLAB	0.1	
		TNT4A	33.075		2.88	95.26	1.40	3.03	2	TOP SLAB	5.5	2.88	2	TOP SLAB	0.1	
		TNT6A	41.600		2.58	107.33	1.40	2.96	2	TOP SLAB	5.5	2.58	2	TOP SLAB	0.1	
		TNT7A	42.000		2.72	114.24	1.40	2.93	2	BOTTOM SLAB	0.1	2.72	2	TOP SLAB	0.1	
		TNT7B	42.000		2.57	107.94	1.40	2.96	1	TOP SLAB	5.5	2.57	2	TOP SLAB	0.1	
		TNAGRIT4	43.000		2.78	119.54	1.40	2.81	2	BOTTOM SLAB	0.1	2.78	2	TOP SLAB	0.1	
		TNAGT5A	45.000		2.76	124.20	1.40	2.86	1	BOTTOM SLAB	11	2.76	2	TOP SLAB	0.1	
		TNAGT5B	45.000		2.54	114.30	1.40	2.54	2	BOTTOM SLAB	0.1	2.70	2	TOP SLAB	0.1	



LRFR SUMMARY
(LOOKING DOWNSTREAM)

PROJECT NO. R-2511
MARTIN COUNTY
STATION: 365+81.00 -L-

SHEET 2 OF 9



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
LRFR SUMMARY FOR
REINFORCED CONCRETE
BOX CULVERTS
(NON-INTERSTATE TRAFFIC)

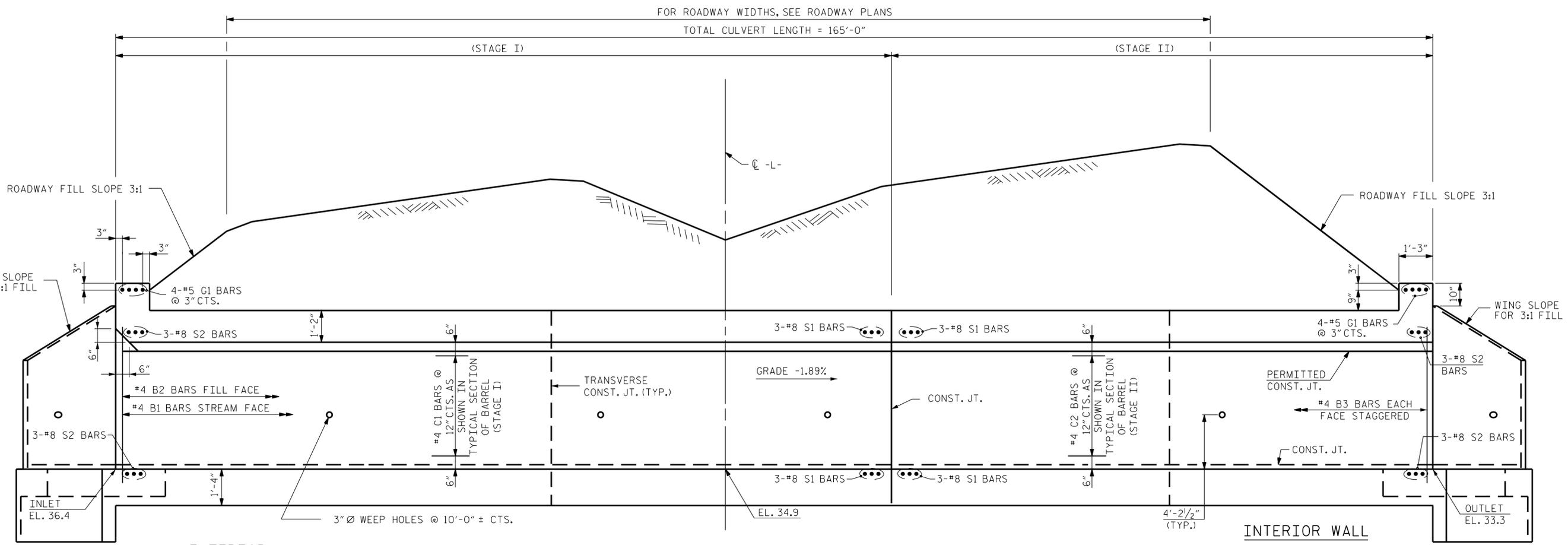
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SHEET NO. CU-49-2
TOTAL SHEETS 9

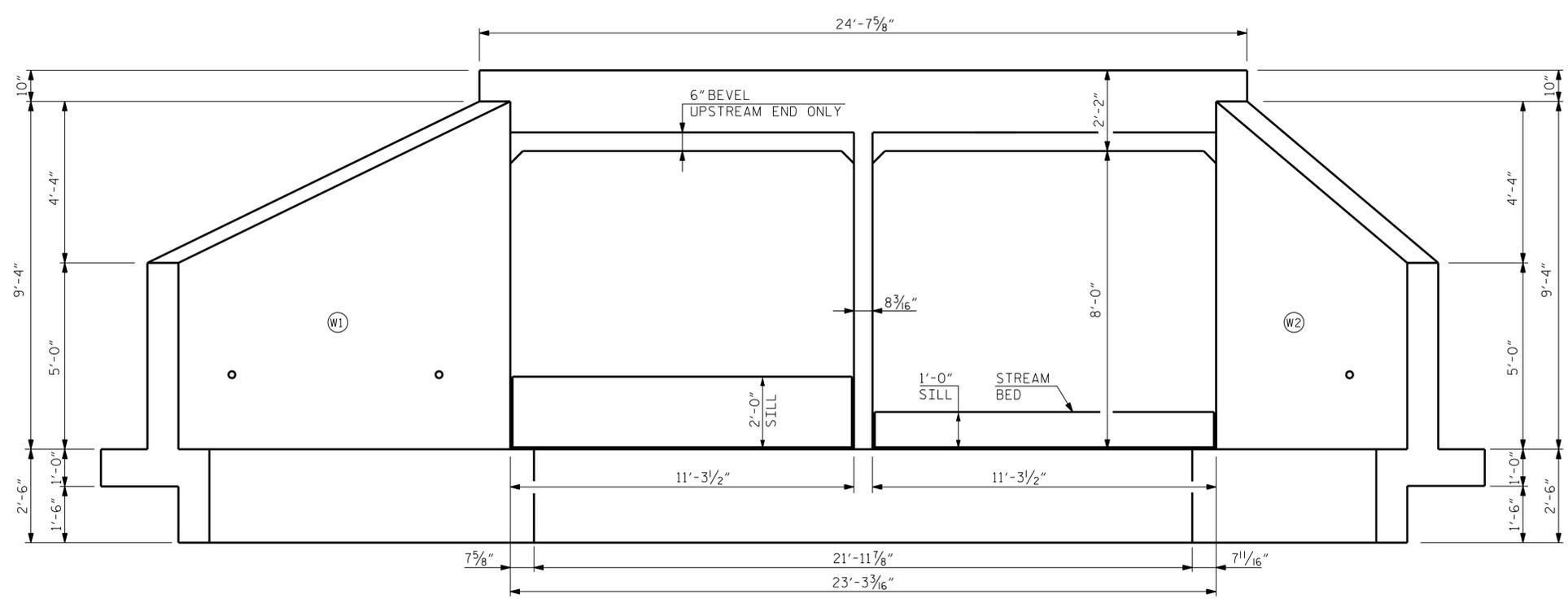
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DRAWN BY : B. H. GONFA DATE : JAN 2022
CHECKED BY : A. L. STROUD DATE : JAN 2022
DESIGN ENGINEER OF RECORD : A. L. STROUD DATE : JAN 2022

