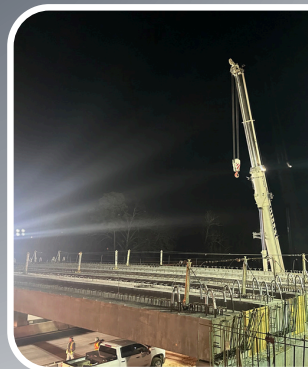




Technical Proposal
**S-31 (CANNONS CAMPGROUND RD.)
OVER PETERS CREEK
EMERGENCY BRIDGE REPLACEMENT
DESIGN-BUILD**

Spartanburg County, SC

Contract ID Number
P041165



April 16, 2025





4.1 Technical Proposal



Our Team of Wright Brothers Construction Company, Inc (WBC) and Neel-Schaffer (NS) is highly motivated and fully equipped to deliver this critical infrastructure repair and improvement project with the highest quality and utmost urgency, in accordance with the expedited schedule set by SCDOT. WBC and NS are uniquely suited for this project, with the established partnership, design-build experience, vast resources, and bridge construction expertise necessary to complete this project on time. The WBC Team's experience, along with our **Core Values of Integrity, Urgency, Selflessness, and Hard Work, will be critical to the success of this project.**

Wright Brothers is one of the Southeast's largest heavy civil contractors, successfully delivering major roadway and bridge projects since 1961. With a resume that includes 15 alternative delivery projects totaling over \$500M, WBC has completed over \$1.46B in heavy civil, highway, concrete structures, and paving contracts in the last 10 years. With over 725 employees and 500 pieces of heavy construction equipment, WBC has the ability to self-perform all major work disciplines on this project including demolition, mass grading, drainage, pile driving, drilled shafts, bridge construction, setting precast, and finish grading. Even with our ability to self-perform virtually all major items of work on the project, we will engage highly qualified subcontractors to assist in the success of the project and ensure schedule certainty. Neel-Schaffer brings a highly qualified staff of more than 600+ engineers firm-wide, 150 of whom work in the East Region, including a multi-disciplinary staff of 30 located in Columbia, SC.

Approach to Phasing

The WBC Team fully understands the magnitude, multiple disciplines, and SCDOT's critical schedule to replace and re-open this bridge and provide long-term quality facilities. To meet these responsibilities, the WBC Team will work closely together from procurement to the final punch list.

To achieve Substantial Completion by November 29, 2025, the WBC Team has determined priority early design and construction activities considering critical factors including: Environmental Permitting, Utility Coordination, ROW and Easements, Geotechnical Analysis for Bridges and Walls, and Precast Fabrication. Based on our extensive Accelerated Bridge Construction (ABC) experience, we know that it will be key to advance plans details for bridge foundations and precast bridge components bridges that may provide the earliest NTP for Construction and provide sufficient lead time to fabricate materials. Our Team is aware of the ROW and utility constraints present at the project site and will develop approved retaining wall designs and construction methods that minimize impacts to the fullest extent possible. Utility coordination will proceed immediately based on our conceptual plans to ensure conflicts are avoided or addressed by the design.

As a result of our schedule analysis, our approach will be to begin geotechnical investigations for the bridge and retaining walls immediately. Laboratory testing for final reports will be critical to inform our design and confirm wall types, so the DB Team is prepared to utilize the resources of multiple qualified laboratories for analysis of geotechnical data. Early Work Packages for design will include Retaining Walls, Drilled Shafts, and Precast Materials, to advance the development of shop drawings and procurement of critical materials on an accelerated schedule.

Given below is a brief description of the anticipated scope for the S-31 Bridge over Peters Creek. Through the ATC process, our Team has developed several innovative concepts to provide a high-quality structure that will also meet the Department’s schedule goals. Concept Plans for the bridge and roadway are provided in Appendix A.1 and A.2 and our Formal ATCs being incorporated into the Cost Proposal are included in Appendix C.

S-31 over Peters Creek (Spartanburg County) will consist of a 160’ long two-span bridge (60’ cored slabs –100’ box beams). Abutments 1 and 2 will be founded on H Piles and the interior Bent 2 will be founded on drilled shafts. Precast substructure elements, including columns, abutments, and wingwalls, will be used to accelerate the schedule. The Bent 2 cap will be poured in place. Superstructure includes 3’-0” x 2’-0” core slabs for the 60’ Span A and 3’-0” x 3’-3” box beams for Span B with a reinforced concrete overlay deck slab.

This site also includes retaining walls in each quadrant to maintain slopes within the ROW. Through the ATC process, our DB Team has gained approval to utilize alternative wall types, such as soldier pile walls and gravity walls, to address the specific geometric and geotechnical conditions of the site. These walls include:

- Wall 1 - SE Quadrant - Soldier Pile or Sheet Pile

- Wall 2 - SW Quadrant - Gravity Wall

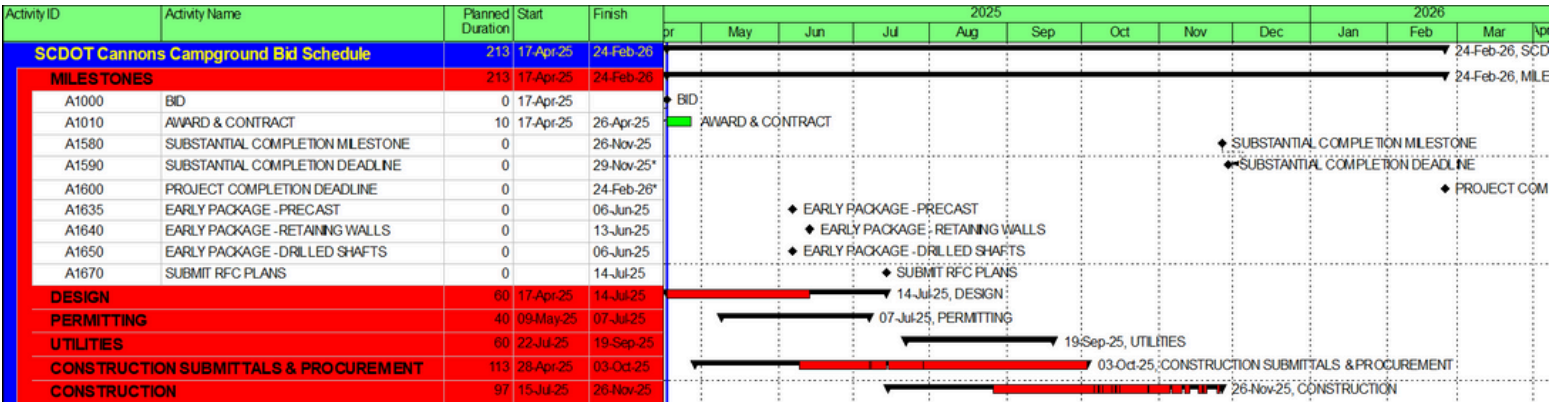
- Wall 3 - NE Quadrant - Gravity Wall
- Wall 4 - NW Quadrant - Soldier Pile or Sheet Pile

- Wall 5 - NW Quadrant - Gravity Wall

We anticipate mobilizing to complete the bridge demolition immediately upon design approval, while a drilling subcontractor procures casing materials and mobilizes for the drilled shafts. The bridge crew will move to install piling while supporting the drilled shaft sub, at which point precast substructure will be fabricated and installed. The Bent 2 cap will be cast-in-place and then cored slabs and box beams will be set in place and grouted along with precast approach slabs. Barrier walls will be slip-formed and a reinforced concrete overlay will be poured, cured, and grooved to complete the bridge work. Retaining walls will be completed by subcontractors on an independent schedule. Roadway grading will be completed, base and asphalt paving, and finally striping, signage, guardrail, and any required safety features to open the road.

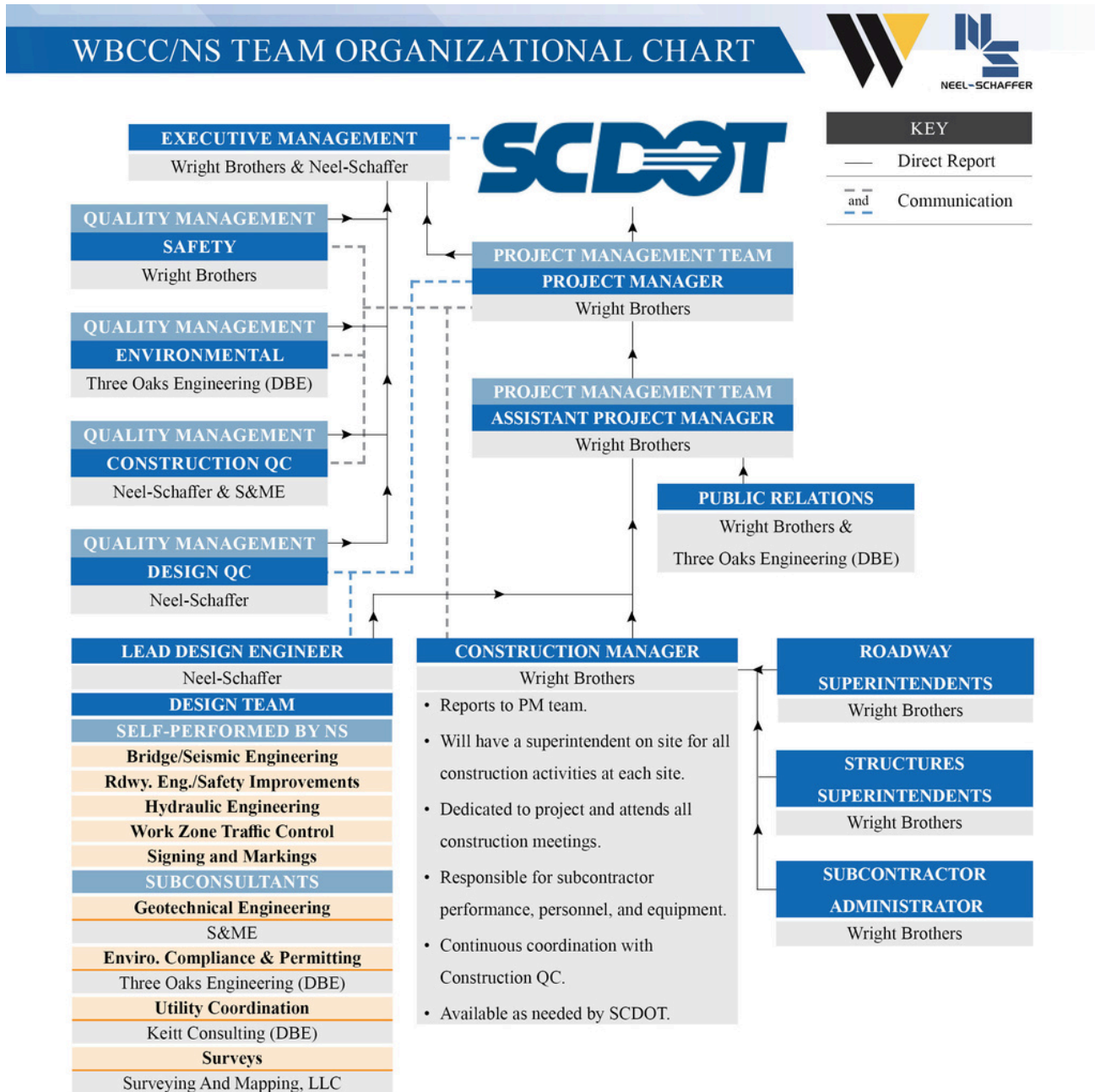
Additional bridge crews will be called upon as necessary for critical operations or to further accelerate work and ensure schedule success. With the support of our headquarters in Charleston, TN, our Asheville, NC office, and over 200 employees in the Carolinas, we have capacity to mobilize additional forces as necessary.

The WBC Team understands that it will be critical to begin design immediately. We are prepared to begin as of the date of Public Announcement, to provide our Team with the best chance of success. Below is a summary of our anticipated schedule.



Proven Experience in Accelerated Bridge Delivery

The WBC Team has developed a reputation for success on some of the most complex and challenging design-build bridge replacement projects undertaken in the Southeast. During the SR 299 over I-24 Bridge Replacement D-B in Dade Co., GA, WBC managed over 100 personnel and 8 subcontractor crews to slide in two bridge spans over the interstate in 56 hours. This was achieved, with zero safety incidents, through meticulous planning, abundance of resources, and unique expertise of the WBC staff. The unique experience, allocation of resources, and coordination skills to progress an ABC bridge project in such a limited duration is critical for this project. This Organizational Chart represents the overall team structure and responsibilities of our well-prepared DB Team.



We appreciate the opportunity to provide this Proposal for your consideration.

Should you have any questions, please contact Ethan Brown, PE, DBIA at 423-790-4015 or ebrown@wbcci.com.



Appendices

3.1.2

SOQ Checklist

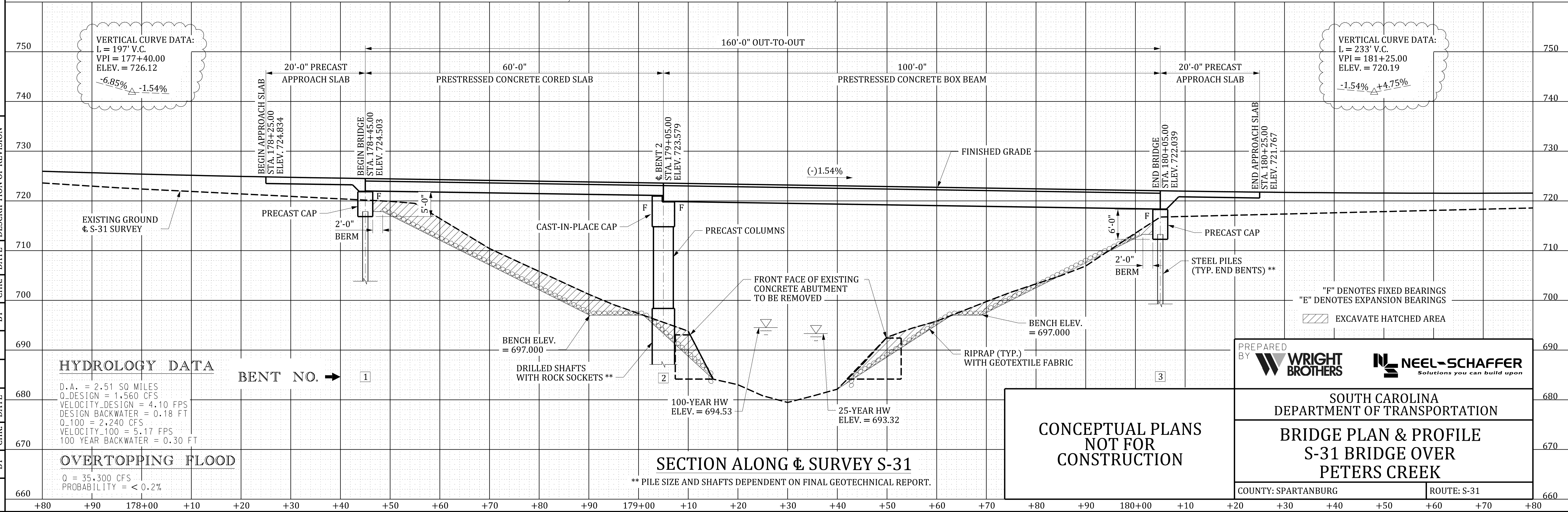


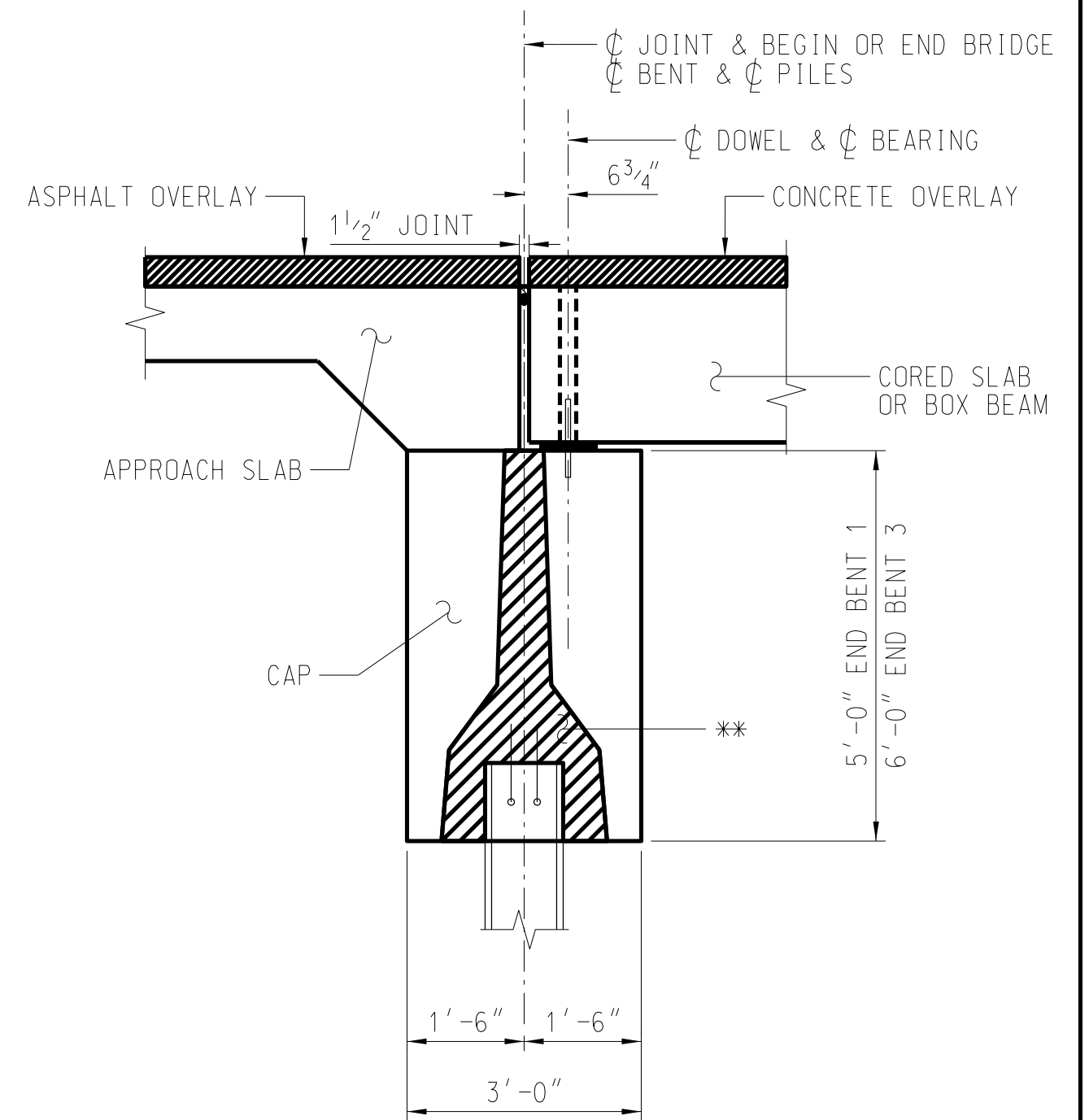
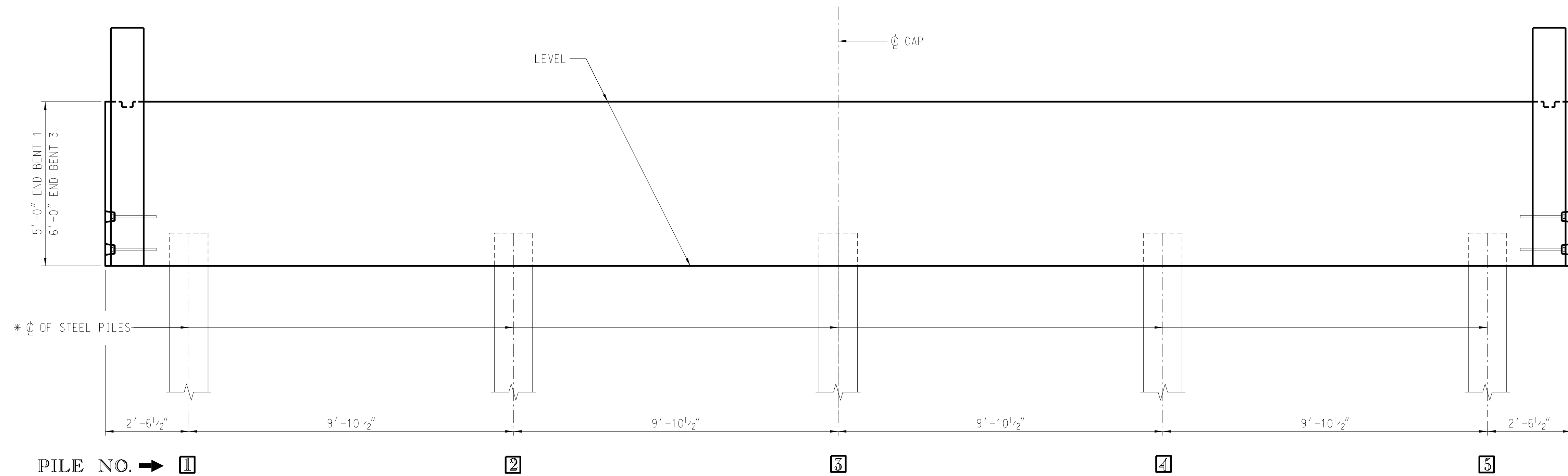
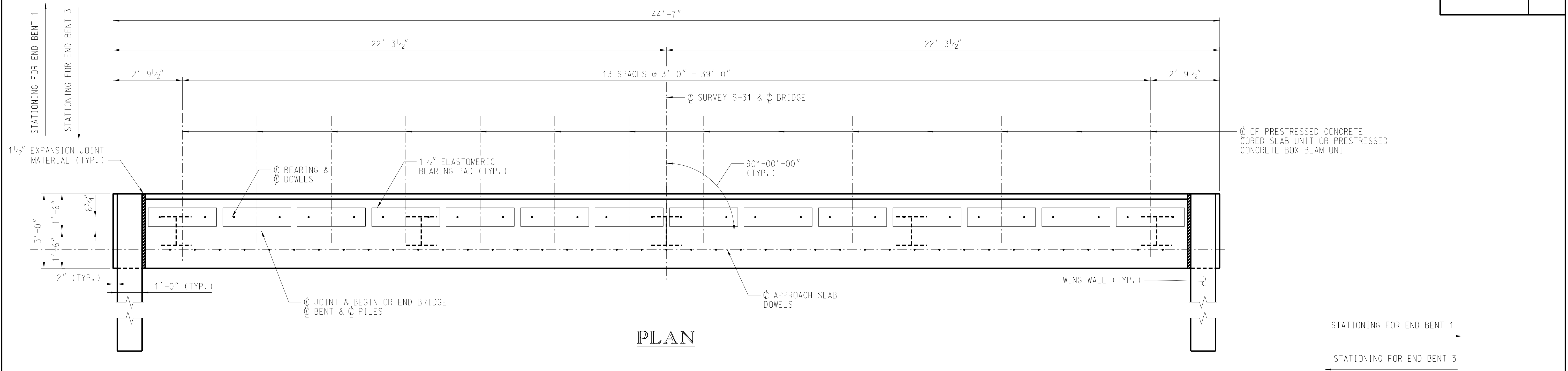


Appendix A.1 - Bridge Concept Plans

		3.1.2
		SOQ Checklist







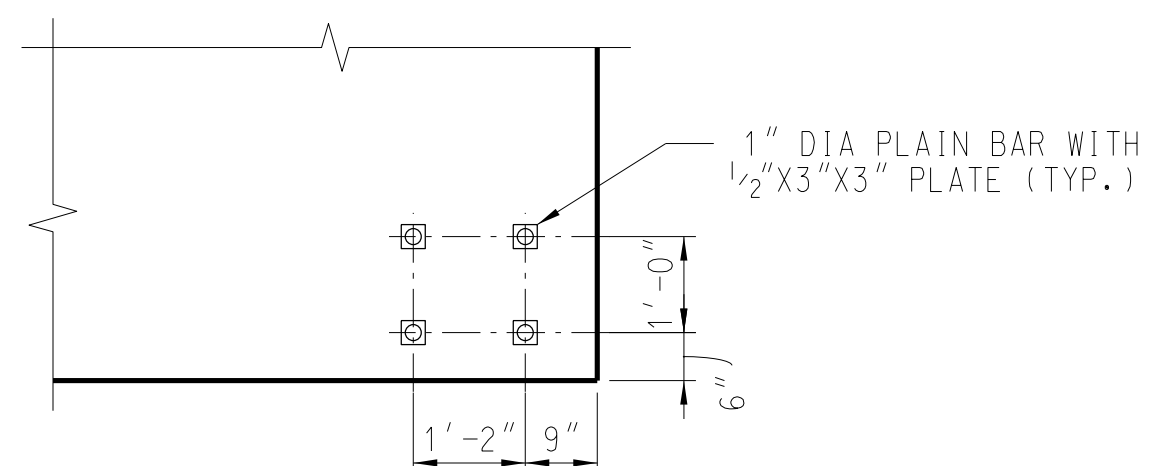
SECTION
THRU BENT

(PILES ARE NUMBERED LEFT TO RIGHT LOOKING
IN THE DIRECTION OF STATIONING)

(LOOKING IN DIRECTION OF STATIONING - END BENT 1)
* PILE SIZE DEPENDENT ON FINAL GEOTECHNICAL REPORT.
(END BENT 1 SHOWN, END BENT 3 SIMILAR)



NOTES:

※※ 1. CAVITY TO BE FILLED WITH CONCRETE GROUT AFTER PLACING THE CAP.



PRECAST WINGWALL DETAIL

CONCEPTUAL PLANS
NOT FOR
CONSTRUCTION

PREPARED BY  **WRIGHT BROTHERS**  **NEEL-SCHAFFER**
Solutions you can build upon

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

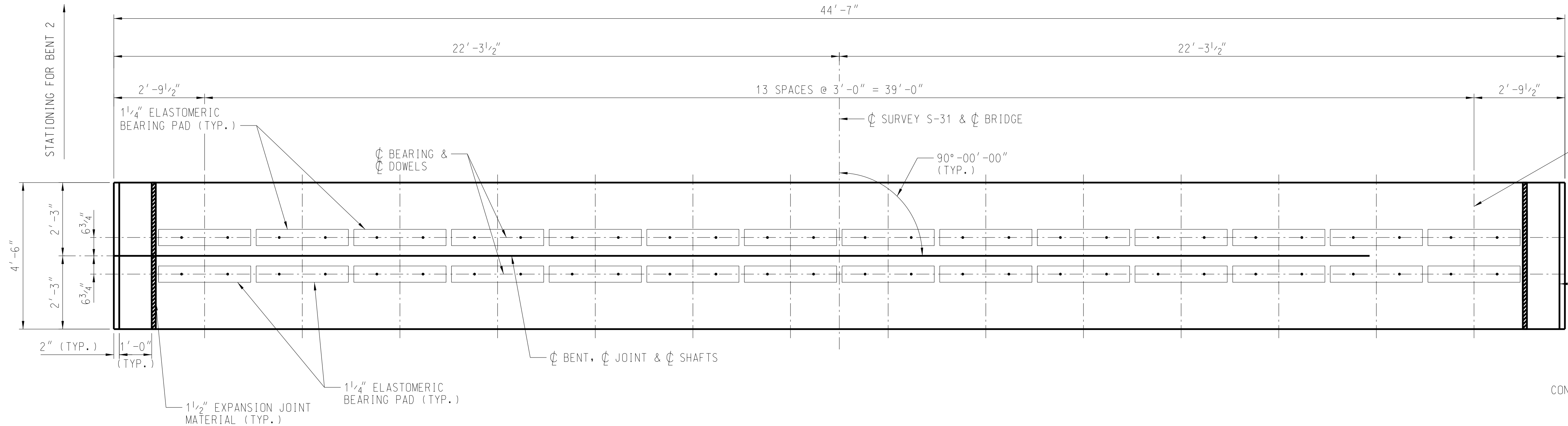
END BENTS

S-31 BRIDGE OVER PETERS CREEK

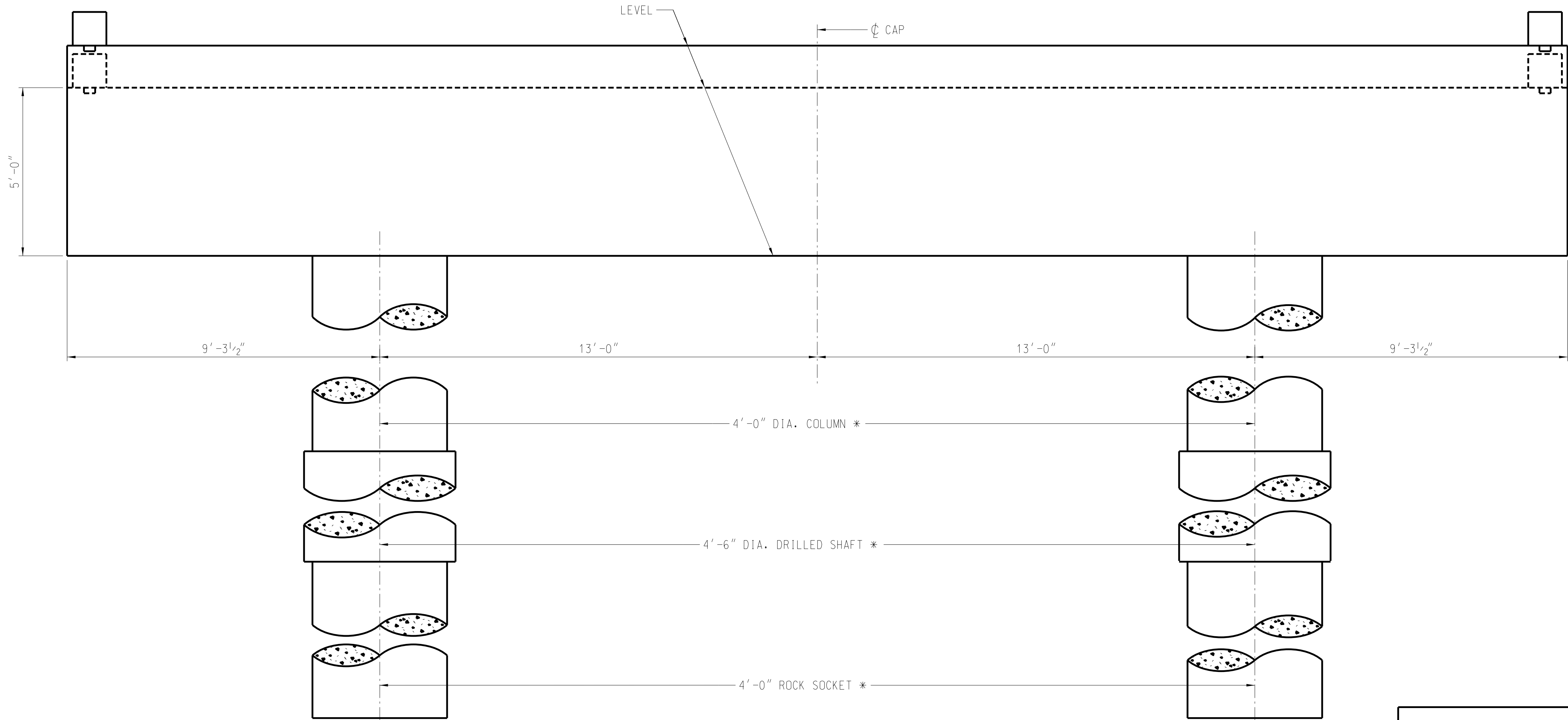
COUNTY: SPARTANBURG

ROUTE: S-31

REVIEWED		QUAN.		BY		CHK.		DATE	
DR.									
DES.									
chardlin.stengle 4/15/2025 4:02:17 PM b_S-31_Int Bent.dgn									
REV.									
REV.									
REV.									
Latest Revision		Previous Revision		DESCRIPTION OF REVISION					
BY	CHK.	DATE	BY	CHK.	DATE				



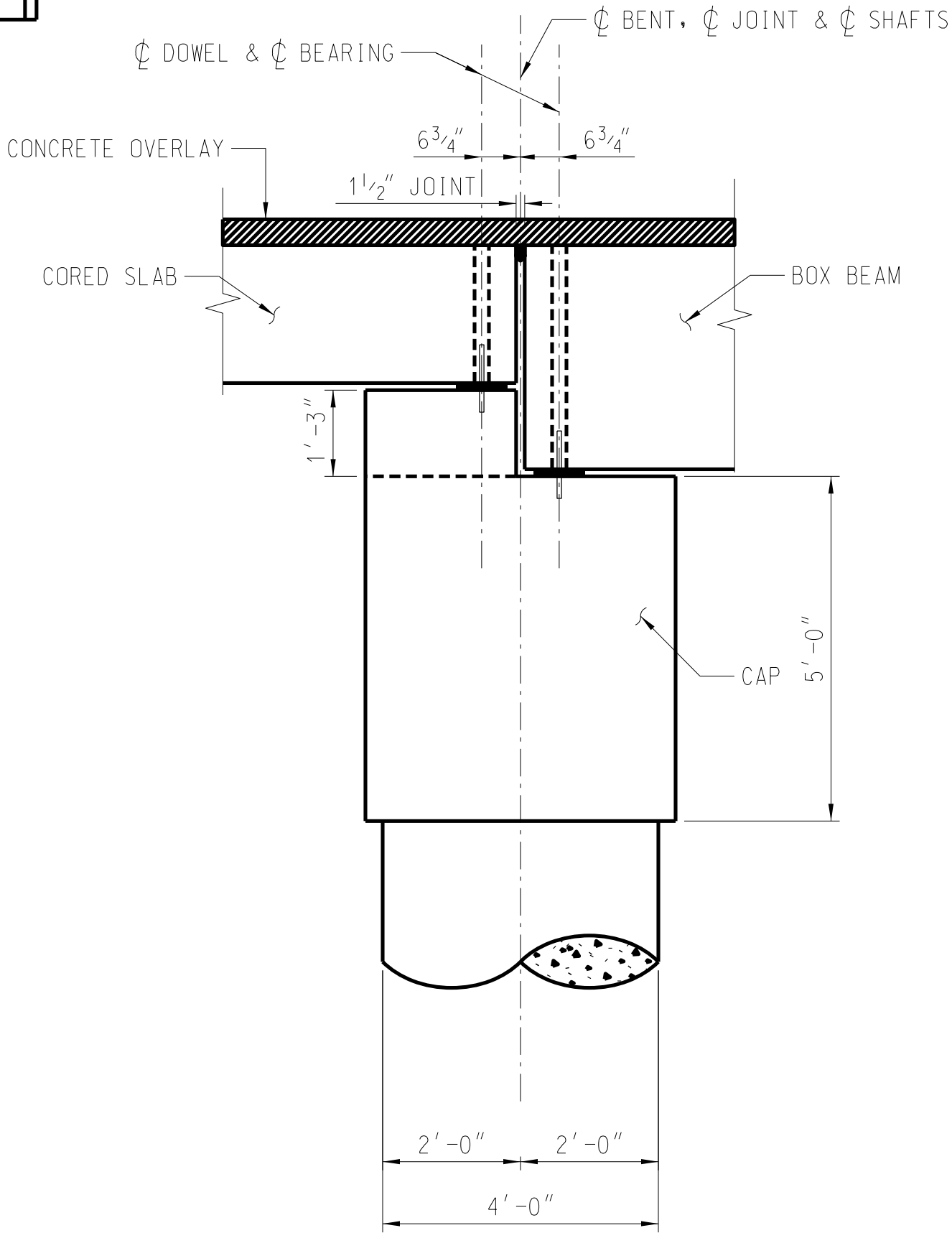
PLAN



ELEVATION

(SHAFTS ARE NUMBERED LEFT TO RIGHT LOOKING IN THE DIRECTION OF STATIONING)

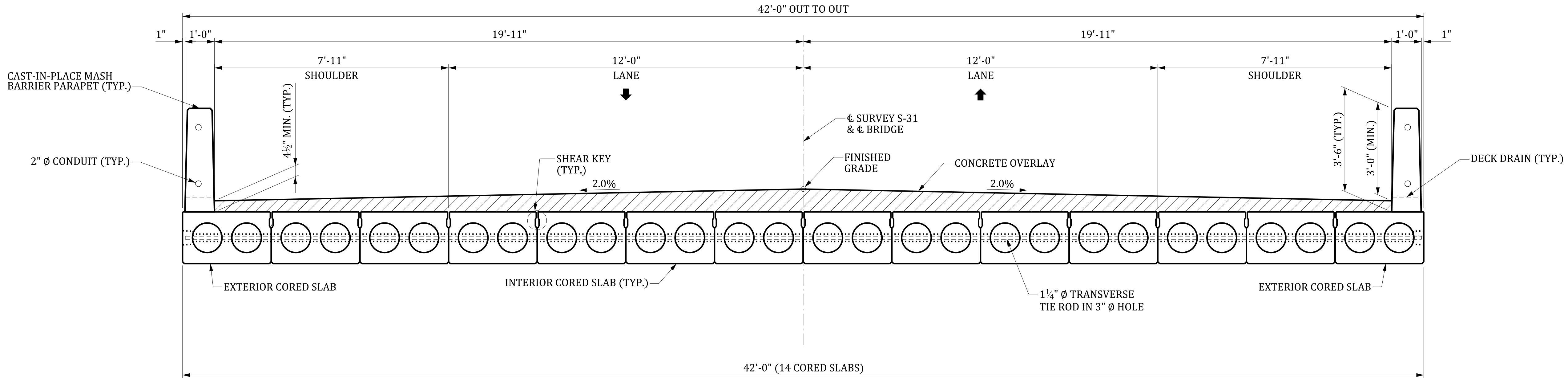
(LOOKING IN DIRECTION OF STATIONING - INTERIOR BENT 2)
* SHAFT/SOCKET SIZE DEPENDENT ON FINAL GEOTECHNICAL REPORT.



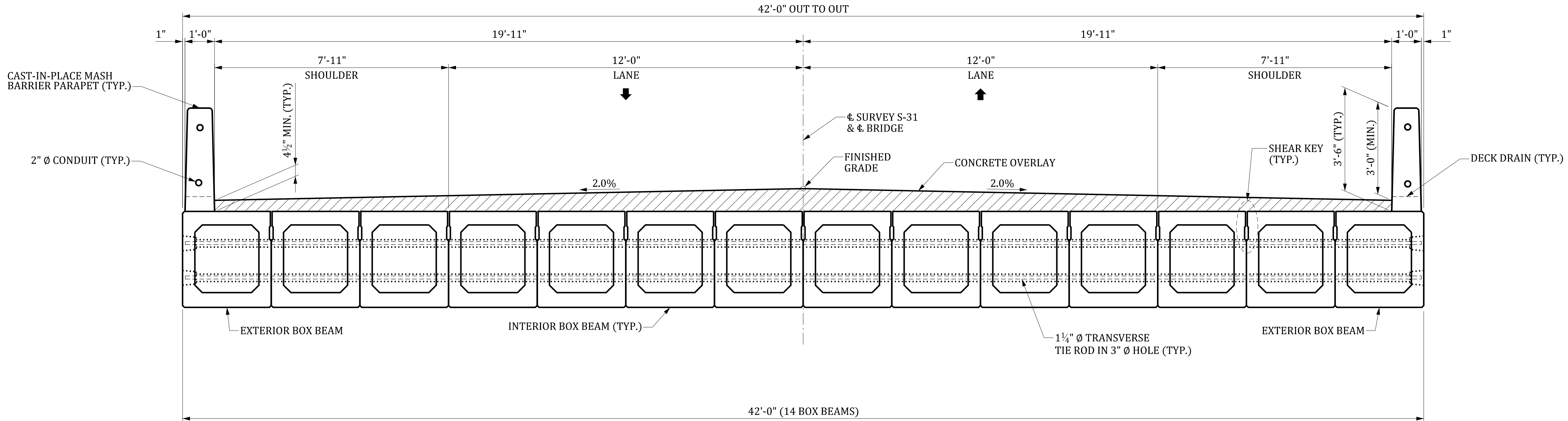
SECTION THRU BENT

CONCEPTUAL PLANS
NOT FOR
CONSTRUCTION

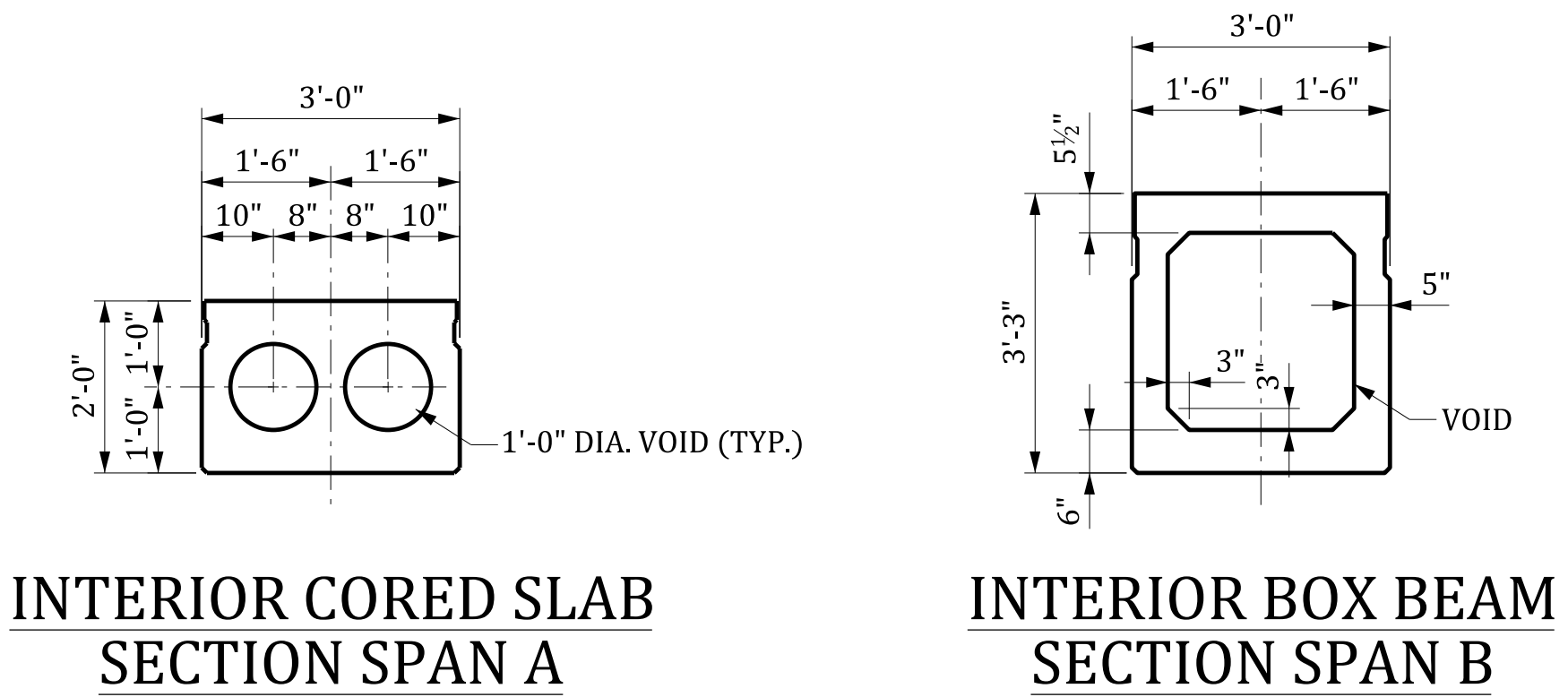
PREPARED BY		WRIGHT BROTHERS		NEEL-SCHAFFER	
BY		SOUTH CAROLINA		DEPARTMENT OF TRANSPORTATION	
		INTERIOR BENT 2		S-31 BRIDGE OVER PETERS CREEK	
COUNTY: SPARTANBURG		ROUTE: S-31			