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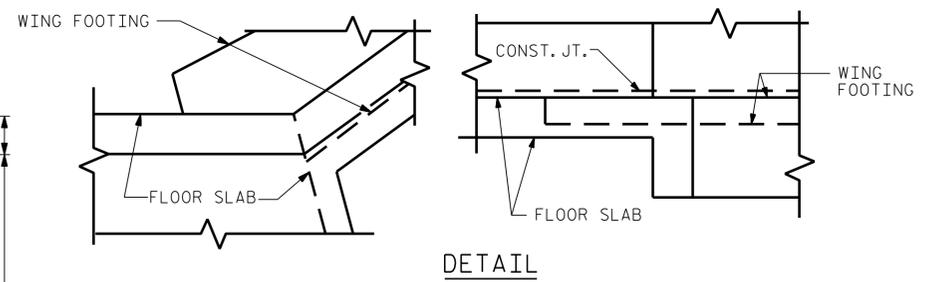
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CULVERT SECTION NORMAL TO ROADWAY



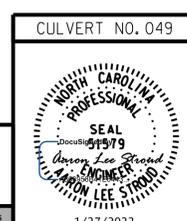
END ELEVATION NORMAL TO SKEW (INLET) (LOOKING DOWNSTREAM)



DETAIL CONNECTION OF WING FOOTING AND FLOOR WHEN SLAB IS THICKER THAN FOOTING

PROJECT NO. R-2511
MARTIN COUNTY
STATION: 365+81.00 -L-

SHEET 3 OF 9



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
DOUBLE 11 FT. X 8 FT.
CONCRETE BOX CULVERT
103°00' 00" SKEW

RK&K
P: (919) 878-9560
8601 Six Forks Road, Forum 1 Suite 700
Raleigh, North Carolina 27615 | NC License No. F-0112
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PLAN - ROOF SLAB
STAGE I

PROJECT NO. R-2511
MARTIN COUNTY
 STATION: 365+81.00 -L-

SHEET 4 OF 9

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DOUBLE 11 FT. X 8 FT.
 CONCRETE BOX CULVERT
 STAGE I
 103°00' 00" SKEW

CULVERT NO. 049



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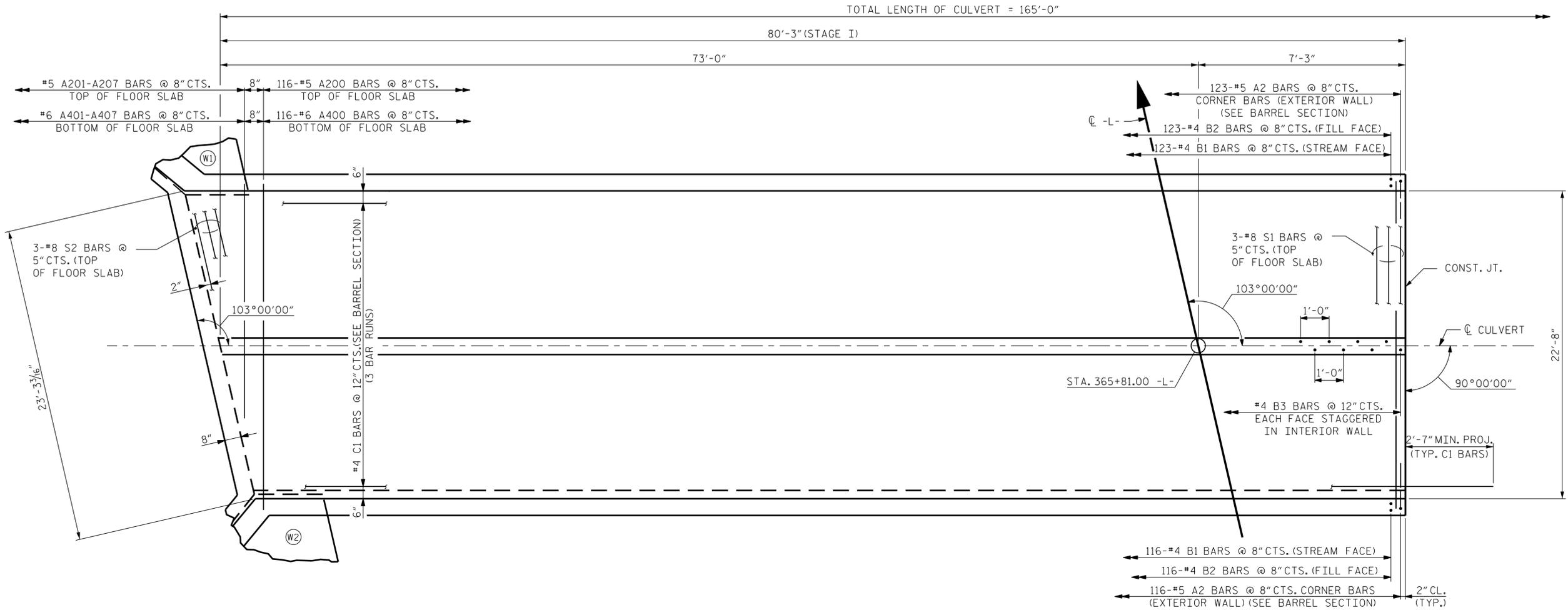
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 DESIGN ENGINEER OF RECORD : A. L. STROUD DATE : JAN 2022