TYPICAL SECTION SPAN A
LOOKING IN DIRECTION OF STATIONING



TYPICAL SECTION SPAN B
LOOKING IN DIRECTION OF STATIONING



CONCEPTUAL PLANS
NOT FOR
CONSTRUCTION

PREPARED BY		 WRIGHT BROTHERS	 NEEL-SCHAFER <i>Solutions you can build upon</i>
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION			
SUPERSTRUCTURE TYPICAL SECTION S-31 BRIDGE OVER PETERS CREEK			
COUNTY: SPARTANBURG		ROUTE: S-31	

chardin.stengle 4/15/2025 4:02:51 PM b_S-31-Typical Section.dgn

REV.	DATE	BY	CHK.	DATE	DESCRIPTION OF REVISION

REV.	DATE	BY	CHK.	DATE	DESCRIPTION OF REVISION



Appendix A.2 - Roadway Concept Plans

		3.1.2
		SOQ Checklist

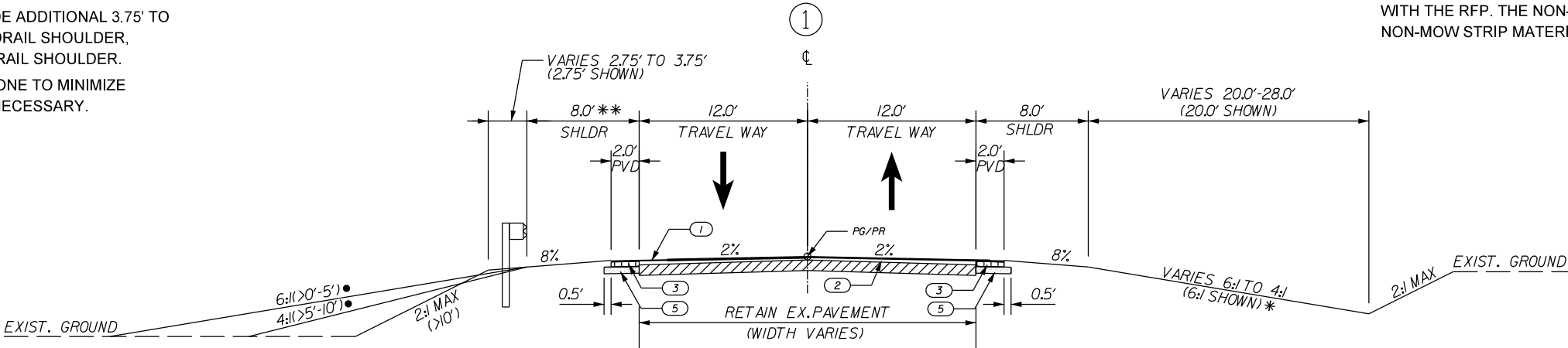


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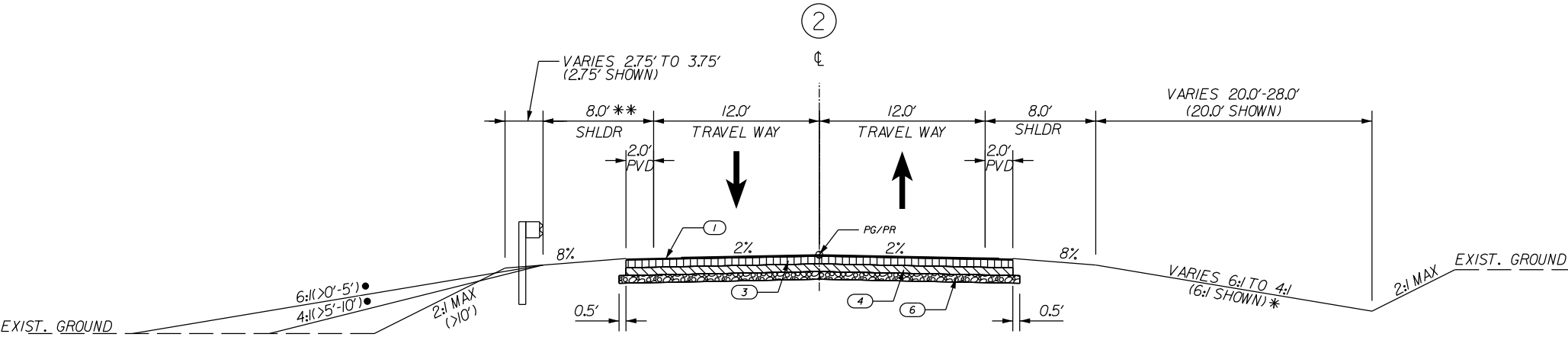
TYPICAL SECTION OF IMPROVEMENT
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
COLUMBIA, SC

- * THIS SLOPE MAY VARY BETWEEN A MINIMUM SLOPE OF 12.5H:1V TO A MAXIMUM SLOPE OF 4H:1V. WHERE A DEEPER DITCH THAN PROVIDED BY A 4H:1V SLOPE IS NECESSARY FOR DRAINAGE PURPOSES, CONTINUE THE 4H:1V SLOPE UNTIL THE NECESSARY DEPTH HAS BEEN OBTAINED.
- * * WHEN MASH GUARDRAIL IS USED, PROVIDE ADDITIONAL 3.75' TO SHOULDER HINGE FOR STANDARD GUARDRAIL SHOULDER, PROVIDE 2.75' FOR COMPRESSED GUARDRAIL SHOULDER.
- SLOPES MAY BE HINGED AT THE CLEAR ZONE TO MINIMIZE DISTURBANCE OR IF A DEEPER DITCH IS NECESSARY.

- NOTES:
1. SEE SCDOT STD. DWG. SECTION 805 FOR GUARDRAIL DETAILS & ADDITIONAL GRADING REQUIREMENTS AT LEADING END TREATMENTS.
 2. PROVIDE NON-MOW STRIP UNDER GUARDRAIL IN ACCORDANCE WITH THE RFP. THE NON-MOW STRIP SHALL BE ASPHALT. PROPRIETARY NON-MOW STRIP MATERIAL IS NOT ALLOWED.



USE THIS SECTION ON S-31
FROM STA. 176+00.00 TO STA.177+57.75
FROM STA. 181+33.17 TO STA.182+50.00



USE THIS SECTION ON S-31
FROM STA. 177+57.75 TO STA. 181+33.17

EXCEPTION: 160.00' X 42.00' CONCRETE BRIDGE WITH 20' APPROACH SLABS
FROM STA. 178+45.00 TO STA. 180+00.05

LEGEND

- 1 HOT MIX ASPHALT SURFACE COURSE TYPE B (200 LBS/SY)
- 2 HOT MIX ASPHALT SURFACE COURSE TYPE E FOR BUILD-UP (0-1.5")
HOT MIX ASPHALT INTERMEDIATE COURSE TYPE B FOR BUILD-UP (>1.5")
- 3 HOT MIX ASPHALT INTERMEDIATE COURSE TYPE B (200 LBS/SY)
- 4 HOT MIX ASPHALT BASE COURSE TYPE A (350 LBS/SY)
- 5 SHOULDER WIDENING MATERIAL (600 LBS/SY)
- 6 GRADED AGGREGATE BASE COURSE (10 INCHES)



ROUTE NO./ ROAD	FUNCTIONAL CLASSIFICATION	DESIGN SPEED (MPH)	FROM STA.	TO STA.
S-31	URBAN MINOR ARTERIAL	45 30 (SAG CURVE)	176+00.00	182+50.00

CONCEPTUAL PLANS
NOT FOR CONSTRUCTION

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
COLUMBIA, SC

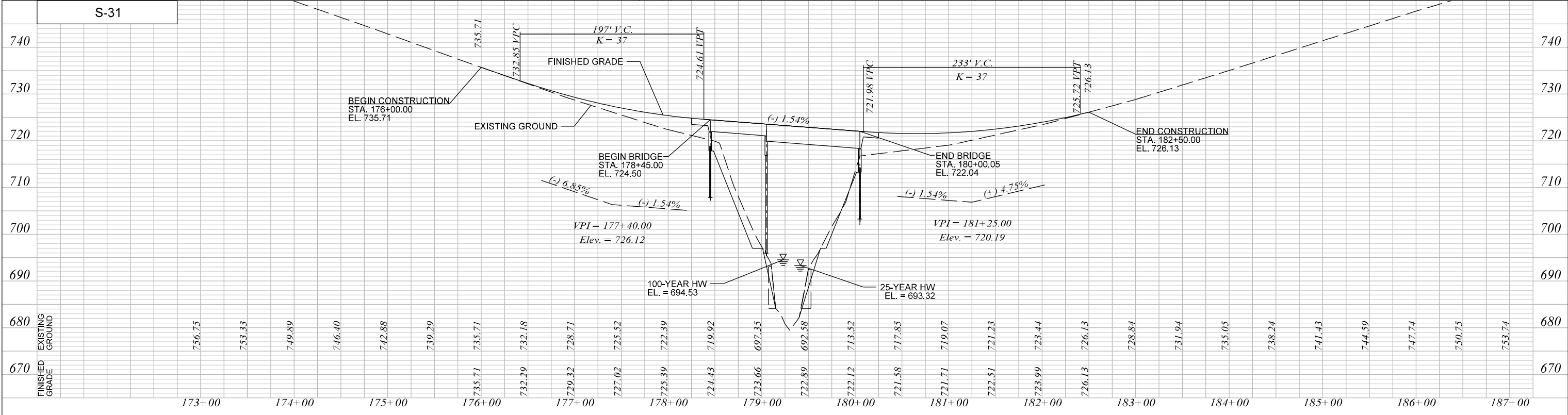
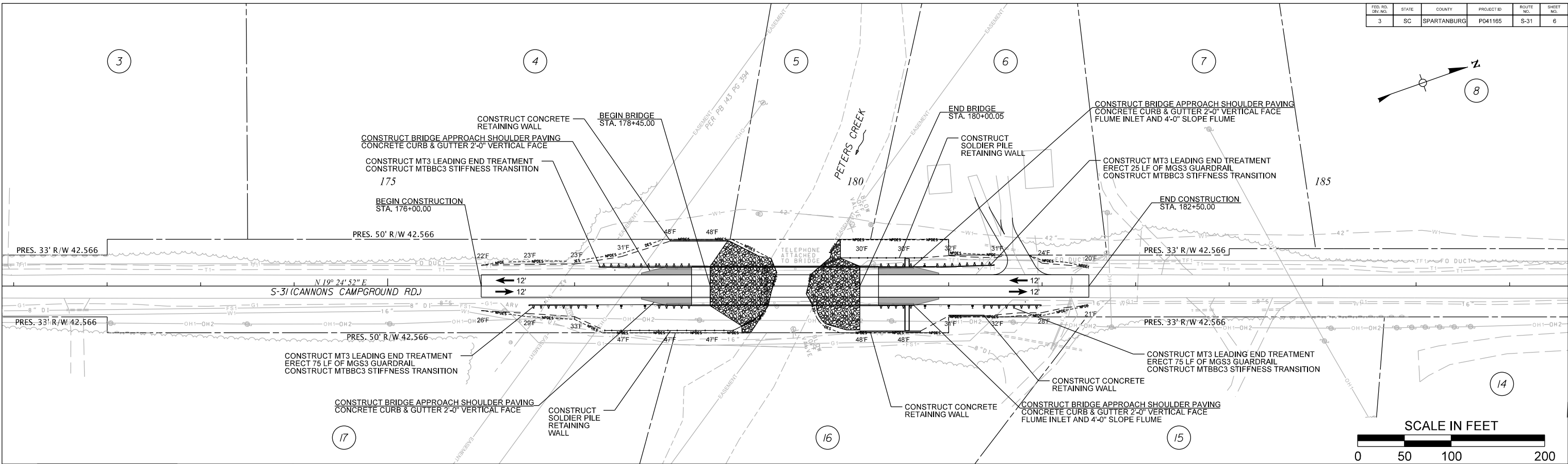
S-31
BRIDGE REPLACEMENT
OVER PETERS CREEK

TYPICAL SECTION SHEET

SCALE: 1" = NTS

SHEET NO. 3

scott.wilson
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4/15/2025



CONCEPTUAL PLANS
NOT FOR CONSTRUCTION

5				SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION COLUMBIA, SC
4				
3				
2				
1				
REV. NO.	BY	DATE	DESCRIPTION OF REVISION	SCALE: 1" = 50'H, 10'V
S-31 BRIDGE REPLACEMENT OVER PETERS CREEK				SHEET NO. 6



Appendix B - Required Forms

		3.1.2 SOQ Checklist
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12. EQUAL EMPLOYMENT OPPORTUNITY CERTIFICATION

(COMPLETE THIS SECTION FOR FEDERAL PROJECTS ONLY) EQUAL EMPLOYMENT OPPORTUNITY PERFORMANCE

Select the Certification that applies to the PROPOSER:

Certification (1) ☒ or Certification (2) ☐

Select the appropriate responses in the applicable Certification:

Certification (1): Pursuant to 41 C.F.R. §60-1.7(b)(1), Previous Equal Employment Opportunity Performance Certification, as the Prospective Prime Contractor, I HEREBY CERTIFY THAT I:

(a) (☒ HAVE / HAVE NOT) developed and filed an Affirmative Action Program pursuant to 41C.F.R. §60-2 and/or 60-4;

(b) (☒ HAVE / HAVE NOT) participated in a previous contract or subcontract subject to the equal opportunity clause;

(c) (☒ HAVE / HAVE NOT) filed with the Joint Reporting Committee, the Director of Office of Federal Contract Compliance, or the Equal Employment Opportunity Commission, all reports due under the applicable filing requirements,

OR

Certification (2): I, HEREBY CERTIFY that as the Prospective Prime Contractor submitting this Proposal, (**CLAIM / DO NOT CLAIM**) exemption from the submission of the Standard Form 100 (EEO-1) due to the fact that it employs a total of less than fifty (50) employees under C.F.R. §60-1.7, or qualifies for an exempted status under 41 C.F.R. §60-1.5.

I FURTHER CERTIFY that the above Certification will be made part of any Subcontract Agreement involved with this project.

Signed: J. Mitchell Simpson
(Officer/PROPOSER)

Executed on April 10, 2025 .

Title: President/COO

Company: Wright Brothers Construction Company, Inc.

Address: 1500 Lauderdale Memorial Highway
Charleston, TN 37310

Note: The above certification is required by the Equal Employment Opportunity Regulations of the Secretary of Labor (41 CFR 60-1.7(b)(1)), and must be submitted by PROPOSERS only in connection with contracts which are subject to the equal opportunity clause. Contracts that are exempt from the equal opportunity clause are set forth in 41 CFR 60-1.5. (Generally, only contracts of \$10,000 or under are exempt.)

Currently, Standard Form 100 (EEO-1) is the only report required by Executive Orders or their implementing regulations.

Proposers, Primary Members, or proposed Contractors and Consultants who have participated in a previous contract subject to the Executive Orders and have not filed the required reports shall note that 41 CFR 60-1.7(b)(1) prevents the award of contracts and subcontracts unless such contractor submits a report covering the delinquent period or such other period specified by the Federal Highway Administration or by the Director, Office of Federal Contract Compliance, U.S. Department of Labor.

11. NON-COLLUSION CERTIFICATION

NON-COLLUSION CERTIFICATION

Project ID: P041165

IN ACCORDANCE WITH THE PROVISIONS OF S.C. CODE ANN. §§ 39-3-10 ET. SEQ., 39-5-10 ET. SEQ., 15 U.S.C. §45; 23 C.F.R. §635.112(F); AND 28 U.S.C. §1746, I HEREBY ACKNOWLEDGE THAT I AM AN OFFICER OF THE PROPOSER FIRM AND, UNDER PENALTY OF PERJURY UNDER THE LAWS OF THE UNITED STATES AND SOUTH CAROLINA, DECLARE, BY MY CERTIFICATION BELOW, THAT THE FOLLOWING IS TRUE AND CORRECT, AND FURTHER, THAT THIS FIRM, ASSOCIATION OR CORPORATION HAS NOT, EITHER DIRECTLY OR INDIRECTLY, ENTERED INTO ANY AGREEMENT, PARTICIPATED IN ANY COLLUSION, OR OTHERWISE TAKEN ANY ACTION IN RESTRAINT OF FREE COMPETITIVE BIDDING IN CONNECTION WITH THE SUBMISSION OF A BID PROPOSAL ON THE ABOVE REFERENCED PROJECT.

BY CHECKING THIS BOX ☒ , I CERTIFY THAT I HAVE READ, UNDERSTAND, ACCEPT, AND ACKNOWLEDGE ALL OF THE ABOVE STATEMENTS.

Executed on April 10, 2025
(Date)

Signed: J. Mitchell Simpson
(Officer/Proposer)

President/COO
(Title)

1500 Lauderdale Memorial Highway
Charleston, TN 37310
(Address)

DISCLOSURE OF POTENTIAL CONFLICT OF INTEREST CERTIFICATION

PROPOSER hereby indicates that it has, to the best of its knowledge and belief has:

✓ Determined that no potential organizational conflict of interest exists.

 Determined a potential organizational conflict of interest as follows:

Attach additional sheets as necessary.

1. Describe nature of the potential conflict(s):
2. Describe measures proposed to mitigate the potential conflict(s):

J. Mitchell Simpson
Signature

April 10, 2025
Date

J. Mitchell Simpson
Print Name

Wright Brothers Construction Company, Inc.
Company

If a potential conflict has been identified, please provide name and phone number for a contact person authorized to discuss this disclosure certification with Department of Transportation contract personnel.

Name

Phone

Company

13. STIPEND ACKNOWLEDGEMENT FORM

Stipend Acknowledgement Form

S-31 (Cannons Campground Rd.) over Peters Creek Emergency Bridge Replacement Spartanburg County

Proposer: Wright Brothers Construction Company, Inc.

ADDRESS: 1500 Lauderdale Memorial Hwy Charleston, TN 37310.

The undersigned Proposer, hereby:

☐

Waives the stipend for this Project.

☒

Accepts the stipend for this Project.

By accepting the stipend for this Project, Proposer agrees:

1) to execute and include the Stipend Agreement in Article XIII of the RFP with its RFP response;

2) to submit an invoice with FEIN number for the stipend amount to the SCDOT POC after SCDOT's posting of the Notice of Award on SCDOT's Design-Build Website.;

3) to transfer all rights to its Work Product used to develop the Proposal as of the date of this acknowledgement. "Work Product" means all submittals, ideas, innovations, solutions, methods, processes, design concepts, materials, electronic files, marked up drawings, cross sections, quantity lists and intellectual property, made by Proposer during the RFP process, including the Proposal, exchange of information during the pre-Proposal and post-Proposal period.

SCDOT will pay the stipend to each eligible unsuccessful Proposer, who has signed a Stipend Agreement, within ninety (90) days after execution of the Contract or the decision to not award a contract.

April 10, 2025

Date

Wright Brothers Construction Company, Inc.

Proposer

J. Mitchell Simpson, P.E.

Print Name

14. STIPEND AGREEMENT

STIPEND AGREEMENT

Project ID: P041165

S-31 (Cannons Campground Rd.) over Peters Creek Emergency Bridge Replacement Spartanburg County

THIS STIPEND AGREEMENT (the “Agreement”) is made and entered into as of the 10 day of April, 2025 by and between the SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION (hereinafter “SCDOT”), and Wright Brothers Construction Company, Inc. (“Proposer”), with reference to the following facts:

SCDOT issued a Request for Proposal (“RFP”) for design and construction of the above-referenced Design-Build Project (“Project”), pursuant to procurement authority granted in Section 57-5-1625 of the S.C. Code of Laws, 1976, as amended. The RFP provided for payment of stipends as provided herein. Capitalized terms used, but not defined, have the meanings ascribed in the RFP.

NOW, THEREFORE, Proposer hereby agrees as follows:

1. Work Product.

1.1 Proposer shall prepare and submit a responsible and responsive Technical Proposal and Cost Proposal that conforms in all material respects to the requirements and provisions of the RFP, as determined by SCDOT, and are timely received by SCDOT in accordance with the RFP Milestone Schedule.

1.2 By signing this Stipend Agreement, Proposer agrees to transfer full and complete ownership to SCDOT of all Work Product. The Work Product (as defined below) shall become the property of SCDOT without restriction or limitation on its use, without further compensation or consideration, and can be used in connection with this Project or any future projects by SCDOT. Neither Proposer nor any of its team members shall copyright any of the material developed under this Agreement.

1.3 The term “Work Product” shall mean the Proposal and all material, electronic files, marked up drawings, cross sections, quantity lists, submittals, ideas, innovations, solutions, methods, processes, design concepts, Trade Secrets or confidential information, and intellectual property, made by or produced for Proposer in the development and submission of the Technical and Cost Proposal, including exchanges of information during the pre-Proposal and post-Proposal period.

2. Compensation and Payment.

2.1 A stipend to Proposer for the Work Product described herein shall be \$32,500.00 and is payable to Proposer that was determined to be responsible and (1) submitted a responsive Technical Proposal and responsive Cost Proposal to the RFP which is not selected for award of this Project, or (2) was awarded the Contract but the Contract was terminated by SCDOT for convenience after the Submittal of Proposal Due Date (See Final RFP Milestone schedule) but prior to the Notice to Proceed #1. Responsibility of Proposers and responsiveness of the Technical Proposal and Cost Proposal will be determined by SCDOT as a condition of payment.

2.2 SCDOT will pay the stipend to Proposer as follows, subject (as applicable) to the following conditions:

- (a) Proposer has submitted this signed Stipend Agreement, unchanged with its response to the RFP.
- (b) After posting of the Notice of Award on SCDOT’s Design-Build Website, Proposer has submitted to SCDOT an invoice, with FEIN Number, for the Stipend amount.
- (c) After execution of the Contract or the decision not to award a contract, SCDOT will pay the invoice for the stipend amount to the unsuccessful Proposer meeting the criteria of Section 2.1 within 90 calendar days of receipt of the invoice from Proposer.
- (d) If the procurement is suspended or cancelled prior to the Proposal Due Date (see FINAL RFP Milestone schedule), no stipend will be paid to Proposer.
- (e) After the submittal of Proposals, but prior to award, if the procurement is cancelled, all Proposers that provide a responsive Technical Proposal and Cost Proposal to the final RFP and submitted a signed Stipend Agreement with their RFP shall receive the stipend
- (f) In the event of a Best and Final Offer, only one stipend will be paid to each Proposer that executed a Stipend Agreement and met the other criteria and conditions herein.
- (g) No stipends will be paid to a Proposer who withdraws at any time from this procurement.

2.3 Acceptance by the Proposer of payment of the stipend amount from SCDOT shall constitute a waiver by Proposer of any and all right, equitable or otherwise, to bring any claim in connection with this procurement, procurement process, award of the Contract, or cancellation of this procurement.

2.4 The Proposer awarded the contract shall be not eligible to receive a stipend.

2.5 If Proposer elects to waive payment of the stipend, SCDOT will not use the ideas or information contained in that Proposer's Proposal for this Project. However, the Proposer's Proposal will be subject to the South Carolina Freedom of Information Act.

3. Indemnities.

3.1 Subject to the limitations contained in Section 3.2, Proposer shall indemnify, protect and hold harmless SCDOT and its directors, officers, employees and contractors from, and Proposer shall defend at its own expense, all claims, costs, expenses, liabilities, demands, or suits at law or equity arising, in whole or in part, from the negligence or willful misconduct of Proposer or any of its agents, officers, employees, representatives or subcontractors or breach of any of Proposer's obligations under this Agreement.

3.2 This indemnity shall not apply with respect to any claims, demands or suits arising from use of the Work Product by SCDOT.

4. Compliance With Laws.

4.1 Proposer shall comply with all federal, state, and local laws, ordinances, rules, and regulations applicable to the work performed or paid for under this Agreement and covenants and agrees that it and its employees shall be bound by the standards of conduct provided in applicable laws, ordinances, rules, and regulations as they relate to work performed under this Agreement. Proposer agrees to incorporate the provisions of this paragraph in any subcontract into which it might enter with reference to the work performed pursuant to this Agreement.

4.2 The Proposer agrees (a) not to discriminate in any manner against an employee or applicant for employment because of race, color, religion, creed, age, sex, marital status, national origin, ancestry or disability of a qualified individual with a disability; (b) to include a provision similar to that contained in subsection (a) in any subcontract; and (c) to post and to cause subcontractors to post in conspicuous places available to employees and applicants for employment, notices setting forth the substance of this clause.

5. Assignment.

Proposer shall not assign this Agreement without SCDOT's prior written consent. Any assignment of this Agreement without such consent shall be null and void.

6. Miscellaneous.

6.1 Proposer and SCDOT agree that Proposer, its team members, and their respective employees are not agents of SCDOT as a result of this Agreement.

6.2 This Agreement, together with the RFP, as amended from time to time, the provisions of which are incorporated herein by reference, embodies the entire agreement of the parties. There are no promises, terms, conditions, or obligations other than those contained herein or in the RFP, and this Agreement shall supersede all previous communications, representation, or agreements, either oral or written, between the parties hereto.

6.3 It is understood and agreed by the parties hereto that if any part, term, or provision of this Agreement is by the courts held to be illegal or in conflict with any law of the State of South Carolina, the validity of the remaining portions or provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the Agreement did not contain the particular part, term, or provisions to be invalid.

6.4 This Agreement shall be governed by and construed in accordance with the laws of the State of South Carolina.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

Witness:

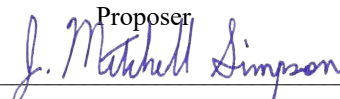
SOUTH CAROLINA DEPARTMENT
OF TRANSPORTATION

By: _____

Jae Mattox
Preconstruction Alternative Delivery Engineer

Recommended:

Tyler A. Clark

Proposer


J. Mitchell Simpson, P.E., President/COO
Wright Brothers Construction Company, Inc.

Confidential and Proprietary Information Page List

In the Technical Proposal appendix, Proposer shall include a list of page numbers that contain confidential and/or proprietary information. Failure to include this list in the Technical Proposal appendix waives the confidentiality protection and subjects the information to disclosure in accordance with the law.

The Wright Brothers Team, consisting of Wright Brothers Construction Company and Neel-Schaffer, has no confidential or proprietary information contained in this document.



Appendix C - Approved Formal ATCs

		3.1.2 SOQ Checklist
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FINAL FATC DETERMINATION

Date Received: 4/10/2025

Date Reponse Sent: 4/10/2025

Wright Bros./NS			SCDOT		
ATC No.	Primary Discipline	Concept	Response	Justification	Final?
1	Structures	Proposed shortening of the bridge by changing the span arrangement to one 60' span of cored slabs and one 100' span of box girders	Approved		Yes
2	Structures	Proposes alternative wall types to be constructed here, and at other locations on the project to include Soldier Pile walls with precast concrete panels inserted between the flange, and Cast-in-Place Gravity Walls	Approved		Yes



Formal Alternative Technical Concepts Submittal Form

Project: SCDOT S-31 (Cannons Campground Rd.) over Peters Creek

Project ID: 041165

ATC No.: 1

Priority: High

Team: Wright Brothers - Neel-Schaffer

Date: 4/10/25

Description (required):

This ATC would propose a shortening of the bridge by changing the span arrangement to one 60' span of cored slabs and one 100' span of box girders per the attached drawings. Our preliminary analysis for constructability and the arrangement of slopes and setback requirements indicates that this would be feasible.

This ATC results in a change to the bridge profile and shifts the low point off the proposed bridge surface, improving drainage and reducing the risk of ponding water. This also impacts slope tie-down points. The DB Team has identified locations of walls or other steepened slope methods to keep project limits within the available ROW.

This ATC will also request the use of multiple precast elements – including columns, abutments, wingwalls, and approach slabs. Example details of precast elements, including the use of NMB Splice Sleeve couplers for the drilled shaft to column connection are included in the attachments. NMB systems are widely used for various types of precast connections of columns, beams, and walls even in seismic zones. Documentation regarding construction means and methods, including templates for the field placement of drilled shaft dowels and the grouting operation, is provided in the Attachments.

The final riding surface on the bridge deck will consist of a reinforced concrete overlay slab, with 4 ½" minimum concrete overlay thickness and at least one mat of #3 reinforcing bars spaced at 12" in each direction, similar to the requirements of SCDOT Bridge Package 31. Due to the crown, an additional mat of rebar may be necessary to meet clearance requirements in a variable depth overlay slab, which would be provided at no additional cost to the Department if required for the design. A raked finish will be applied to the top of cored slabs and box girders, and a grooved finish will be applied to the overlay slab. Barrier height above the overlay will comply with DM0119.

Proposed bridge ends are located based on a theoretical 2:1 projection from the face of the existing concrete abutment at the normal water surface. Proposed grading ties into the existing abutment with a bench 2' higher than the FEMA 100 yr water surface elevation. The existing channel bank will be protected with rip rap with no additional fill into the channel.

Usage:

This ATC is proposed to modify the S-31 Bridge over Peters Creek and the roadway profile.

Deviations (required):

- The span arrangement would deviate from the requirements listed in Exhibit 4b section 2.1.5. The arrangement and bent locations would be designed per the attached sheet.
- The superstructure type would deviate from the requirements listed in Exhibit 4b section 2.1.6, using precast box girders and precast cored slabs.
- The galvanized rebar for corrosion protection required in Exhibit 4b section 2.1.8 will not be required due to the proposed riding surface.
- The bridge deck surface would deviate from the requirements in Exhibit 4b section 2.1.12.
- Exhibit 4b section 2.1.13 will not apply.
- The bridge drainage requirements would deviate from the requirements in Exhibit 4b section 2.1.15.
- The bridge substructure types would deviate from the requirements in Exhibit 4b section 2.1.19 to allow the use of precast columns on cast-in-place drilled shafts and precast abutments with precast wingwalls.

Formal Alternative Technical Concepts Submittal Form

Project: SCDOT S-31 (Cannons Campground Rd.) over Peters Creek

Project ID: 041165

ATC No.: 1

Priority: High

Team: Wright Brothers - Neel-Schaffer

Date: 4/10/25

The bridge length would deviate from the requirements for the minimum bridge length requirements in Attachment B of the RFP.

Justification:

This ATC will allow flexibility in the availability of bridge crews and subcontractors, increasing the productivity of limited personnel through the efficient use of ABC materials, and accelerating the Project schedule. It will reduce the bridge scope, including a reduction of overall bridge length and elimination of one intermediate bent on drilled shaft foundations. The raised profile is accommodated within the ROW through the use of walls which can be completed concurrently with the bridge construction.

Schedule:

Our preliminary schedule for the precast construction can be accomplished using a 5-day work week, allowing for the ability to work weekends or additional shifts with additional crews to regain time for delays or weather. This would not be possible with double-shifted or 7-day construction that would be necessary to complete a bridge with 3 spans of AASHTO girders and a cast-in-place deck using standard methods. Application of this ATC will result in on-time Substantial Completion.

Impacts:

This ATC will positively impact the construction schedule, achieving on-time completion of the project and reducing the impact of extended closure on the traveling public and project stakeholders. This ATC will require the implementation of additional retaining walls or slope steepening to keep impacts within the ROW.

History:

Wright Brothers and Neel-Schaffer have designed and constructed multiple cored slab and box beam bridges of similar scope and size, notably the S-147 Bridge over Reedy River in SCDOT Bridge Package 31, which is currently in Final Design.

Wright Brothers and Neel-Schaffer have both shared and individual experience in construction of bridges with precast abutments and wingwalls, notably the S-80 Bridge over Reedy River in SCDOT Bridge Package 31, which is currently in Final Design. Wright Brothers has recently utilized precast abutments and wingwalls on the Olin McIntosh WWD Bridge in McIntosh, AL. Contact: Hunter Sartain, PE (WSP) - 678-520-4980.

Wright Brothers has constructed fully precast bridges using NMB splice sleeves and our personnel are experienced in their use and installation such as in the BRF-0117 (501) project for ALDOT in Dekalb Co., AL. Contact: Kelvin Stewart (ALDOT) - 256-259-0472. We have also constructed precast approach slabs, such as on the GDOT SR 299 at I-24 ABC bridge replacement. Contact: Andrew Hoenig, P.E., DBIA (GDOT) - 404-985-4377. Sample construction details from these projects are provided in the attachments.

Risks:

There is a risk that required additional walls may not be constructible without access to adjacent properties. If Wright Brothers is unable to secure right of entry to adjacent parcels, we are prepared to modify wall locations, change wall types, secure additional crews or subcontractors, or utilize specialized equipment to ensure timely completion of the project. Walls will be optimized in design to reduce this risk.

Formal Alternative Technical Concepts Submittal Form

Project: SCDOT S-31 (Cannons Campground Rd.) over Peters Creek

Project ID: 041165

ATC No.: 1

Priority: High

Team: Wright Brothers - Neel-Schaffer

Date: 4/10/25

Costs (required):

The change in superstructure type, reduction in bridge length, and reduction in overhead and overtime required is anticipated to result in a cost savings of approximately \$400,000. The additional retaining walls and embankment may result in a cost increase of approximately \$200,000, providing a total cost reduction of \$200,000.

Quality:

This ATC will improve the quality of the bridge provided due to relocating the low point off the bridge surface.

Operations & Maintenance:

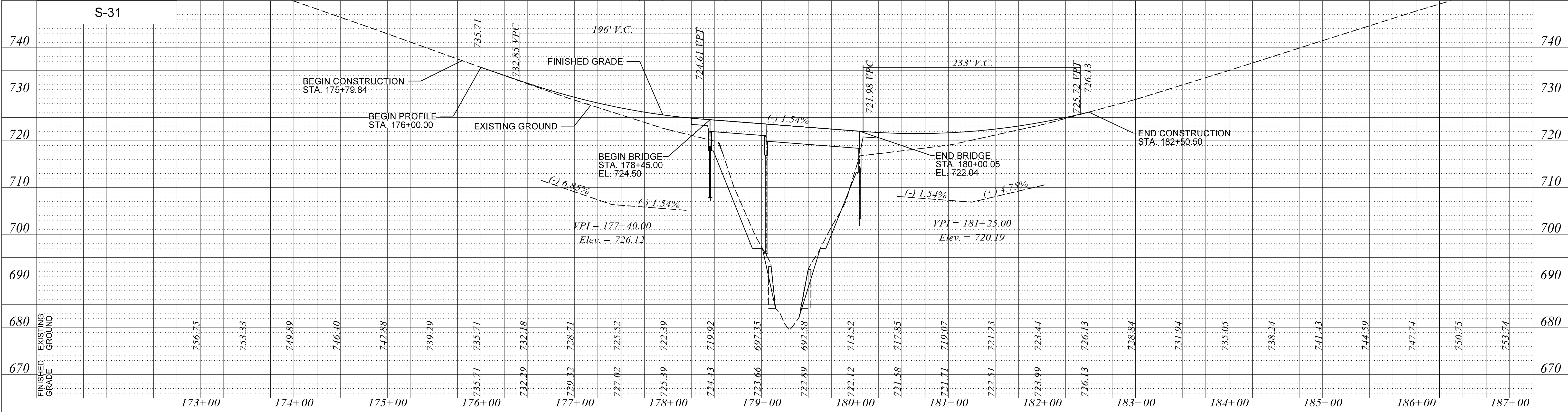
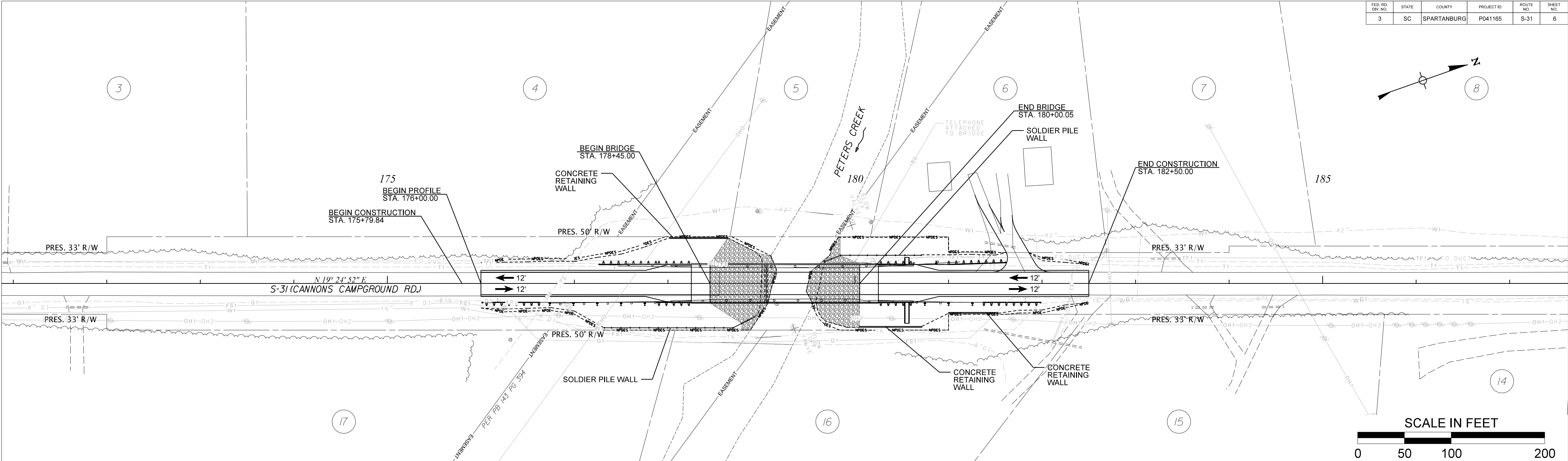
There are several benefits to Operations and Maintenance through the use of this ATC. Primarily, this ATC shifts the profile low point off of the proposed bridge deck, reducing the risk of ponding water and/or freezing water on the bridge deck and thereby reducing safety hazards and future bridge maintenance costs.

FATC #1 - Attachments

Wright Brothers Construction Company, Inc. – Neel-Schaffer, Inc.

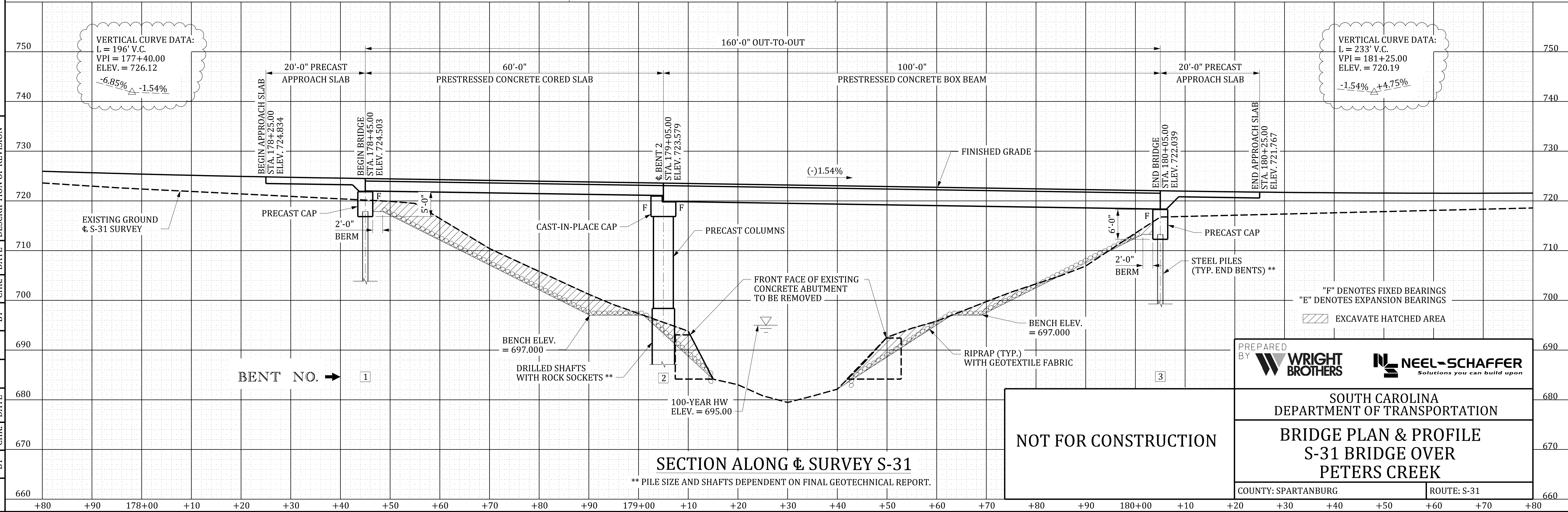
Proposed Bridge Layout, Profile, Roadway Plan

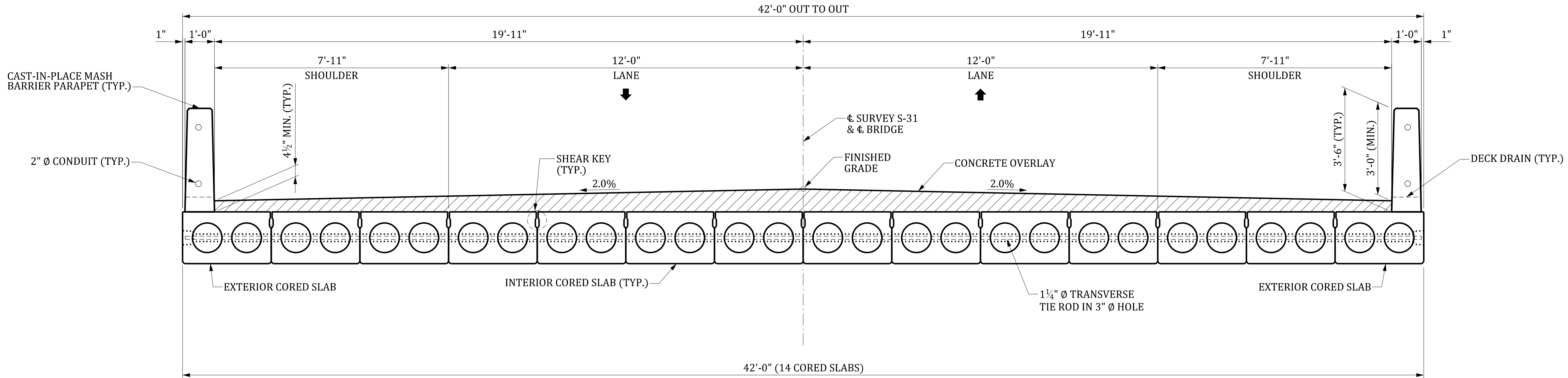
FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROUTE NO.	SHEET NO.
3	SC	SPARTANBURG	P041165	S-31	6