PLAN - FLOOR SLAB
STAGE I

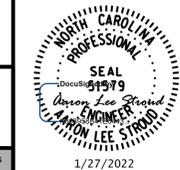
PROJECT NO. R-2511
MARTIN COUNTY
 STATION: 365+81.00 -L-

SHEET 5 OF 9

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DOUBLE 11 FT. X 8 FT.
 CONCRETE BOX CULVERT
 STAGE I
 103°00' 00" SKEW

CULVERT NO. 049



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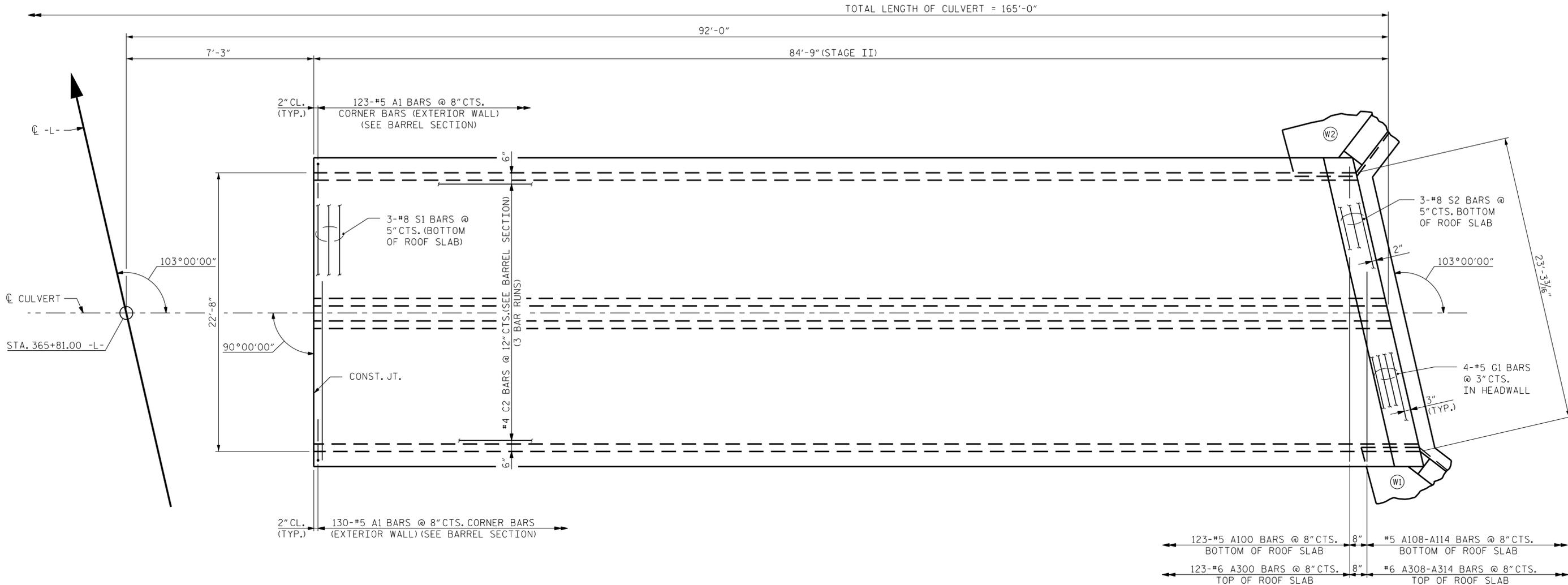
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 CHECKED BY : A. L. STROUD DATE : JAN 2022
 DESIGN ENGINEER OF RECORD : A. L. STROUD DATE : JAN 2022

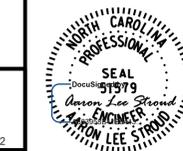


PLAN - ROOF SLAB
STAGE II

PROJECT NO. R-2511
MARTIN COUNTY
 STATION: 365+81.00 -L-

SHEET 6 OF 9

CULVERT NO. 049



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DOUBLE 11 FT. X 8 FT.
 CONCRETE BOX CULVERT
 STAGE II
 103°00' 00" SKEW



1/27/2022

REVISIONS

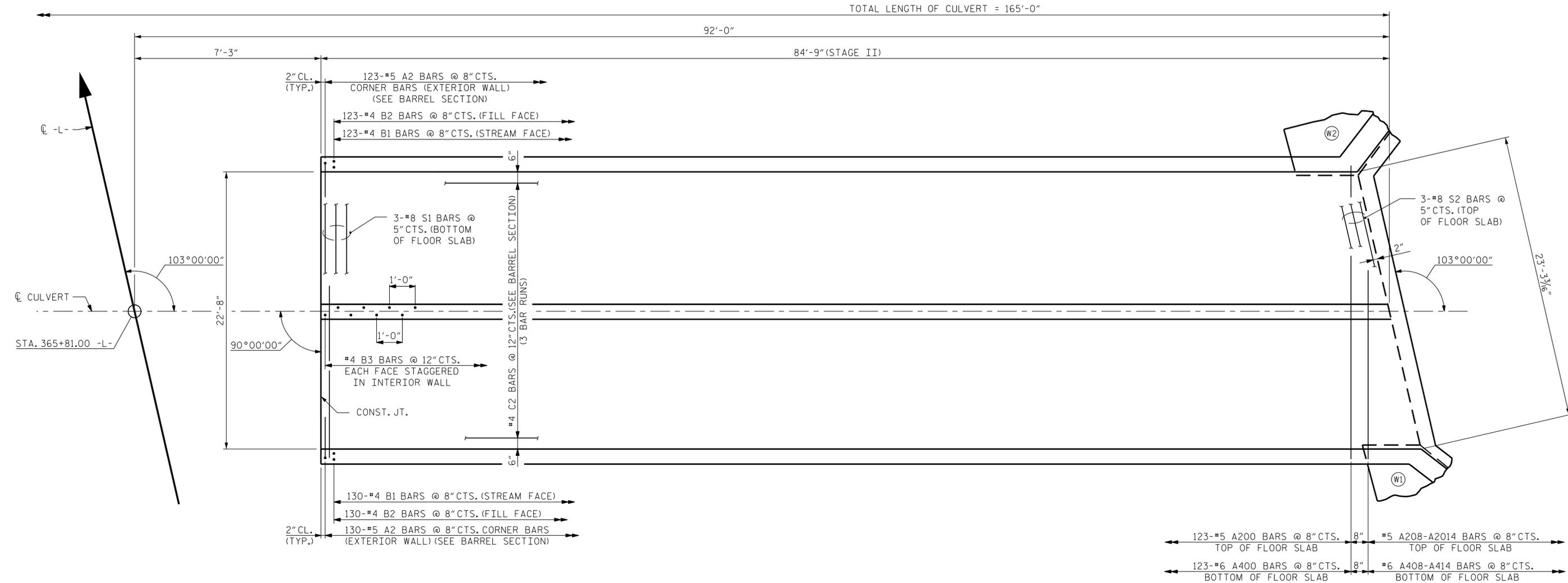
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SHEET NO.	
CU-49-6	TOTAL SHEETS 9

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 DESIGN ENGINEER OF RECORD : A. L. STROUD DATE : JAN 2022



PLAN - FLOOR SLAB
STAGE II

PROJECT NO. R-2511
MARTIN COUNTY
 STATION: 365+81.00 -L-

SHEET 7 OF 9

CULVERT NO. 049



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DOUBLE 11 FT. X 8 FT.
 CONCRETE BOX CULVERT
 STAGE II
 103°00' 00" SKEW



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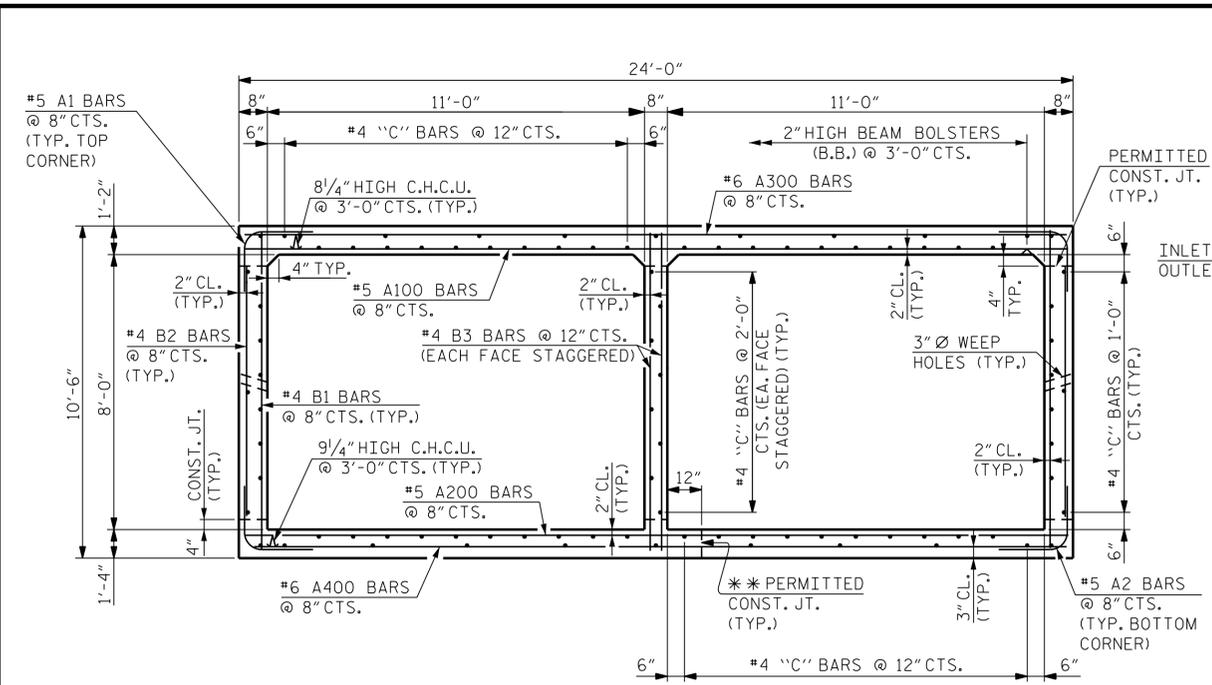
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CU_49-7
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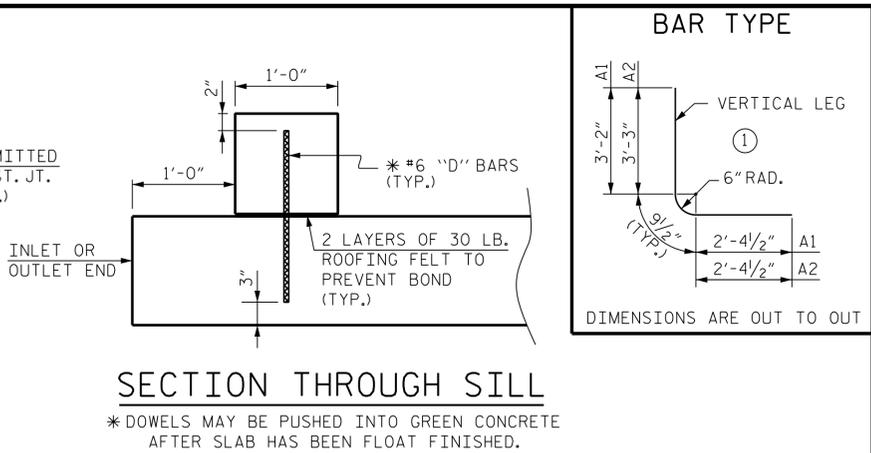
RIGHT ANGLE SECTION OF BARREL
(THERE ARE 88 "C" BARS IN SECTION OF BARREL)

**STEEL IN THE BOTTOM SLAB MAY BE SPLICED AT THE PERMITTED CONSTRUCTION JOINT AT THE CONTRACTOR'S OPTION. EXTRA WEIGHT OF STEEL DUE TO SPLICES WILL BE PAID FOR BY THE CONTRACTOR.