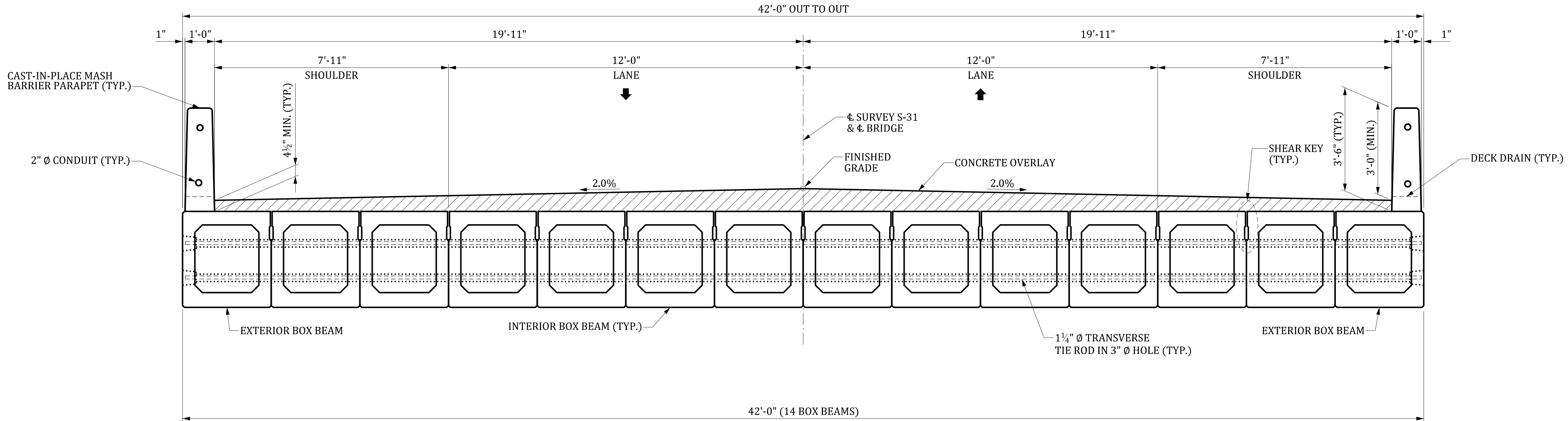
CONCEPTUAL PLANS
NOT FOR CONSTRUCTION

5				SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION COLUMBIA, SC
4				
3				S-31 BRIDGE REPLACEMENT OVER PETERS CREEK
2				
1				PLAN & PROFILE SHEET
REV. NO.	BY	DATE	DESCRIPTION OF REVISION	SCALE: 1" = 50'H, 10'V
				SHEET NO. 6

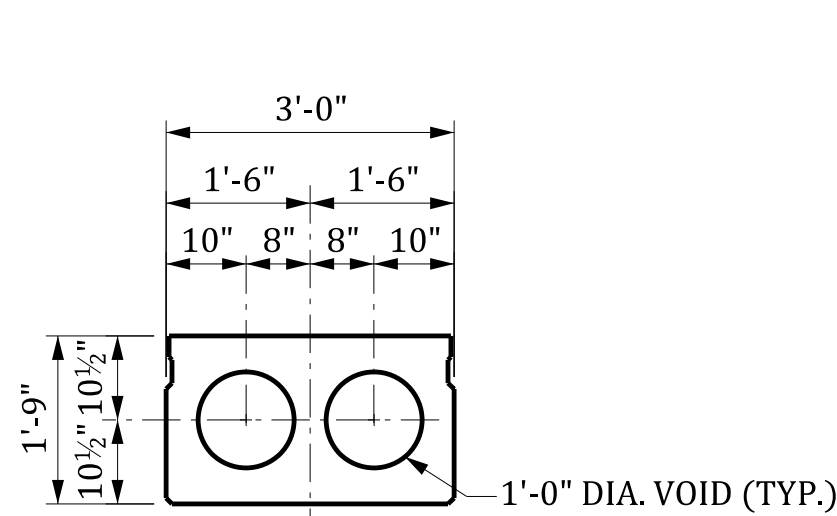




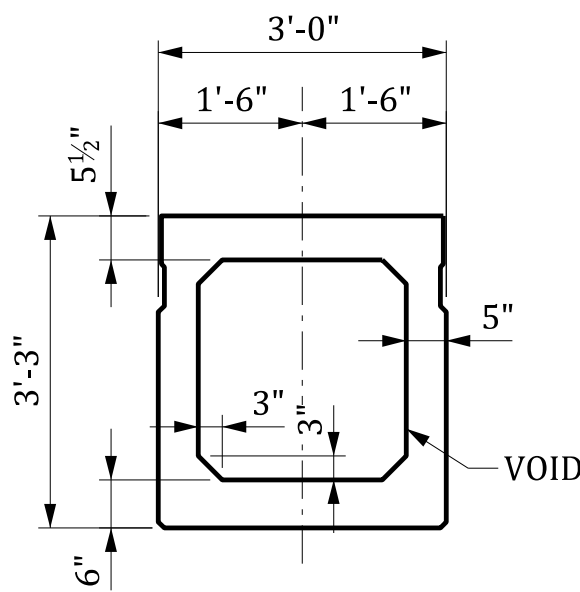
TYPICAL SECTION SPAN A
LOOKING IN DIRECTION OF STATIONING



TYPICAL SECTION SPAN B
LOOKING IN DIRECTION OF STATIONING



INTERIOR CORED SLAB
SECTION SPAN A



INTERIOR BOX BEAM
SECTION SPAN B

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REV.	DATE	BY	CHK.	DATE	DESCRIPTION OF REVISION

REV.	DATE	BY	CHK.	DATE

NOT FOR CONSTRUCTION

PREPARED BY
 WRIGHT BROTHERS
 NEEL-SCHAFER
Solutions you can build upon

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

SUPERSTRUCTURE
TYPICAL SECTION
S-31 BRIDGE OVER PETERS CREEK

COUNTY: SPARTANBURG

ROUTE: S-31

Precast Column Details

NMB Splice Sleeve Manufacturer Information

- General Brochure
- FAQs
- Grout Operation Details
- Templates for Alignment of Field Dowels

ALDOT Dekalb County Precast Bridge Example

NMB SPLICE-SLEEVE® SYSTEMS



**REVISED
2017**

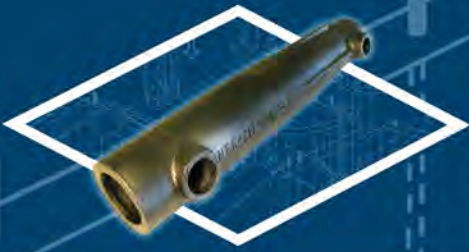


The Paramount Tower, San Francisco

Over 30 Million Sold World-Wide



Splice Sleeve North America, Inc.



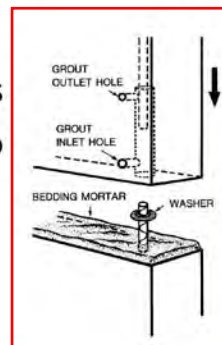
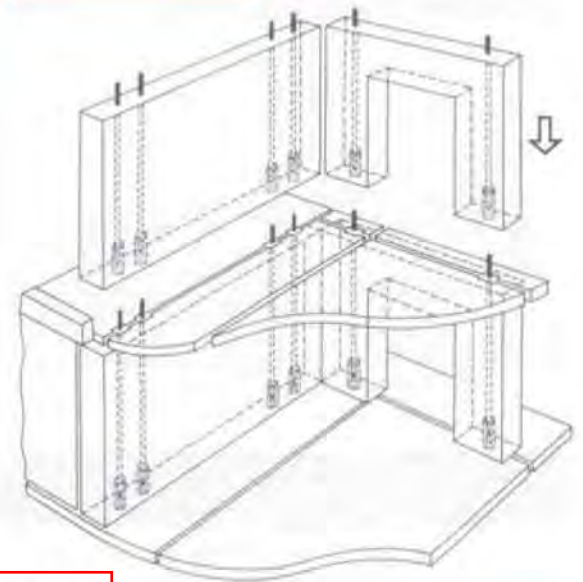
NMB SPLICE-

The **NMB SPLICE-SLEEVE®** is an efficient coupler for splicing reinforcing bars which uses a cylindrical-shaped steel sleeve interior of which is filled with **SS MORTAR®** grout a cementitious, non-metallic, non-shrink high-early-strength grout. Reinforcing bars to be spliced are inserted into the sleeve to meet approximately at the center of the sleeve. The resulting splices will develop tensile and compressive strengths in excess of the specified minimum for ASTM Grade 60 bars conforming to the ACI Building Code Requirements for both Type 1 and Type 2 conditions.

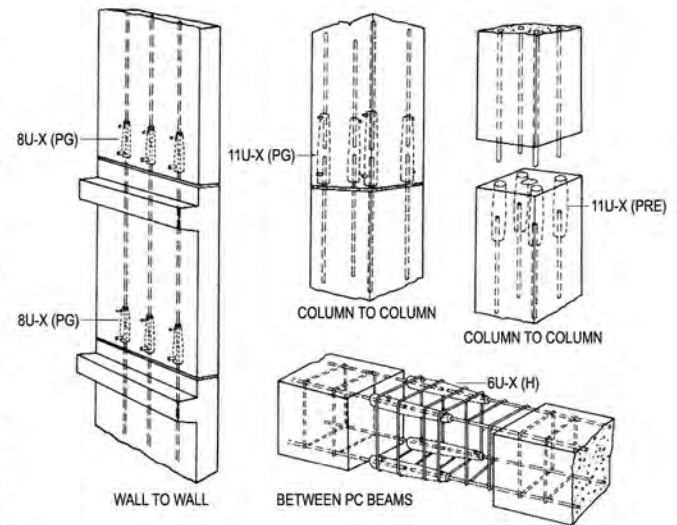
The **NMB SPLICE-SLEEVE® SYSTEM** is a proven method for connecting precast reinforced concrete structural members. At the precast plant, the sleeves are embedded precast element on one end of the main reinforcing bars to be connected. The bars protrude from the other end of the precast member. At the building site, the precast members are joined by inserting the protruding bars from the end of one precast member into the sleeves of the adjacent member. The sleeves are then grouted, in effect making the reinforcing bars continuous through the connection.

This is called "Emulation" and the **NMB** is categorized as an emulative connection for precast systems. (Refer to ACI 550.1R-09 for more information).

Patented Worldwide



The NMB SPLICE-SLEEVE® is particularly appropriate for use in joining vertical precast concrete structural elements (columns and shearwalls). This is because the sleeve can be embedded completely in the precast elements at the manufacturing yard and when the elements are joined in the erection process, there is no need to make a closure pour or to perform other cosmetic patching after the bars are joined. This is sometimes referred to as a “blind” connection. When used in cast-in-place situations, the NMB SPLICE-SLEEVE performs the same function as other mechanical rebar splicing devices, basically that of extending the rebar length.



APPLICATIONS

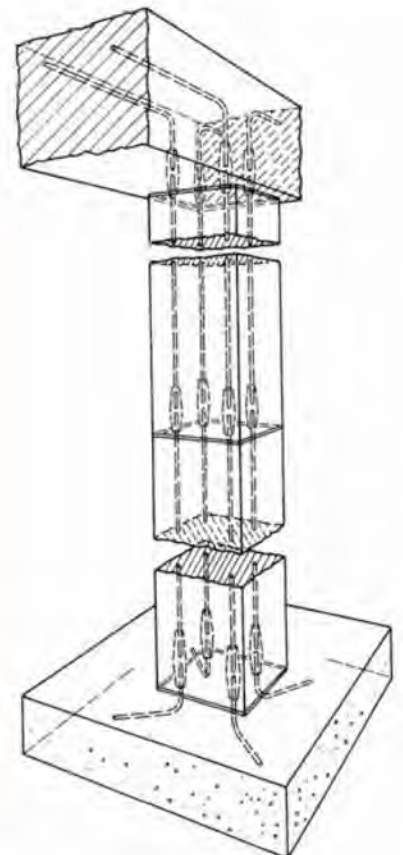
NMB SPLICE-SLEEVES have been used in a number of different applications both in cast-in-place and precast concrete structures.

Precast Concrete Connections:

- Column-to-column
- Column-to-beam
- Column-to-foundation
- Beam-to-beam
- Shear wall to shear wall
- Shear wall to foundation
- Elevator and stair cores
- Airport control towers
- Bridge piers and Pier caps
- Caissons
- Large diameter hollow columns

Cast-in-place Concrete Structures:

- Connections of prefabricated column reinforcing cages
- Connections of new bars to old in vertical and horizontal rehabilitation work
- Stress relief joints in post-tensioned cast-in-place floor slabs

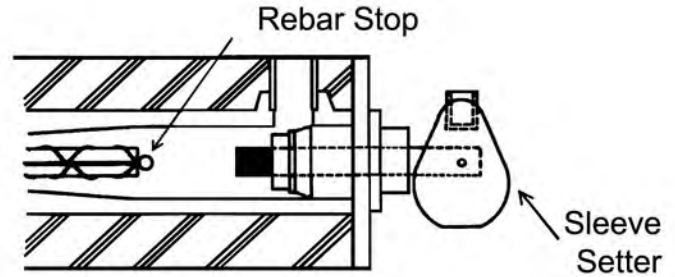




NMB SPLICE-SLEEVE

NMB SPLICE-SLEEVES are installed and held firmly in place in the forms during concrete pouring by means of a Sleeve Setter featuring a fast-acting cam operated locking device.

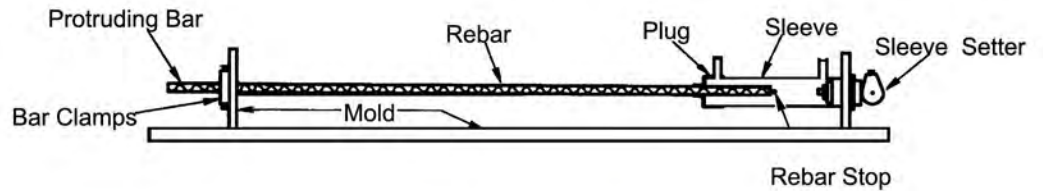
The NMB SPLICE-SLEEVE has an integral Rebar Stop in the mid-portion which assures the specified embedment of the rebar into the sleeve and an optional setscrew to hold the bar in the narrow end.



The uniform exterior dimension of the sleeve permits use of stirrups or hoops of the same size throughout the length of the sleeve.

No special treatment such as threading of rebar ends is required.

NMB SPLICE-SLEEVE can connect bars of the same size or up to two sizes smaller than the sleeve size.



The NMB can be epoxy coated and used to connect epoxy coated bars without removing the coating.





8 Day Bridge – Epping, NH



Salt Lake City – Front Runner Railway



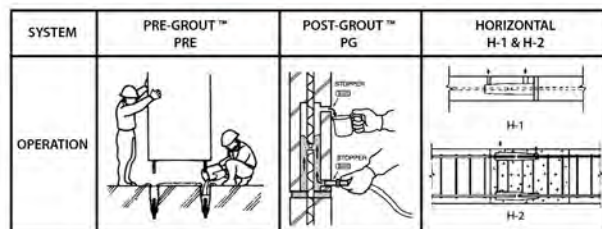
F35 Training Facility ATCT

ERECTION

During erection, precast concrete elements are set into position one of three ways (see diagrams). The rebar dowels projecting from either the foundation or opposite piece are inserted into **NMB Splice-Sleeves** embedded in the precast element. The wide (field) end of the sleeves is designed larger than the rebar to provide tolerance to accommodate bar misalignment. The sleeve also allows tolerance with inserted rebar length (see chart on Page 5).

If needed, additional tolerance can be gained by “Upsizing” to a bigger sleeve. This can be one or two sizes (max.) bigger than the rebar. Similar to Upsizing, different rebar sizes can be “Transition Spliced” in the **NMB Splice-Sleeve** (for details see User’s Manual). These abilities allow all bars to be quickly mated and grouted simultaneously, saving crane time and speeding erection.

The precast elements are temporarily braced while the grout cures sufficiently in the sleeves. Typically EORs specify 4,000 psi which is comfortably above a yield strength connection. This is achieved in less than 24 hours at 68°F (see chart above), contributing to rapid construction.



SS Mortar® (Grout) - Compressive Strength Time vs Temperature

Curing Temp	Compressive Strength (psi)					
	12 hr	18 hr	1 day	3 days	7 days	28 days
41°F 5°C	---	834	1,869	5,823	8,871	13,860
50°F 10°C	410	1,869	2,905	6,858	9,907	14,895
68°F 20°C	1,869	3,328	4,364	8,317	11,366	16,354
86°F 30°C	2,905	4,364	5,399	9,352	12,401	17,389
104°F 40°C	3,708	5,167	6,202	10,155	13,204	18,192

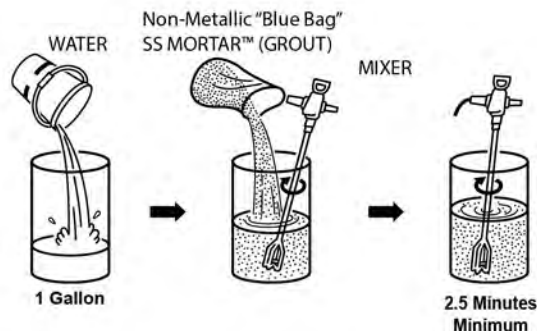
Calculated strength — calculated from the formula $(24.758 \ln x \text{ Cumulative Temperature}) - 54.183$

GROUTING

For PRE-GROUT applications, the SS MORTAR grout is simply poured into the sleeve and consolidated before the next precast member is set in position.

For POST-GROUT and HORIZONTAL applications, the grout is pumped into the sleeve by means of a hand-operated pump. With both these systems, grouting operations can be performed after bracing and do not interfere with erection progress.

In total, **NMB SPLICE-SLEEVE** contributes to speed of construction.





NMB

SPLICE

NMB SPLICE-SLEEVE

Steel Specification: The material properties of the NMB Splice Sleeve® iron castings conform to proprietary specification based on ASTM A536-84. The Models 5U-X and 6U-X satisfy the ASTM A536 Grade 65-45-12 [minimum yield and tensile strength of 65,000 and 45,000 psi respectively], Model 7U-X through Model 14U-X, Model A11W, and Model SNX11 satisfy ASTM A536 [Grade 80-55-06] with a Grade of 85-60-06 [minimum yield and tensile strength of 85,000 and 60,000 psi respectively].

Grout Specification: The grout used in the NMB must be non-metallic, "SS Mortar®". Minimum grout strength requirements for ASTM A615 Grade 60 rebars:

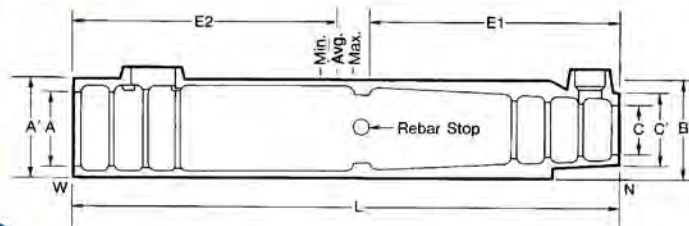
Type 2 (ACI)*	(100% Fu = 150% Fy = 90 ksi)	9,500 psi
Type 1 & AASHTO	(125% Fy = 75 ksi)	6,500 psi
Yield Strength	(100% Fy = 60 ksi)	4,000 psi

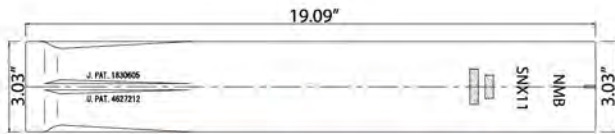
NOTE: to allow for variations in curing, typically cube breaks of 4,000-psi are specified by the EOR for removal of bracing and continued erection.

*Note that for ASTM A706 Grade 60 rebars, 100% of specified tensile equals 133% of specified yield.

DIMENSIONS OF NMB SPLICE-SLEEVES*											RECOMMENDED REBAR EMBEDMENT LENGTH					
Sleeve No.	Bar Diameter	ASTM Bar Size		Sleeve Length (L) inch (mm)	Narrow End Diameter		Max. Dia. (B) inch (mm)	Wide End Diameter			Factory Dowel (E1)		Field Dowel (E2)			SS Mortar lbs. per Sleeve (kg)
		U.S.	Metric		I.D. (C) inch (mm)	O.D. (C') inch (mm)		I.D. (A) inch (mm)	Total Tolerance inch (mm)	O.D. (A') inch (mm)	inch (mm)		inch (mm)			
											Min.	Max.	Min.	Avg.	Max.	
5U-X	0.625	#5	16 MM	9.65 (245)	0.87 (22)	1.50 (38)	1.81 (46)	1.26 (32)	0.63 (16)	1.89 (48)	4.13 (105)	4.33 (110)	4.13 (105)	4.53 (115)	4.92 (125)	1.26 (0.57)
6U-X	0.750	#6	20 MM	11.22 (285)	1.02 (26)	1.65 (42)	1.97 (50)	1.42 (36)	0.67 (17)	2.05 (52)	4.92 (125)	5.12 (130)	4.92 (125)	5.32 (135)	5.71 (145)	1.76 (0.80)
7U-X	0.875	#7	22 MM	12.80 (325)	1.14 (29)	1.77 (45)	2.28 (58)	1.73 (44)	0.86 (22)	2.36 (60)	5.71 (145)	5.91 (150)	5.71 (145)	6.11 (155)	6.50 (165)	2.65 (1.20)
8U-X	1.000	#8	25 MM	14.57 (370)	1.30 (33)	1.93 (49)	2.48 (63)	1.89 (48)	0.89 (23)	2.52 (64)	6.50 (165)	6.69 (170)	6.50 (165)	6.99 (178)	7.48 (190)	3.46 (1.57)
9U-X	1.128	#9	28 MM	16.34 (415)	1.42 (36)	2.06 (52)	2.60 (66)	2.01 (51)	0.89 (23)	2.67 (68)	7.40 (188)	7.56 (192)	7.40 (188)	7.88 (200)	8.35 (212)	3.95 (1.79)
10U-X	1.270	#10	32 MM	17.91 (455)	1.57 (40)	2.28 (58)	2.80 (71)	2.16 (55)	0.89 (23)	2.87 (73)	8.19 (208)	8.35 (212)	8.19 (208)	8.66 (220)	9.13 (232)	4.94 (2.24)
11U-X	1.410	#11	35 MM	19.49 (495)	1.73 (44)	2.40 (61)	3.03 (77)	2.32 (59)	0.91 (23)	3.03 (77)	8.98 (228)	9.13 (232)	8.98 (228)	9.45 (240)	9.92 (252)	6.02 (2.73)
SNX11	1.410	#11	35 MM	19.09 (485)	1.69 (43)	3.03 (77)	3.03 (77)	2.32 (59)	0.91 (23)	3.03 (77)	8.86 (225)	9.25 (235)	8.27 (210)	8.86 (225)	9.45 (240)	6.99 (3.17)
A11W	1.410	#11	35 MM	19.49 (495)	1.73 (44)	3.31 (84)	3.30 (84)	2.60 (66)	1.19 (30)	3.30 (84)	8.86 (225)	9.69 (246)	8.27 (210)	8.96 (228)	9.50 (241)	7.74 (3.52)
14U-X	1.693	#14	40 MM	24.41 (620)	2.01 (51)	2.80 (71)	3.46 (88)	2.60 (66)	0.91 (23)	3.46 (88)	11.42 (290)	11.61 (295)	11.42 (290)	11.91 (303)	12.40 (315)	9.19 (4.17)
18U	2.257	#18	57 MM	36.22 (920)	2.68 (68)	3.66 (93)	4.72 (120)	3.27 (83)	1.01 (26)	4.25 (108)	17.00 (432)	18.11 (460)	17.00 (432)	17.56 (446)	18.11 (460)	25.31 (11.48)

**The minimum embedment length for the bars using a larger size sleeve must follow the requirements for the sleeve size, not the bar size. For example, for a #9 bar with #11U-X sleeve, the embedment length must be based upon 11U-X, i.e. the maximum factory dowel (E1) is 9.13"; the maximum field dowel (E2) is 9.92".