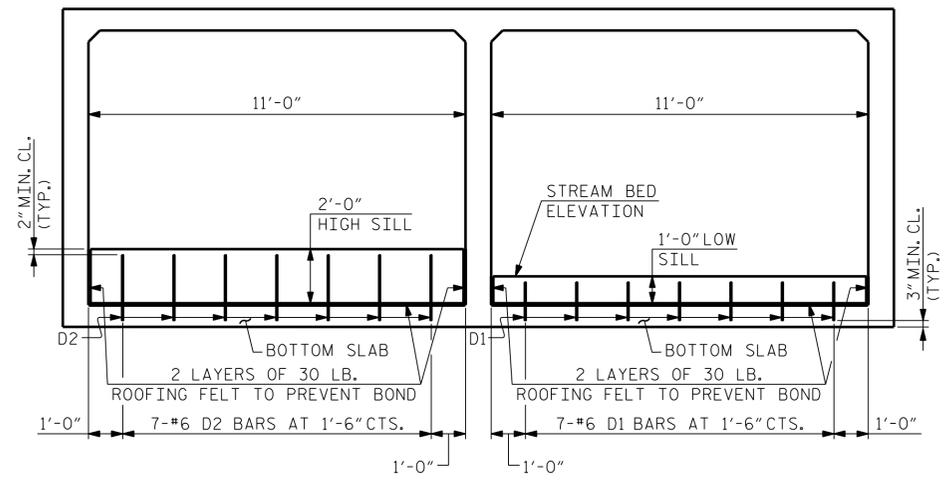
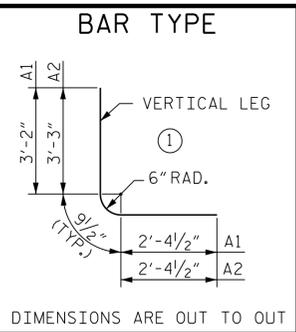
NOTE:
NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAMBED MAY BE USED TO LINE THE BOTTOM OF THE CULVERT BARREL. RIP RAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL IN THE HIGH FLOW BARREL.

IF RIP RAP IS USED TO LINE THE HIGH FLOW BARREL, NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FILL VOIDS AND PROVIDE A FLAT PASSAGE FOR ANIMAL PASSAGE.

NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.



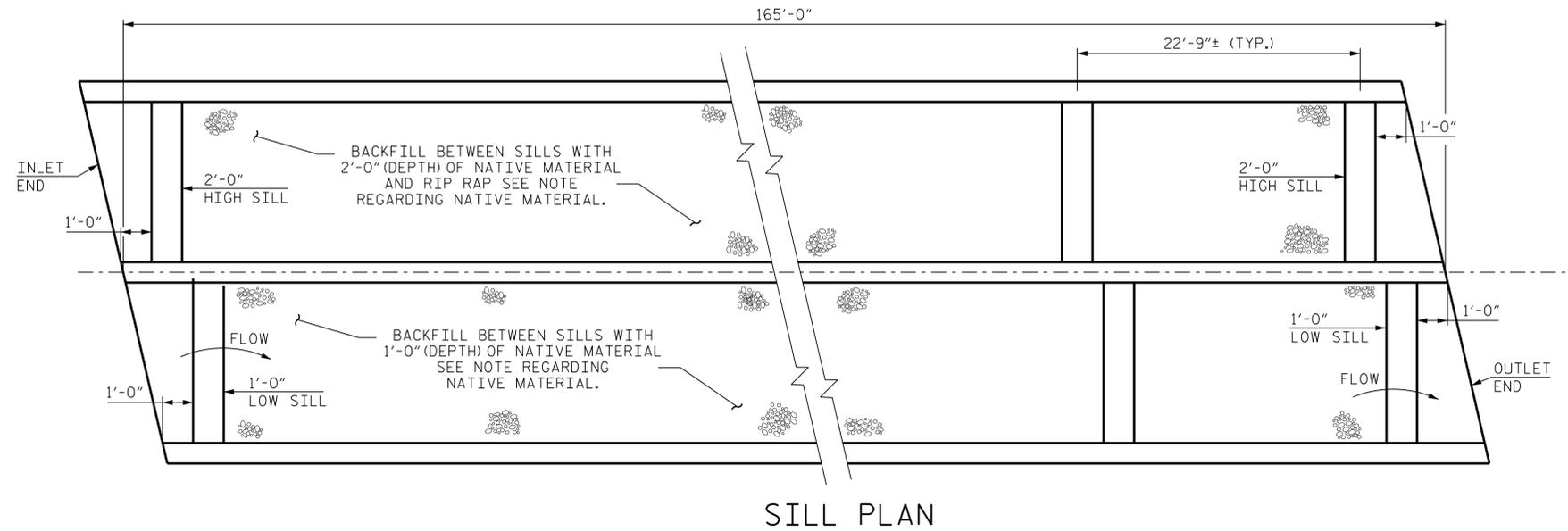
SECTION THROUGH SILL
* DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED.



SILL ELEVATION
DOWEL SPACING SHOWN PERPENDICULAR TO CULVERT BARREL

BILL OF MATERIAL (STAGE I)						BILL OF MATERIAL (STAGE II)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	239	#5	1	6'-4"	1,579	A1	253	#5	1	6'-4"	1,671
A2	239	#5	1	6'-5"	1,600	A2	253	#5	1	6'-5"	1,693
A100	116	#5	STR.	23'-8"	2,863	A100	123	#5	STR.	23'-8"	3,036
A101	1	#5	STR.	22'-8"	24	A108	1	#5	STR.	21'-11"	23
A102	1	#5	STR.	19'-9"	21	A109	1	#5	STR.	19'-0"	20
A103	1	#5	STR.	16'-10"	18	A110	1	#5	STR.	16'-1"	17
A104	1	#5	STR.	13'-11"	15	A111	1	#5	STR.	13'-2"	14
A105	1	#5	STR.	11'-0"	11	A112	1	#5	STR.	10'-3"	11
A106	1	#5	STR.	8'-1"	8	A113	1	#5	STR.	7'-4"	8
A107	1	#5	STR.	5'-2"	5	A114	1	#5	STR.	4'-5"	5
A200	116	#5	STR.	23'-8"	2,863	A200	123	#5	STR.	23'-8"	3,036
A201	1	#5	STR.	22'-8"	24	A208	1	#5	STR.	21'-11"	23
A202	1	#5	STR.	19'-9"	21	A209	1	#5	STR.	19'-0"	20
A203	1	#5	STR.	16'-10"	18	A210	1	#5	STR.	16'-1"	17
A204	1	#5	STR.	13'-11"	15	A211	1	#5	STR.	13'-2"	14
A205	1	#5	STR.	11'-0"	11	A212	1	#5	STR.	10'-3"	11
A206	1	#5	STR.	8'-1"	8	A213	1	#5	STR.	7'-4"	8
A207	1	#5	STR.	5'-2"	5	A214	1	#5	STR.	4'-5"	5
A300	116	#6	STR.	23'-8"	4,123	A300	123	#6	STR.	23'-8"	4,372
A301	1	#6	STR.	22'-8"	34	A308	1	#6	STR.	21'-11"	33
A302	1	#6	STR.	19'-9"	30	A309	1	#6	STR.	19'-0"	29
A303	1	#6	STR.	16'-10"	25	A310	1	#6	STR.	16'-1"	24
A304	1	#6	STR.	13'-11"	21	A311	1	#6	STR.	13'-2"	20
A305	1	#6	STR.	11'-0"	17	A312	1	#6	STR.	10'-3"	15
A306	1	#6	STR.	8'-1"	12	A313	1	#6	STR.	7'-4"	11
A307	1	#6	STR.	5'-2"	8	A314	1	#6	STR.	4'-5"	7
A400	116	#6	STR.	23'-8"	4,123	A400	123	#6	STR.	23'-8"	4,372
A401	1	#6	STR.	22'-8"	34	A408	1	#6	STR.	21'-11"	33
A402	1	#6	STR.	19'-9"	30	A409	1	#6	STR.	19'-0"	29
A403	1	#6	STR.	16'-10"	25	A410	1	#6	STR.	16'-1"	24
A404	1	#6	STR.	13'-11"	21	A411	1	#6	STR.	13'-2"	20
A405	1	#6	STR.	11'-0"	17	A412	1	#6	STR.	10'-3"	15
A406	1	#6	STR.	8'-1"	12	A413	1	#6	STR.	7'-4"	11
A407	1	#6	STR.	5'-2"	8	A414	1	#6	STR.	4'-5"	7
B1	239	#4	STR.	10'-1"	1,610	B1	253	#4	STR.	10'-1"	1,704
B2	239	#4	STR.	7'-4"	1,171	B2	253	#4	STR.	7'-4"	1,239
B3	160	#4	STR.	10'-1"	1,078	B3	170	#4	STR.	10'-1"	1,145
C1	264	#4	STR.	30'-2"	5,320	C2	264	#4	STR.	30'-8"	5,408
D1	28	#6	STR.	1'-11"	81	D1	28	#6	STR.	1'-11"	81
D2	28	#6	STR.	2'-11"	123	D2	28	#6	STR.	2'-11"	123
G1	4	#5	STR.	24'-3"	101	G1	4	#5	STR.	24'-3"	101
S1	6	#8	STR.	23'-8"	379	S1	6	#8	STR.	23'-8"	379
S2	6	#8	STR.	24'-3"	388	S2	6	#8	STR.	24'-3"	388
REINFORCING STEEL					27,900 LBS.	REINFORCING STEEL					29,222 LBS.

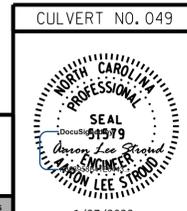
SPLICE LENGTHS		
BAR	SIZE	SPLICE LENGTHS
B2	#4	1'-10"
C1	#4	2'-5"
C2	#4	2'-5"



SILL PLAN

PROJECT NO. R-2511
MARTIN COUNTY
STATION: 365+81.00 -L-

SHEET 8 OF 9



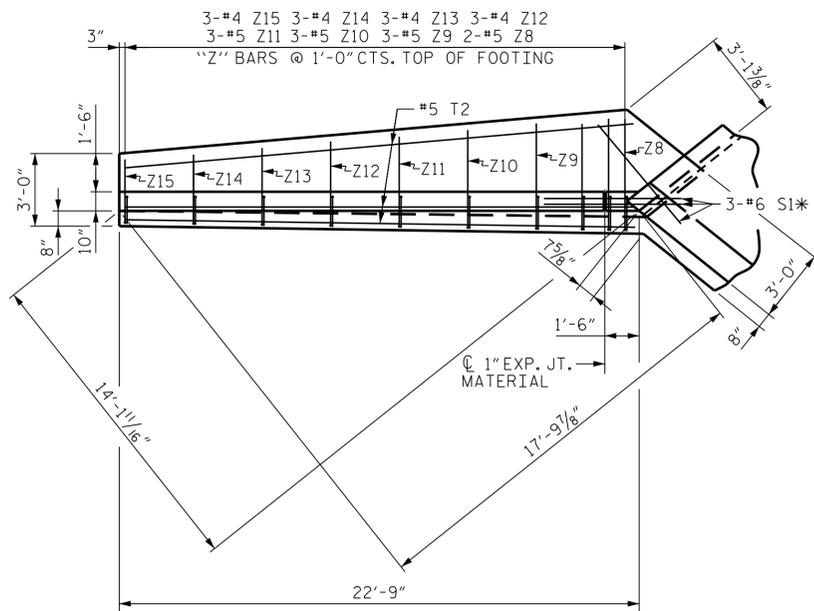
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
DOUBLE 11 FT. X 8 FT. CONCRETE BOX CULVERT
103°00' 00" SKEW