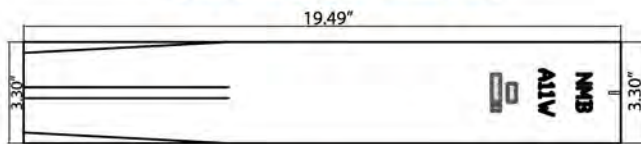




SNX11

- US PVC grout tubes
3/4" inlet & 1/2" outlet
- Screw in Rubber Plugs
- 9/11 RP for upsizing
- More Tolerance

NEW PRODUCTS!



A11W



How to specify NMB SPLICE-SLEEVES:

SPECIFIC: Show sleeve size and grouting system.

Examples: NMB SPLICE SLEEVE 8U-X(PG), 11U-X (PRE) from Splice Sleeve North America, Inc. Livonia, Michigan.

GENERIC: Mechanical rebar splices by means of grout-filled steel sleeves with frusto-conical geometry into which a non-shrink, high-strength grout is introduced using a low pressure pump, the splice to meet the TYPE 1 or 2 requirements of ACI 318.

AASHTO:

The NMB SPLICE-SLEEVE exceeds the requirements (min. 125%F_y) of the AASHTO, Standard Specification for Highway Bridges, Division I- Design, Section 8.32.2. This article sets down requirements for fatigue design of mechanical connections. The NMB is listed generically as the "Grout-filled sleeve (without threaded ends), with or without epoxy coated rebar", which gains the 18-ksi stress category (highest) under 5 million cycle testing per NCHRP 10-35 methodology.

APPROVAL AND RECOGNITION

- ESR-3433: ICC Evaluation Service, Inc.
- New York State Department of Transportation
- Various U.S. State Department of Transportation
- New York City Board of Standards and Appeals, Calendar No. 329-89-SM
- City of Los Angeles, Departments of Building and Safety, Research Report



MGM Grand, Las Vegas



Costa Azul LNG Plant, Mexico



Edison Bridge, Fort Myers



FAA Control Tower, Orlando



Tennis Stadium, Yale University



Mystic Garage, Medford, MA



Splice Sleeve North America, Inc.
38777 W. Six Mile Road, Suite 205
Livonia, Michigan 48152
For More Information, Call: 734-838-0420
On the Web: www.splicesleeve.com



TABLE OF CONTENTS- FREQUENTLY ASKED QUESTIONS

1. ENGINEERING VI-2

2. PURCHASING..... VI-3

3. PRODUCTION..... VI-3

4. FIELD VI-4

5. QUALITY CONTROL TESTING VI-5

1. ENGINEERING

1. How many bar sizes differential can be accommodated?

Any given size sleeve can connect the bar designated or any combination of smaller bars. For example, the #11U-X sleeve can connect, #11, #10, #9, #8, #7, etc. The minimum embedment length for the bars in the sleeve must follow the requirements for the sleeve size, not the bar size. However, it is recommended to upsize 2 bar sizes. For example, #9U-X sleeves can be used for splicing #7, #8, and #9.

2. What is the difference between a Type 1 and Type 2 splice?

Type 1 mechanical connection splices outlines that, a full mechanical connection shall develop in tension or compression, as required at least **125 percent** of specified yield strength f_y of the reinforcing bar. The definition of **Type 2** depends on the code being referenced.

- For **Type 2** mechanical connection splices, Section 21.1.6.1 of ACI 318-11 outlines that a full mechanical splice connection shall develop in tension or compression, as required, at least **1.25 f_y** of the reinforcing bar and shall develop the specified tensile strength of the spliced bar which is the same as 150% of specified yield for ASTM A615.
- For **Type 2** mechanical connection splices, Section 1921.2.6.1.2 of UBC-97 outlines that, mechanical connections shall develop in tension lesser of **95 percent** of the ultimate tensile strength, f_u or **160 percent** of specified yield strength, f_y of the reinforcing bar and the ICBO Evaluation Service adds cyclic testing under Acceptance Criteria AC133. The NMB has been reviewed for Type 2 as noted in Evaluation Report ESR-3433.

3. Do I need to specify Type 2?

Type 2 splices are only needed if the coupler is deemed to be in a plastic hinge zone in the structural system and the building is located in a high seismic zone which requires confirming of provisions outlined in Chapter 21 of the ACI 318 Building Design Code.

4. Is the Type 2 NMB Splice-Sleeve different?

No, it is the same sleeve. However, the minimum grout strength changes from 6,500-psi for Type 1 (125%) to 9,500-psi for Type 2 (150%) connections as per ACI 318-11.

5. Do I need to specify different grout for Type 2?

No, the only grout approved for use in the NMB Splice-Sleeves is SS Mortar®. We have designed SS Mortar to achieve well over 11,000-psi at 28-days when mixed as directed. Typical 28 days strength ranges above 12,500-psi.

6. Can I use the NMB upside down?

Yes, this is called Pre-Grout position. The sleeve is filled (pre-grouted) just before the precast element is erected above. This is especially good to create blind architectural connections. However, if you want the option of pumping grout after erecting, you can detail so as to pump grout through the 14 mm PVC grout tube and seal off the 22 mm port that allows grout to spill over at the wide end.

7. Do I need to stagger sleeves?

No, sleeves are not usually staggered. It is highly impractical to stagger sleeves on either side of a joint. Many tests have been done over 33 years that show staggering is not necessary. Further, you can refer to the ACI Committee 349 “Code Requirements for Nuclear Safety Related Concrete” that gives design criteria for eliminating staggering that normally is required in Chapter 21 of the ACI 318 code.

8. How close can I space NMB's?

The NMB is treated like it is a rebar. You must be able to get concrete around it. Based on the maximum size of aggregate a minimum distance of 1” between sleeves is to be maintained.

9. How much concrete cover is required for the NMB's?

The NMB is treated like it is the main reinforcing bar. Depending on the exposure conditions, one need to maintain the minimum cover that would have been required over the main bars.

10. What is the embedment length of a bar and sleeve assembly?

The NMB is considered to be part of the bar and its length is part of the embedment length for the situation in question.

11. Can the NMB connect Epoxy Coated Rebar?

Yes. NMB Splice Sleeves are available with Epoxy Coating on the outside.

12. Can the NMB be hot-dip galvanized?

No. However, zinc coating can be applied on the outer surface. SSNA provides zinc coated sleeves

2. PURCHASING

1. Where can I get help to figure out what to order?

Call Splice Sleeve North America at (877) 880-3230 or email to info@splicesleeve.com.

2. Where do I place an order?

Call Splice Sleeve North America at (877) 880-3230 or FAX (734) 838-0422 or email to: order@splicesleeve.com.

3. What is the difference between a Rubber Plug (RP) and a Setter Rubber (SR)?

The Rubber Plug (RP) is a standard accessory that fits over the narrow end of the sleeve and seals the factory bar coming into the sleeve. The Setter Rubber (SR) is part of the Cam-Type Sleeve Setter (STR-CT). It fits in the wide end of the sleeve and holds it to the form. If production calls for more rubbers, you need to ask which ones, for the sleeve or the setter?

4. What else do I need to order besides sleeves?

That depends on the application. You will probably need PVC tubing if the sleeves are located in Post-Grout position (bottom of piece, above the joint). You will need Cam-Type Setters (STR-CT) or PIN Type- (PS) for each sleeve in each form. The field crew will need SS Mortar, a hand grout pump and mixer blade among other common items. Call us for help with your specific situation. Please refer to **NMB Order Guide** page.

5. When can I expect delivery?

We have warehouses in California and Pennsylvania. Most orders are shipped by truck to arrive within one week. We can air freight overnight for stocked items as per your instruction.

3. PRODUCTION

1. Can we use flexible grout tubing?

Flexible tubing is not recommended because the grouting crew may have to clear a plugged port in the field. It is much easier to clear a straight tube with a rod or drill bit. If you must use a flexible tube, make sure the interior is smooth and the tubing as stiff as possible to minimize the risk of collapse. Check all tubing in the plant before shipping precast to the field. Field crews should check tubing on the truck before erecting.

2. How do you attach PVC tubing to the sleeve?

The preferred method is to use thick PVC cement. You can also use electrical tape wrapped around the end to wedge and seal the tube in the sleeve's port for short lengths (less than 6").

3. How much do you tighten the sleeve setter (STR-CT)?

The setter should be just tight enough that the sleeve cannot be rotated by hand. Over-tightening is not a problem however, the Setter Rubber (SR) wears out faster. It is recommended that you release the cams overnight during curing to prolong rubber life.

4. How do I know the factory rebar is properly embedded?

The NMB has Bar-Stops in the middle of the sleeve to set the embedment length. It is also recommended to mark the bar using a jig tube such that the mark appears just outside the Rubber Plug (RP) as a visual pre-pour check.

5. We are using #11U-X sleeves to connect #9 rebar. Any precautions?

Check the Rubber Plug (RP) to make sure it is sealing around the bar as it enters the sleeve. Add duct tape or wrap the RP with a tie wire to make sure the seal is tight. Make sure the bar is fully embedded in the sleeve (see answer above).

6. Do I have to saw cut rebar going into NMB Splice-Sleeve?

Rebar going into the NMB Splice-Sleeve can be cut by saw, shear, or torch.

7. What do we do if we lose some accessories?

Those accessories can be re-ordered separately. For emergency measure; if you lose the Rubber Plug (RP), cut tubular foam pipe insulation into donuts and duct tape them to the end of the sleeve and bar. See the procedure in the User's Manual for the #18U sleeve. Duct tape can also be used to cap the grout tubes. You can substitute ASTM Schedule 40 PVC tubing for our standard metric tubing, but you will have to bevel grind the ends to fit the port. The Grout Washer is used in the field and can be re-ordered and shipped overnight.

4. FIELD

1. The rebar anchor dowel coming out of the foundation is too short. What can I do?

Weld a short length of rebar or a small nut on the short bar to bring it into tolerance.

2. The rebar anchor dowels are out of tolerance in plan. What can I do?

If the bar is within a bar diameter of correct position, drill a hole similar to the diameter of the bar on the side you need to move it. Bend the bar over such that it is in proper location at the base and insert a steel wedge to hold the position. Then, bend the bar back to vertical pivoting at the wedge. Epoxy or grout the hole around the wedge.

If the bar is more than a bar diameter away, cut it off and drill and epoxy anchor a new bar in the correct location. Choose an epoxy anchoring system that develops the ultimate strength of the rebar.

3. Can I use any grout besides SS Mortar®?

No.

4. How fast does SS Mortar cure?

It depends on temperature. In warm weather (70°F+ daytime), it should cure overnight to achieve more than 4,000-psi compressive strength, which should be sufficient to allow removal of bracing. Freezing weather requires the use of radiant heaters to first get the sleeves over 50°F and then to maintain heat overnight.

5. Do I need a high pressure power pump?

No, a hand-operated grout pump is quite sufficient. We recommend the Kenrich Model GP-2HD/SS. It works well for SS Mortar and can be used all around the job site for other grouting applications. SSNA also

provides a Handy Pump for small jobs. It is a simple, robust, plunger style pump that has been designed for small or hard to reach jobs to allow the user to inject SS Mortar grout into Splice Sleeves up to 9U-X.

5. QUALITY CONTROL TESTING

1. What kind of inspection is needed on site?

Our ICC ESR-3433 report states that “special inspection” is required. This means that a quality assurance technician should check the rebar anchor dowel lengths to make sure they meet the minimum embedments specified in the User's Manual. The technician should monitor the grouting operation to verify that all sleeves have been filled and the grout mixed properly. Finally, they should take 2” cube specimens of the grout to test before the removal of bracing and at 28-days.

2. Can the testing lab use plastic cube molds?

No, they must use heavy brass molds with cover plates as per ASTM requirements.

3. Can the lab use the same testing apparatus as they use for concrete cylinders?

No, the test machine must be fitted with the proper supports for 2” cubes. The test values are very high (reaching 14,000-psi) and ASTM procedures must be strictly followed.

4. How do we know if the sleeve is filled?

The proper grouting procedure is to pump into the lower inlet port and catch the grout in a cup. The sleeve should be over-pumped by a few strokes to show that all the air has been pushed out and only a smooth flow of grout is coming from the upper outlet port. Then, stop pumping, wait for the flow to subside and immediately put a stopper in the upper port. This insures that the grout cannot backflow. Remove the nozzle and put a stopper in the lower inlet port.

If you are doing Pre-Grout sleeves, you can look down inside and see that the sleeve is filled with grout. If the grout is somewhat stiff, use a wire to stir it to remove any entrapped air at the very bottom. Shooting the grout down in the sleeve with the grout pump nozzle is a good alternative to pouring it by hand. It's faster, too.

5. How do we know the strength of the splice?

The performance of the NMB is related to the embedment length of the bars and the compressive strength of the grout. Charts and data are available to show the effect of bar embedment and grout strength. As long as the bars meet minimum embedment lengths and the grout meets minimum compressive strengths, the splice will perform as specified.



NMB SPLICE-SLEEVE SYSTEM

GROUTING OPERATION



SPLICE SLEEVE NORTH AMERICA, INC.

APPLICATIONS

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Mid-Rise Wall Precast

Precast Super High-Rise Residential

RC columns

High-Rise Wall Precast

Precast Beams

Precast Distribution Warehouse

Precast Hospital

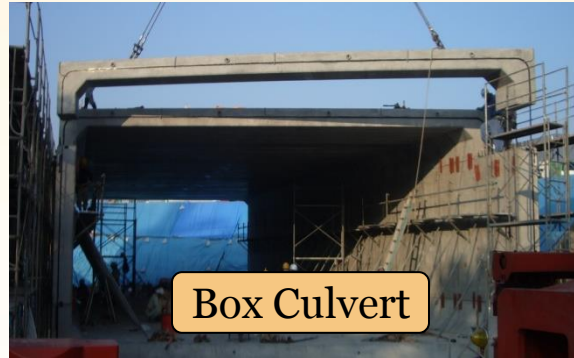
Seismic Reinforcement

SRC Structure

APPLICATIONS



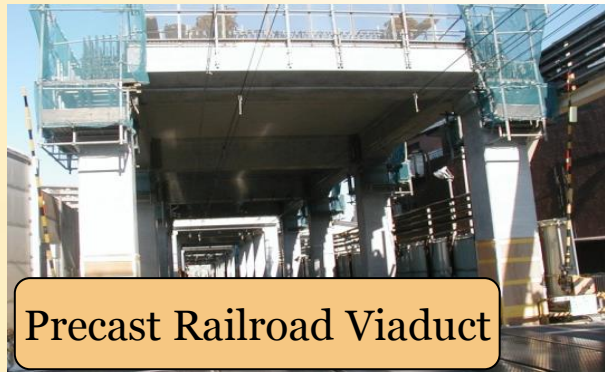
Railroad RC Pile



Box Culvert



Bridge-Caisson Pile



Precast Railroad Viaduct



Arch Culvert



Bridge -Substructure



Precast Elevated Bridge



Power Plant-Turbine Tower



Nuclear Power Plant-Intake

APPLICATIONS



ITEM	DESCRIPTION
SS Mortar®	SS Mortar
Grout Pump	Manual/Electric/Air Operated
Handy Pump	Use as a backup in case of power outage
Grout Hose	For grout pump
Stopper with Indicator (SWI)	At Grout Outlet ports
Self-Sealing Valve (SSV)	At Grout Inlet ports
Nozzle	Use a nozzle to fit into Self-Sealing Valve



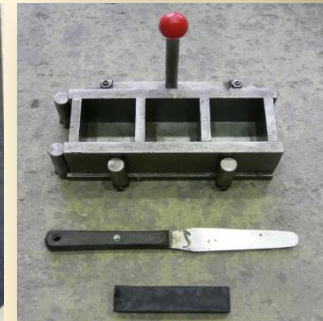
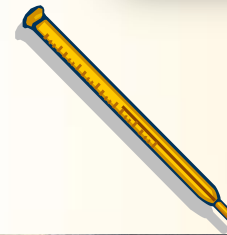
GROUT MIXING: TOOLS & EQUIPMENT

ITEM	DESCRIPTION
Mixing Bucket	Use 5 gallon (19 liters) steel pail. Avoid using plastic bucket.
Measuring Pail	For measuring 1 gallon (3.785 liters) of water
Scale	For measuring the correct weight of water (use as an alternative)
Electric Drill	(≥ 7 amp, 500-1300 RPM)
Mixing Paddle	NMB paddle
Stopwatch	Timing the required mixing time
Rubber/Latex Glove	
Cutter	To open SS Mortar
Protection Glasses	
Protection Mask	
Sponge	
Portable Heater	Use during winter as necessary



GROUT TESTING AND CUBE SPECIMENS: TOOLS & EQUIPMENT

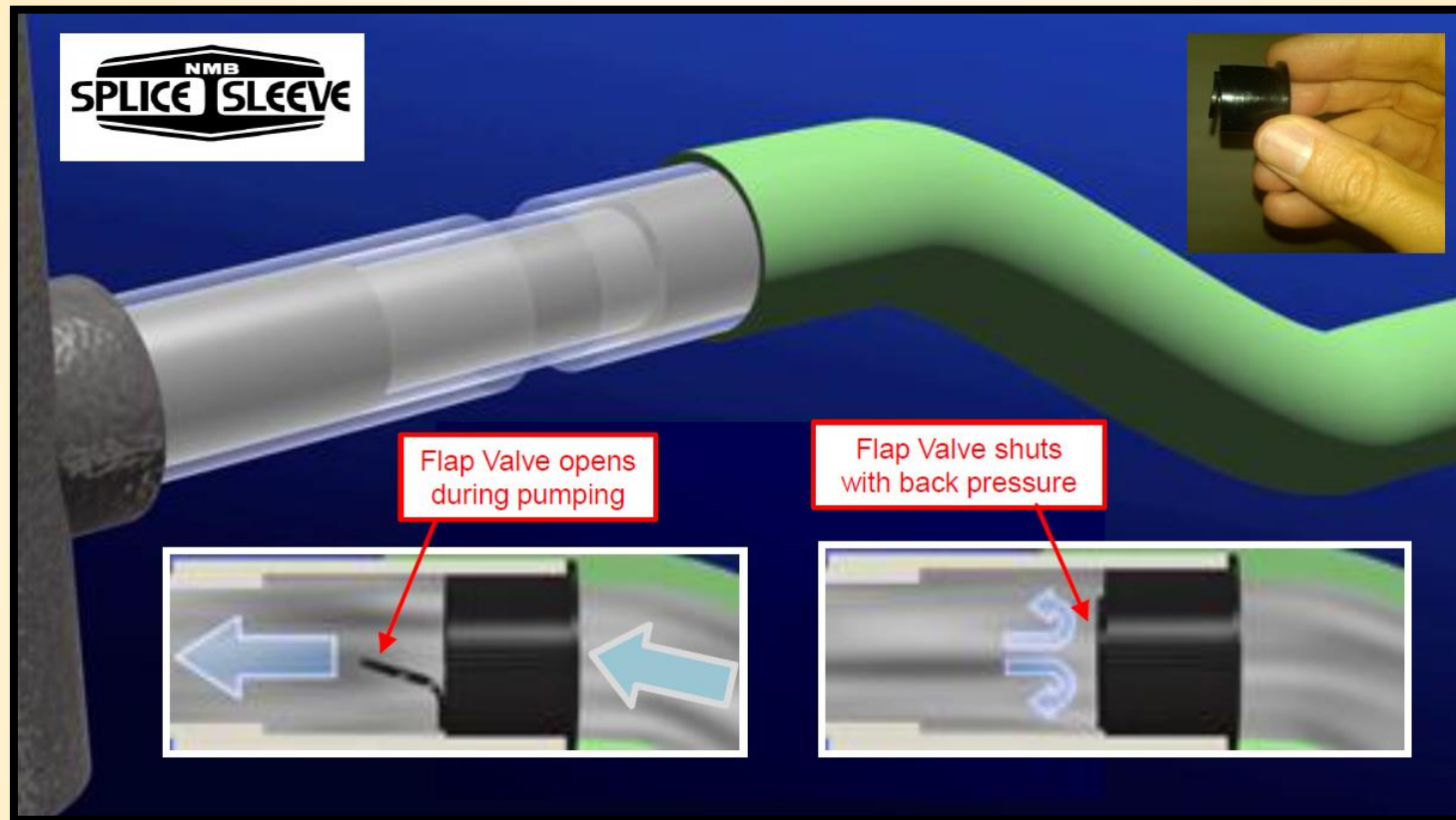
ITEM	DESCRIPTION
Measuring Cup	2 pint (0.95 liters). Use for pouring mixed grout into flow cylinder and cubic molds
Thermometer	Measure temperature of air, water, and materials
Flow Table	For consistency test. 13.39" x 13.39" x 0.79" (340 x 340 x 20 mm)
Flow Cylinder	2" dia. x 4" high
Tape Measure	To measure the diameter of the puddle for consistency test
Angle Adjuster	For leveling the flow table as necessary
Leveler	To check the leveling of flow table
Spatula/Cement Knife	For removing excess grout during consistency and compressive strength tests
Tamper/Rubber Stick	For tamping grout during compressive strength test
Mallet/Wooden Hammer	For tapping the mold during compressive strength test
2" Triple (Brass or Steel) Cube mold	For assembling specimens for compressive strength test
Curing Box	For curing specimens for compressive strength test