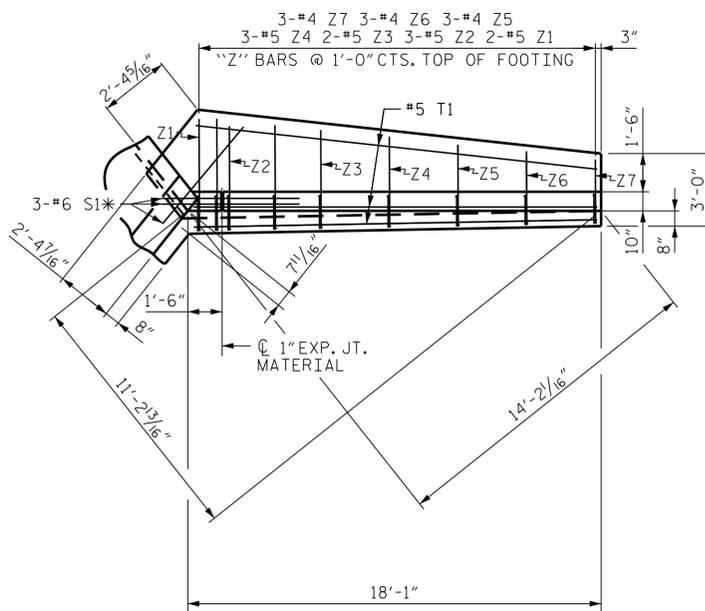
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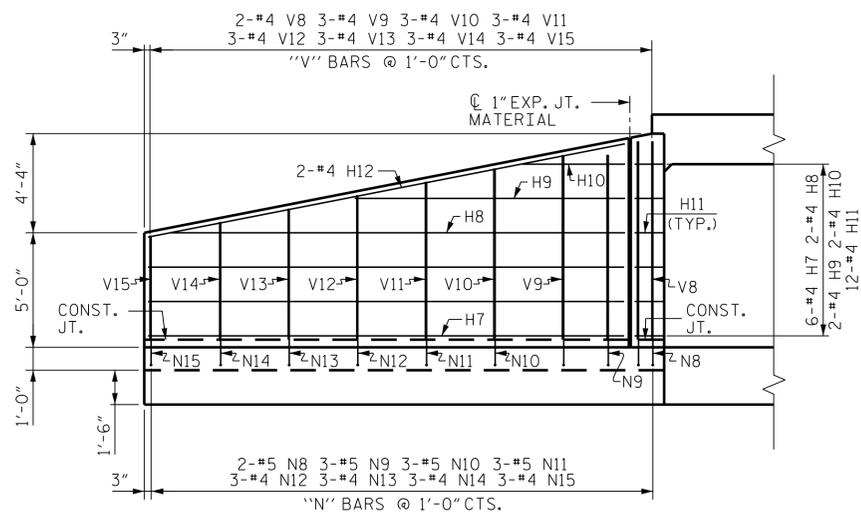
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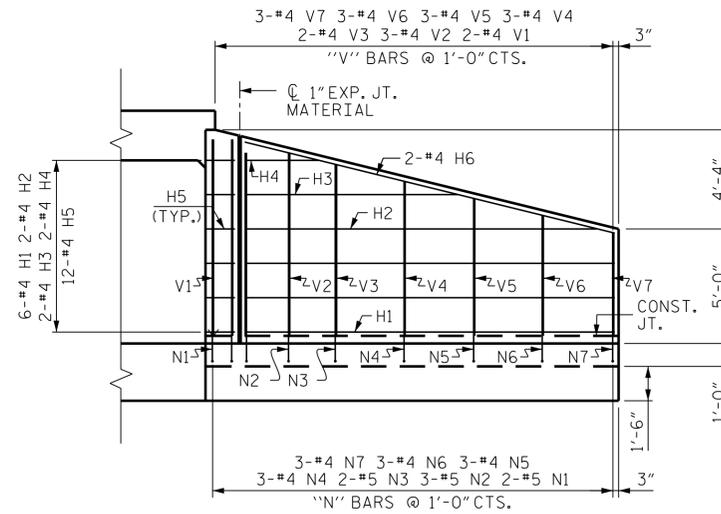
PLAN W1