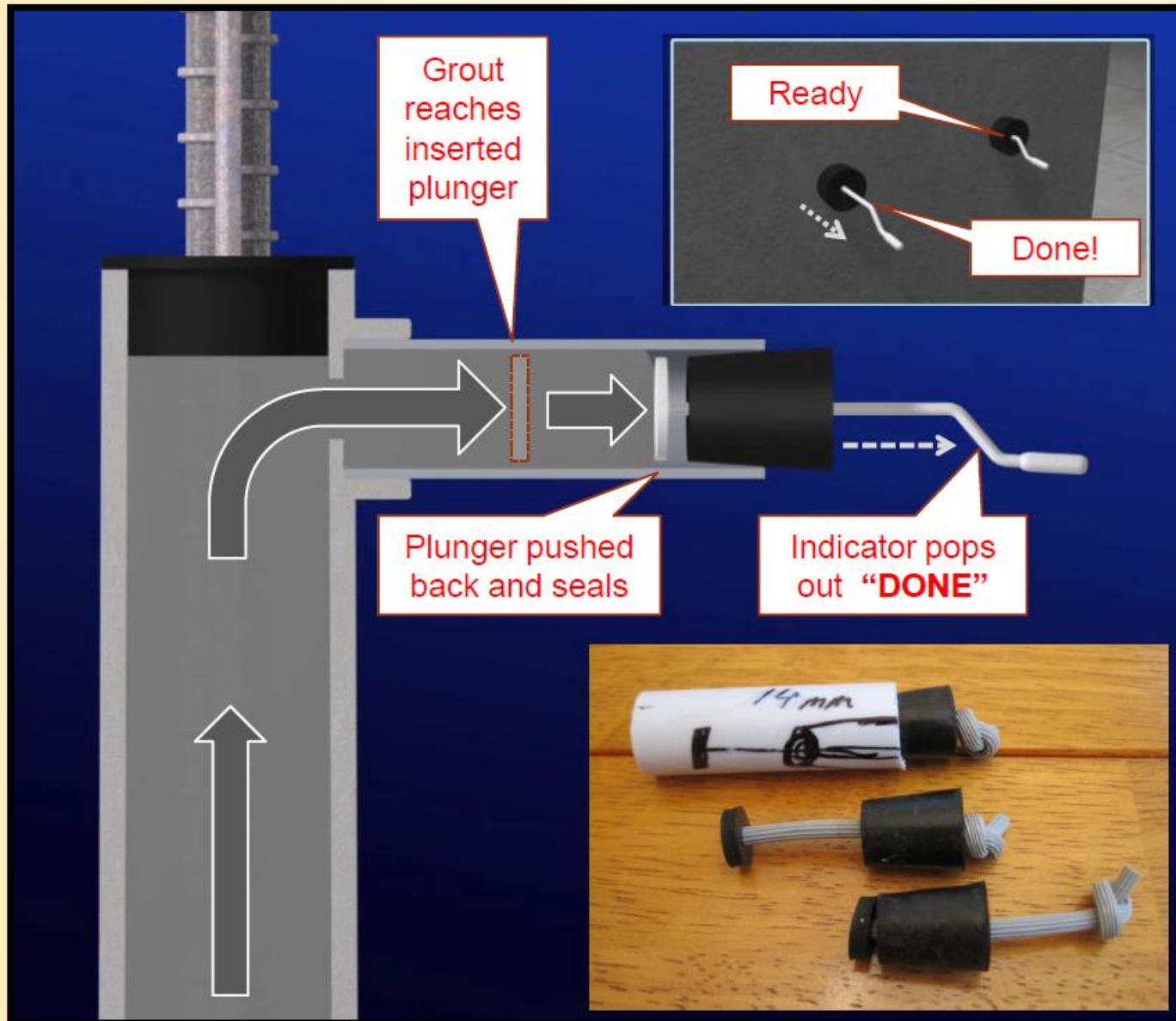
GROUT TESTING AND CUBE SPECIMENS: TOOLS & EQUIPMENT

ITEM	DESCRIPTION
Water Supply	
Electric Power Supply	
Cleaning Tools	
Equipment for saturation	For sleeves and joint area
Air Compressor	For passage inspection
Electrical Tape	For securing grout tubes to the sleeve ports
Flashlight or Spotlight	For passage and grouting inspection
Steel Rod	For passage inspection and trouble-shooting
Sledge Hammer	For passage inspection and trouble-shooting





- ✓ Inserts into PVC grout inlet tube.
- ✓ Flap opens while pumping, then closes when grouting stops, preventing backflow and automatically sealing off the tube.
- ✓ Once grout stiffens, remove, clean and reuse.
- ✓ Saves time with plugs and prevents spills, waste and cleanup.
- ✓ **It is recommended to start pumping slowly, especially while using self-sealing valve to avoid clogging, which subsequently can be increased a little bit once a smooth grout flow is confirmed.**



Ж It allows air and water to pass but when solid grout arrives it pushes the plunger back against the Stopper sealing off the tube automatically.

Ж Once grout stiffens, remove - clean – reuse.

Ж Saves time, catching cups & plugs, prevents spills & cleanup.

Ж Combined with the Self Sealing Valve, one person can grout.

MIXER PADDLES

NOT RECOMMENDED



Cheater-Beater



Paint Paddle M525



Quik Mix M819

RECOMMENDED



Jiffler

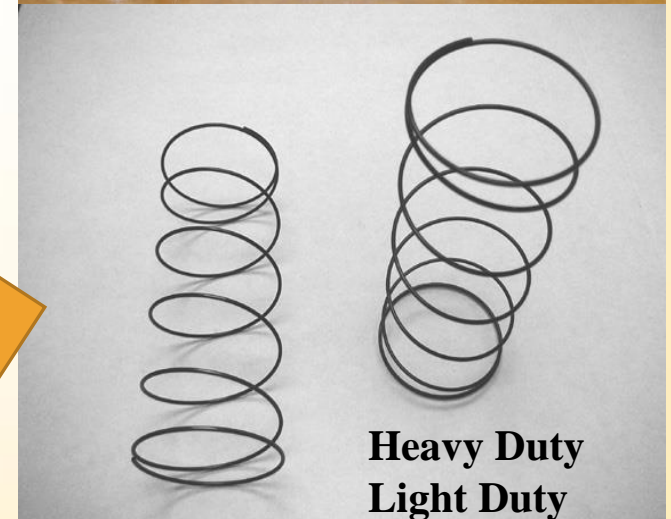
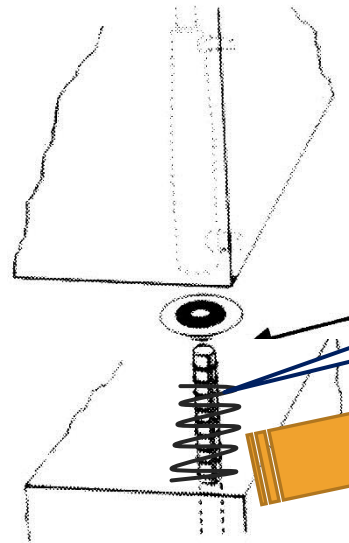
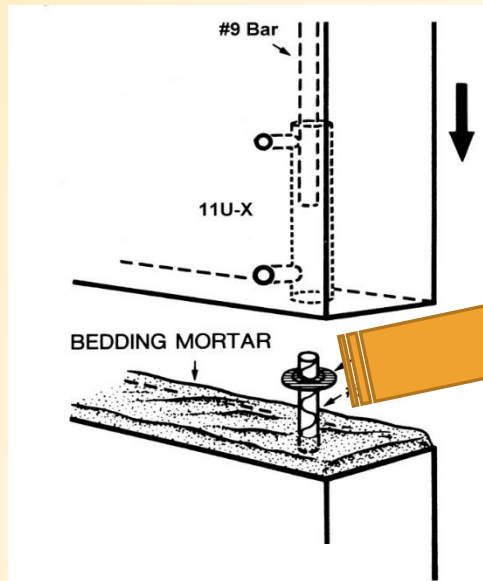


Cross Blade



NMB Paddle

ACCESSORIES FOR ERECTION



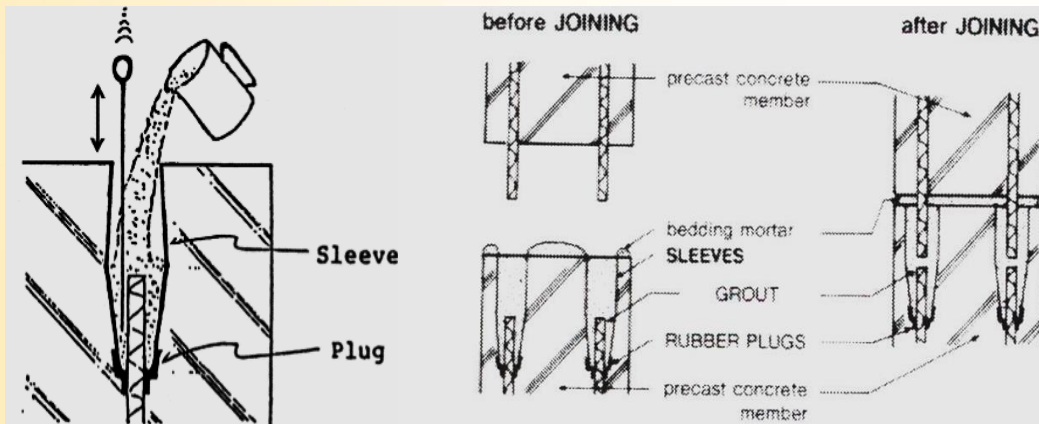
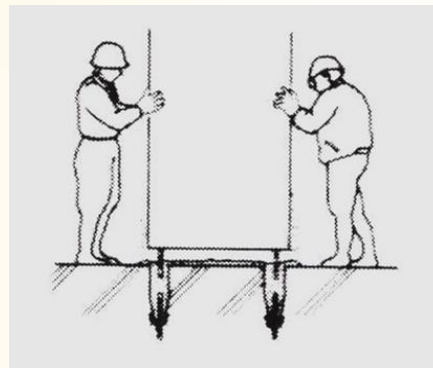
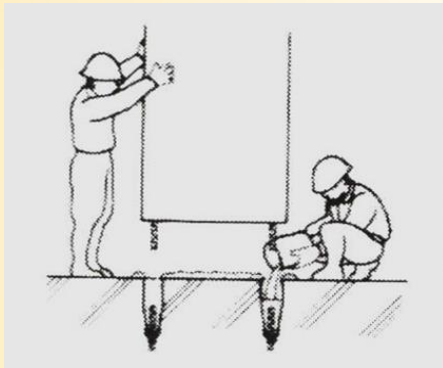
TO PREVENT BEDDING MORTAR GETTING INTO THE SPLICE SLEEVE

OUTLINE OF GROUTING OPERATION

- A. • Work schedule**
- B. • Assign a number to each sleeve**
- C. • Inspection of sleeves through grout holes**
- D. • Procure electricity and water for mixing**
- E. • Procure required quantity of SS Mortar**
- F. • Grout sampling and testing for quality control**
- G. • Grouting operation of Sleeves**
- H. • Cleaning**
- I. • Record keeping**

PRE-GROUTING METHOD

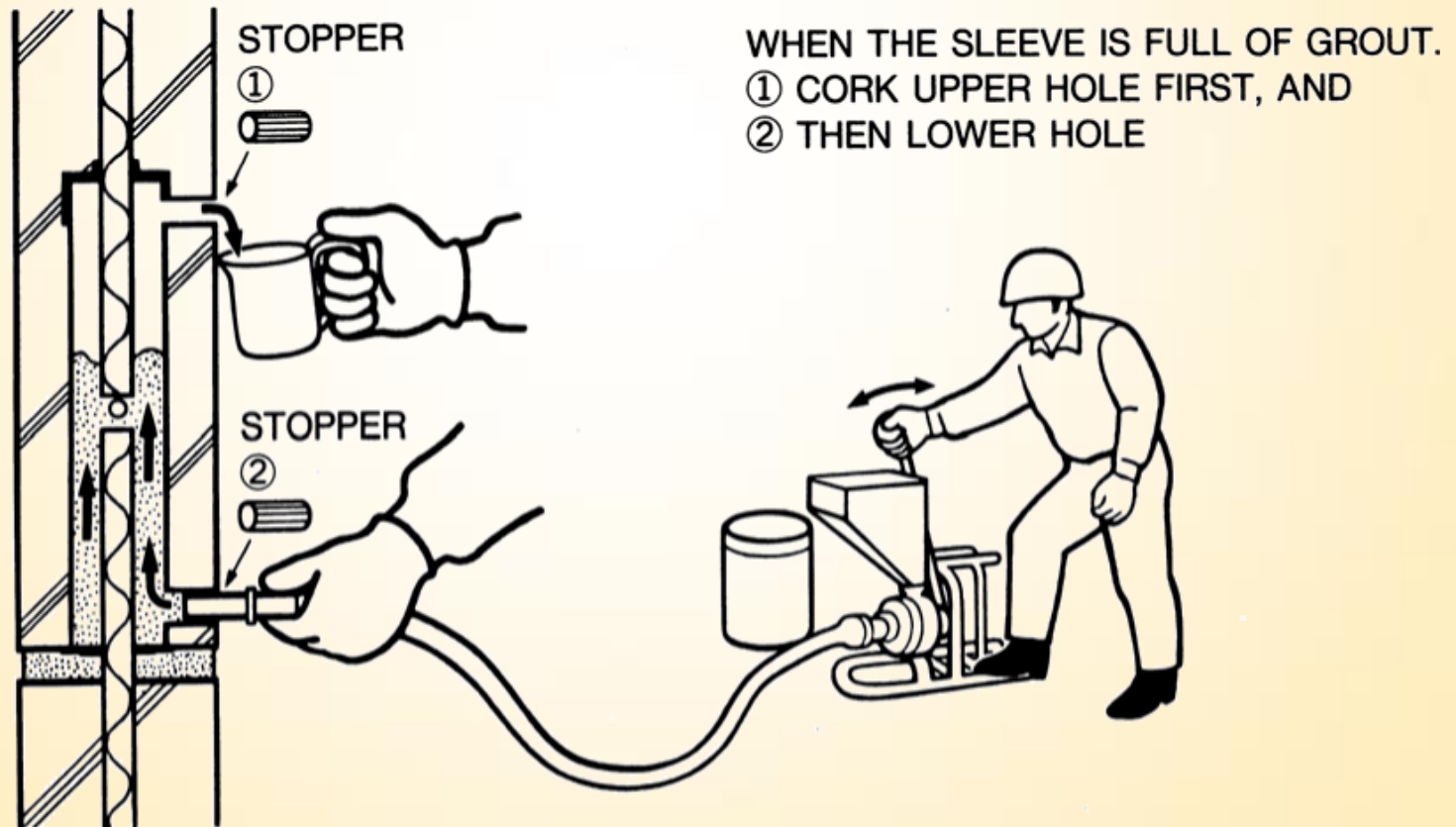
The NMB Splice-Sleeve® is located at the top of the lower precast member to be spliced. The grout is gravity fed into the Splice-Sleeve and the upper member with projecting rebar is erected into position.



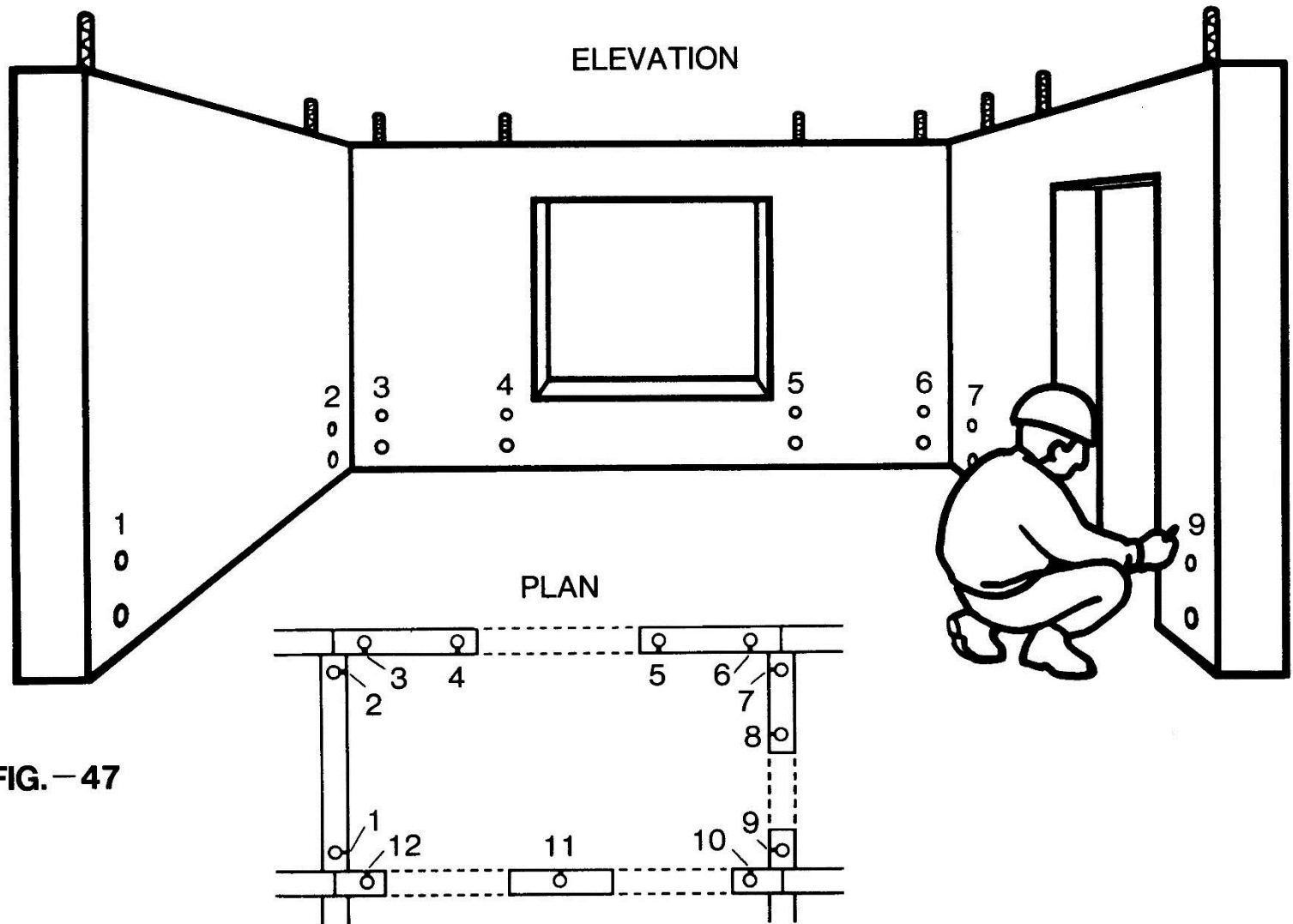
- Pour or pump SS Mortar mixed into the wide end opening of the sleeves.
- Rod with a small diameter wire to remove air in the grout.
- Fill sleeves before placing bedding grout to prevent the grout accidentally dropped in the sleeves.
- **NOTE: remember that once filled, you have 40 minutes to set the precast. Best if precast is dry fitted to check all fits before filling.**

POST-GROUTING METHOD

The NMB Splice-Sleeve® is located in the bottom of the upper member with reinforcing bar projecting out of the top of the lower member. Following the placement of the upper member, grouting is achieved by low pressure pumping

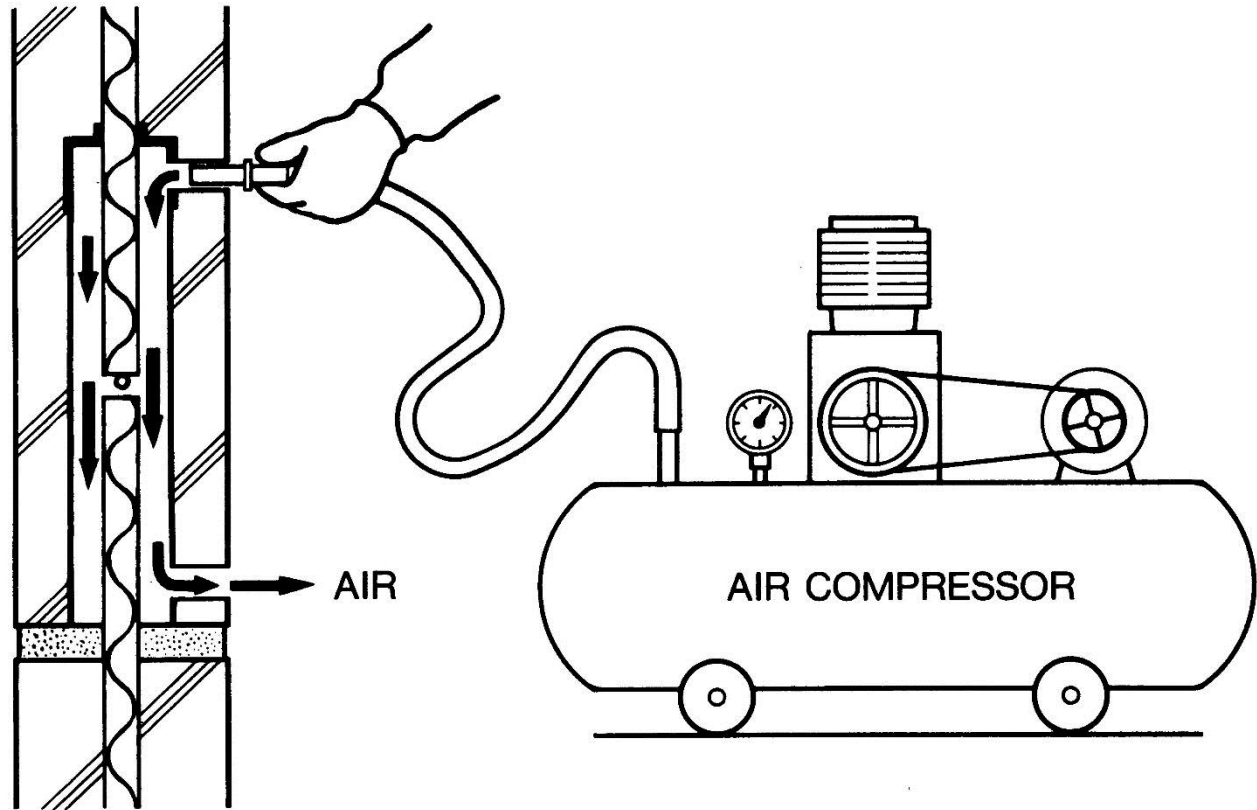


PREPARE DAILY WORK SCHEDULE/MATERIALS



INSPECTION OF SLEEVES PRIOR GROUTING

BLOWING OUT LOOSE MATERIALS



BLOW out loose materials inside sleeves

- ☐ Water may also be used to flush out sleeves from top to bottom.