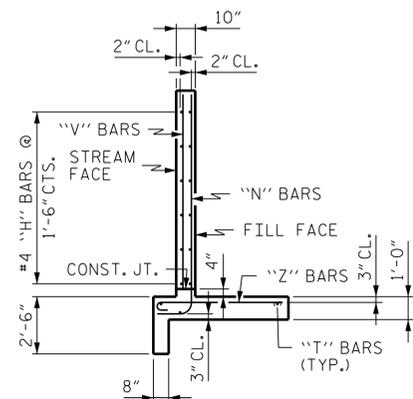
PLAN W2



ELEVATION W1



ELEVATION W2



TYPICAL WING SECTION

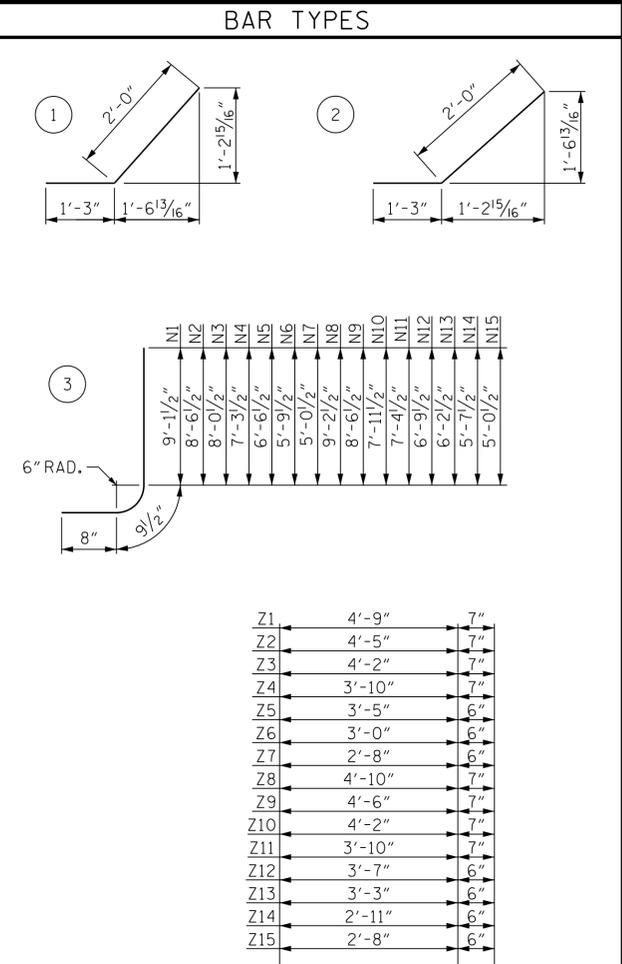
BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	12	#4	STR.	16'-1"	129
H2	4	#4	STR.	15'-5"	41
H3	4	#4	STR.	9'-4"	25
H4	4	#4	STR.	3'-3"	9
H5	24	#4	2	3'-3"	52
H6	4	#4	STR.	16'-7"	44
H7	12	#4	STR.	20'-9"	166
H8	4	#4	STR.	19'-11"	53
H9	4	#4	STR.	12'-2"	33
H10	4	#4	STR.	4'-6"	12
H11	24	#4	1	3'-3"	52
H12	4	#4	STR.	21'-2"	57
N1	4	#5	3	10'-7"	44
N2	6	#5	3	10'-0"	63
N3	4	#5	3	9'-6"	40
N4	6	#5	3	8'-9"	55
N5	6	#4	3	8'-0"	32
N6	6	#4	3	7'-3"	29
N7	6	#4	3	6'-6"	26
N8	4	#5	3	10'-8"	45
N9	6	#5	3	10'-0"	63
N10	6	#5	3	9'-5"	59
N11	6	#5	3	8'-10"	55
N12	6	#4	3	8'-3"	33
N13	6	#4	3	7'-8"	31
N14	6	#4	3	7'-1"	28
N15	6	#4	3	6'-6"	26
S1	12	#6	STR.	6'-0"	108
T1	6	#5	STR.	17'-7"	110
T2	6	#5	STR.	22'-4"	140
V1	4	#4	STR.	8'-7"	23
V2	6	#4	STR.	8'-0"	32
V3	4	#4	STR.	7'-6"	20
V4	6	#4	STR.	6'-9"	27
V5	6	#4	STR.	6'-0"	24
V6	6	#4	STR.	5'-3"	21
V7	6	#4	STR.	4'-6"	18
V8	4	#4	STR.	8'-8"	23
V9	6	#4	STR.	8'-0"	32
V10	6	#4	STR.	7'-5"	30
V11	6	#4	STR.	6'-10"	27
V12	6	#4	STR.	6'-3"	25
V13	6	#4	STR.	5'-8"	23
V14	6	#4	STR.	5'-1"	20
V15	6	#4	STR.	4'-6"	18
Z1	4	#5	4	5'-4"	22
Z2	6	#5	4	5'-0"	31
Z3	4	#5	4	4'-9"	20
Z4	6	#5	4	4'-5"	28
Z5	6	#4	4	3'-11"	16
Z6	6	#4	4	3'-6"	14
Z7	6	#4	4	3'-2"	13
Z8	4	#5	4	5'-5"	23
Z9	6	#5	4	5'-1"	32
Z10	6	#5	4	4'-9"	30
Z11	6	#5	4	4'-5"	28
Z12	6	#4	4	4'-1"	16
Z13	6	#4	4	3'-9"	15
Z14	6	#4	4	3'-5"	14
Z15	6	#4	4	3'-2"	13

REINFORCING STEEL 2,338 LBS
FOR 4 WINGS

CLASS A CONCRETE

4 WINGS	34.4	CY
2 HEADWALLS	2.4	CY
2 END CURTAIN WALLS	2.8	CY
TOTAL	39.6	CY



ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. R-2511
MARTIN COUNTY
STATION: 365+81.00 -L-

SHEET 9 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WINGS FOR
CONCRETE BOX CULVERT
H = 8'-0" SLOPE = 3:1
103°00' 00" SKEW

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CHECKED BY: A. L. STROUD DATE: JAN 2022
DESIGN ENGINEER OF RECORD: A. L. STROUD DATE: JAN 2022

SHEET NO.
CU-49-9
TOTAL SHEETS
9

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	-----	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	-----	SEE PLANS
IMPACT ALLOWANCE	-----	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF STRUCTURAL STEEL - AASHTO M270 GRADE 36	--	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	--	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	--	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION - GRADE 60	--	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	-----	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	-----	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR UNTREATED EXTREME FIBER STRESS	---	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	-----	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	-----	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2018 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1 1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 1/4" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A 1/4" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16" INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINIS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

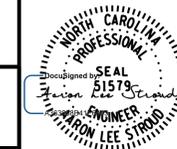
PROJECT NO. R-2511
MARTIN COUNTY
 STATION: 365+81.00 -L-

SHEET 10 OF 10

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 NOTES

CULVERT NO. 049



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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	CU-49-10
1			3			TOTAL SHEETS
2			4			10

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

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DRAWN BY : B. H. GONFA	DATE : JUL 2021
CHECKED BY : A. L. STROUD	DATE : JUL 2021
DESIGN ENGINEER OF RECORD : A. L. STROUD	DATE : JUL 2021