SS MORTAR REQUIREMENT FOR SLEEVES

REBAR Size		Splice-Sleeve	SS Mortar		5" PVC Tubes + 15% overage	
U.S.	Metric	Model	lb/sleeve	Sleeves/Bag	lb/sleeve	Sleeves/Bag
#5	16 mm	5 U-X	0.94	58.8	1.26	40.2
#6	20 mm	6 U-X	1.31	42.0	1.76	30.7
#7	22 mm	7 U-X	2.06	26.7	2.65	20.7
#8	25 mm	8 U-X	2.70	20.4	3.46	16.2
#9	28 mm	9 U-X	3.20	17.2	3.95	13.8
#10	32 mm	10 U-X	4.01	13.7	4.94	11.2
#11	35 mm	11 U-X	5.01	11.0	6.02	9.1
#11	35 mm	SNX11	4.91	11.2	6.99	9.3
#11	35 mm	A11W	6.07	9.1	7.74	7.6
#14	40 mm	14 U-X	7.67	7.2	9.19	6.0
#18	57 mm	18 U	22.62	2.4	25.31	2.1

If pumping **grout tubes add** a little more - see example on chart. When **"upsizing"** add **20%** for each rebar size.

An additional overage of **15%** is recommended to provide for typical waste and field loss while continuously pumping large numbers of sleeves.



SS Mortar® (Grout) manufactured by Splice Sleeve Japan, Ltd. is a special cementitious **non-metallic** filler grout developed for the NMB Splice-Sleeve System.

SS Mortar® (Grout) is packaged in **55-lbs (25-kg)** moisture resistant bags.

Achieves:

≥ **14,000** psi Compressive Strength @ 28 day
 ≥ **4,000** psi in less than 24 hours at 68°F (20°C)

Mixing water: **1 gallon**

Mixing time: **2 ½ minutes** minimum

GROUTING CONDITIONS

- ▶ Store SS MORTAR in a cool dry place
50°F(10°C) - 80°F(27°C)
- ▶ Cold Weather: Heat and keep above 40°F(4.4°C) inside the sleeves and after grouted. Best curing temperature at 60°F(15°C). Use Radian Heater, Electric Blanket, Hydronic Hose
- ▶ Hot Weather: Use chilled mixing water to keep the mixed grout temp below 80°F(27°C)
- ▶ Do not perform grouting when no shelter from rain or snow, under below 40°F, **and/or harmful vibration/impacts are expected throughout curing time.**



SS MORTAR GROUT PERFORMANCE DATA

SS Mortar® (Grout) - Fresh Mortar Test Results

WATER VOLUME	MIX TEMP	CURING TEMP	SET TIME HR-MIN		FLOW GUIDE	BLEEDING %
			INITIAL	FINAL		
0.98 gal (3.7 liters)	68 (20)	41°F (5°C)	9 hr. 31 min.	13 hr. 35 min.	6 1/4" (160 mm)	0.00%
		68°F (20°C)	4 hr. 18 min.	5 hr. 55 min.	6 5/8" (170 mm)	0.00%
		86°F (30°C)	2 hr. 23 min.	3 hr. 20 min.	6 1/2" (165 mm)	0.00%

Nonmetallic, SS Mortar® can be used in when the surrounding concrete and the sleeve temperature is between 35°F (2°C) up to 140°F (60°C).



Freezing grout before it is above 1,500 psi will deplete strength.

The grout itself should be mixed and pumped between 50°F (10°C) and 95°F (35°C).

SS MORTAR GROUT PERFORMANCE DATA

CURING TEMPERATURE	COMPRESSIVE STRENGTH, PSI (MPA)					
	12 HRS.	18 HRS.	1 DAY	3 DAYS	7 DAYS	28 days
41 (5)	----	834 (6)	1,869 (13)	5,823 (40)	8,871 (61)	13,860 (96)
50 (10)	410 (3)	1,869 (13)	2,905 (20)	6,858 (47)	9,907 (68)	14,895 (103)
68 (20)	1,869 (13)	3,328 (23)	4,364 (30)	8,317 (57)	11,366 (78)	16,354 (113)
z86 (30)	2,905 (20)	4,364 (30)	5,399 (37)	9,352 (64)	12,401 (86)	17,389 (120)
104 (40)	3,708 (26)	5,167 (36)	6,202 (43)	10,155 (70)	13,204 (91)	18,192 (125)

4,000 psi = 100% F_y = Specified Yield = 60ksi (ASTM Grade 60 rebar)

4,000 psi = conservatively above F_y allowing for variation in cube versus sleeve curing temperatures.

Typically specified by EORs for removal of bracing and continued erection (typical structures)

6,500 psi = 125% F_y (75ksi) = **ACI Type 1** and **AASHTO**

9,500 psi = 100% Specified Tensile (A615) * (90-ksi) = 150% F_y = **ACI Type 2**

*ASTM Grade 60, 615 rebar F_u = 90-ksi (706 rebar F_u = 80-ksi)

FRESHNESS” BAG LIFE OF NON-METALLIC SS MORTAR

Nissco SS Mortar should be stored in moderate/cool and dry conditions.
50°F – 80°F (10°C – 27°C)

It has a “freshness” bag life of one (1) year.

Bags have a date stamp on the top using letters for the year then month then numbers for the day

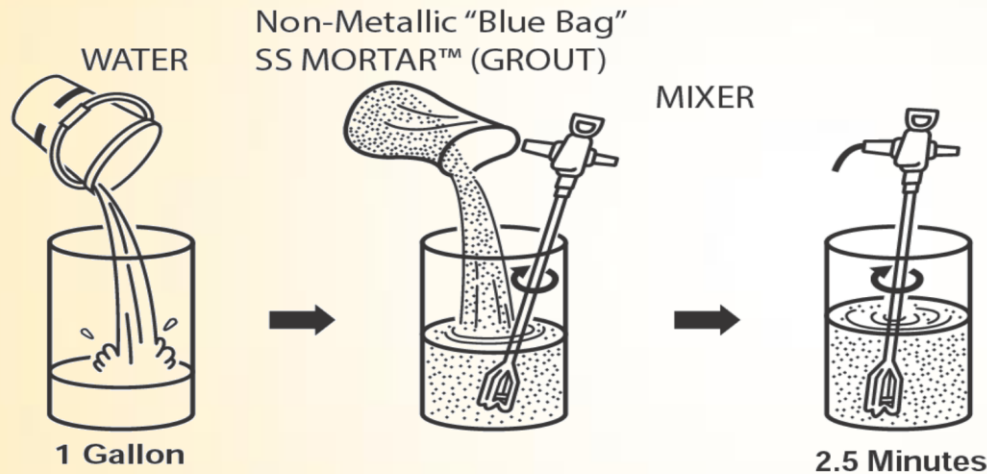
Year	11	12	13	14	15	16	17	18	19	20		
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Month	1	2	3	4	5	6	7	8	9	10	11	12
	A	B	C	D	E	F	G	H	I	J	K	L
Day	As a number from 1 to 31											



CF 25: 13 - 06 - 25 = June 25, 2013

MIXING OF SS MORTAR

- SS Mortar® is a ready-to-use formulation requiring only the proper amount of water, which is suggested at 1.00 gal. = 3.8 liters per bag. The maximum water is 1.03 gal. = 3.9 liters. Do not use admixtures. The field consistency should be between 6.0" minimum and 9.25" maximum

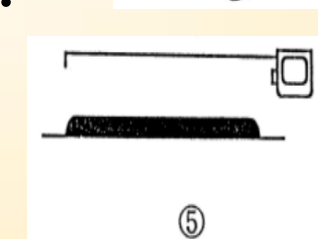
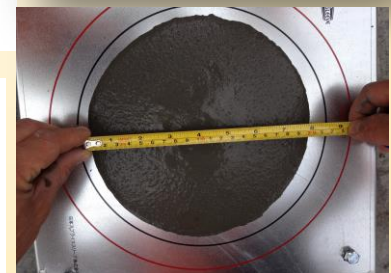
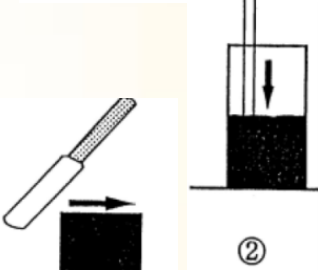
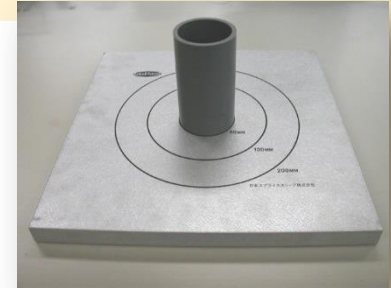
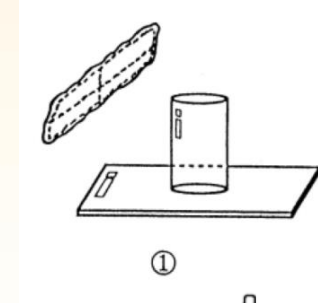


- Use a full bag unit for each batch. Do not use SS Mortar® (Grout) if the package is damaged. SS Mortar® (Grout) has a shelf life of approximately 12 months

- Do not mix by hand.
- Do not add cement, sand, aggregate or admixtures.
- Do not add more water than specified, nor re-mix.
- Do not use partial bag(Use full bag each time)
- Do not use if the bag is damaged.
- Do not use a grout other than SS Mortar.
- Do not use SS Mortar beyond one year shelf life.
- Do not leave the mixed grout in the pump.

FLOW/CONSISTENCY MEASUREMENT OF SS MORTAR

- Wipe the Flow Table surface with wet rag.
- Pour SS Mortar into Flow Cylinder.
- Level the surface at the rim with cement knife.
- Lift Cylinder slowly vertically.
- Measure the diameter in two ways. The diameter is be 6" – 9 ¼" (160mm - 230mm).



COUNTER MEASURES INCASE FLOW/CONSISTENCY TEST OF SS MORTAR IS NOT WITHIN RANGE

SS Mortar Grout Consistency/ Flow Test

Failed

Passed
(Consistency within 6" and 9.25")

Consistency less than 6"

Consistency more than 9.25"

Use Mixed Grout for
Grouting of NMB
Splice-Sleeves

Remix

- Put all mixed grout back into the pail.
- Measure 0.1 or 0.2 liter of water accurately and add to mixed grout.
- Re-mix grout for 30-60 seconds.

Discard the mix and
start mixing a new
batch of SS Mortar

Re-Measure the
Consistency of SS Mortar

**Fail: Dispose and Start
Mixing a new batch of
SS Mortar**

**Pass: Use Mixed Grout
for Grouting of NMB
Splice-Sleeves.**

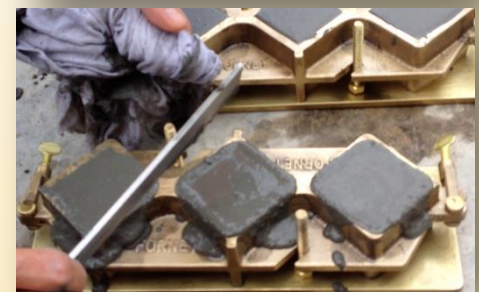
Note:

Dispose mixed grout in the following conditions:

- ① More than 30 minutes passed after the completion of the 1st mixing.
- ① The total amount of mixing water exceeds 3.9 liter (1.03 gallon) per 25 kg bag.

PREPARATION/SAMPLING OF GROUT CUBE SPECIMENS

- ❑ Grout is poured into the mold in two equal layers, each layer being tamped eight (8) times with the tamper and compacted by tapping the sides of the mold several times with a wooden hammer.
- ❑ Remove excess grout with trowel and clean top edge of mold very carefully.
- ❑ Cover the molds with a heavy plate and wet cloth, then place the specimens undisturbed for at least 24 hours in a curing box.
- ❑ Strip the cubes following day, mark to identify on top trowel surface and cure them in lime water for 28 days or until tested.



COMPRESSIVE STRENGTH TESTING OF GROUT CUBE SPECIMENS

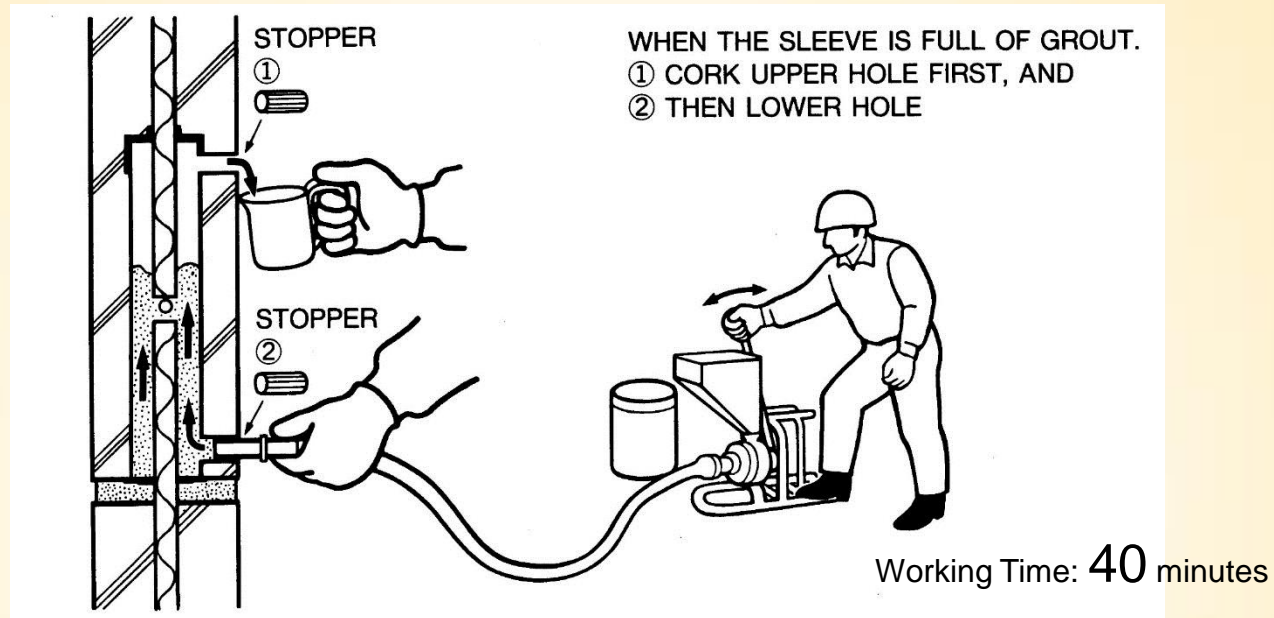
- 2" (5 cm) Cube compressive test will be conducted according to ASTM C109-80

Attention: Place the cube on its side other than the face levelled during preparation. The cube must be placed at the dead center of compressive testing machine



1. First, saturate the pump and grout hose with water to lubricate inside.
2. Pour the mixed grout into the pump hopper and operate the pump to push out the slurry from the hose.
3. After confirming a solid stream of grout coming out of the nozzle, stop pumping and insert the nozzle into the sleeve grout inlet.
4. Keep pumping the grout slowly until a solid flow of grout can be seen from the outlet hole.
5. Catch the overflow in a cup and seal the outlet with stopper.
6. Then, withdraw the nozzle and seal the inlet hole with the stopper.

GROUTING OF NMB SPLICE-SLEEVES



A: Pump grout into sleeve through the inlet port continuously and slowly



B: Catch the overflow in a cup and seal the outlet hole with a rubber stopper.



C: Withdraw the nozzle from the inlet hole and seal it with a rubber stopper.



CHECK-LIST: PRIOR GROUTING

NO.	ITEM	TESTING /INSPECTION METHOD	CRITERIA
1	Material inspection	Check for the Lot Number printed on the bag to confirm the bag life, which should be within one year period to the date of grouting	Make sure that SS Mortar did not expire the bag life of one year
2	Rain water seepage	Visual inspection on SS Mortar	Make sure that no rain water is inside the material
3	Sleeve temperature	Measure the temperature with a thermometer	Should be between 35 ~ 140°F (2~60°C)
4	Location & quantity of sleeves	Check the specification/drawings	Make sure that the location and quantity match the specification/drawings
5	Dowel embedment length	Check for proper dowel embedment length	Make sure that the embedment length of dowel is as per the requirement in the User's Manual
6	Inside sleeve	Visual inspection	Make sure that sleeve inside is clean and free from loose materials
7	Sleeve passage	Check the sleeve by blowing out air through the ports or check for sound by tapping the port, for confirmation of a clear passage	Make sure that there is a clear passage from the inlet to outlet ports



CHECK-LIST: DURING & AFTER GROUTING

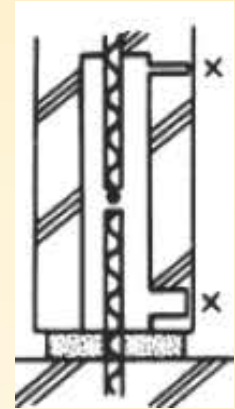
NO.	ITEM	TESTING /INSPECTION METHOD	CRITERIA
8	Mixing water	Confirm as per the User's Manual	1 gallon /55 lbs. bag (0.95~1.03 gallon/55 lbs. bag)
9	Mixing temperature	Confirm as per the User's Manual	50~95°F (10~35°C)
10	Mixing time	Confirm as per the User's Manual	2-1/2 minutes
11	Grout working time	Confirm as per the User's Manual	Within 40 minutes
12	Consistency test	Confirm as per the User's Manual	The consistency measurement should fall in the range of 6" to 9-1/4".
13	Inspection at grouting (Pre- Grout)	Confirm as per the User's Manual	Make sure that all the sleeves were totally filled with SS Mortar. Make sure that the bedding mortar does not get inside the sleeves
14	Inspection at grouting (Post- Grout)	Confirm as per the User's Manual	Make sure that all the sleeves were totally grouted from inside and solid grout comes out from the outlet port
15	Inspection after grouting	Confirm as per the User's Manual	Reconfirm that all sleeves and joint areas are completely grouted by using grouting report as a check sheet



TROUBLE SHOOTING

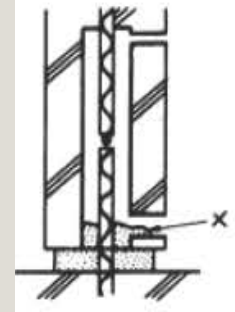
Inlet/outlet ports do not reach the surface

1. Check and mark the position of the ports according to the drawings.
2. Chip out the concrete at the marked positions to find the embedded ports.
3. Blow out the ports with the air compressors or water and confirm that there is a clear passage from the inlet to outlet port.



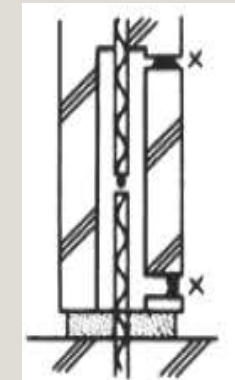
Due to omission of washers, the inlet port is clogged with bedding mortar from the joint

1. Insert a steel rod into the ports and hammer it to clear the port.
2. Repeat step 3 of Item 1.



Inlet and/or outlet port is clogged with concrete debris etc. or plastic Hole Seals (sealing caps)

- For debris etc.:
- Insert a steel rod into the ports and hammer it to clear the port.
- For Hole seals:
1. Use a hooked rod to scrape seals out of the ports.
 2. Repeat step 3 of Item 1.

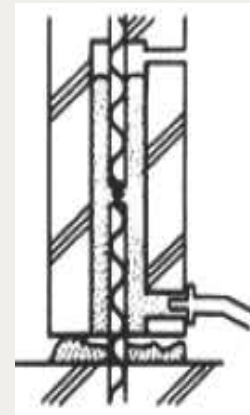




TROUBLE SHOOTING

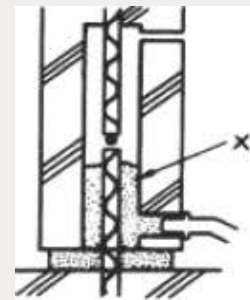
Leakage during pumping of grout from the joint due to incomplete mortar bedding

1. Seal the joint with rags, polyurethane, mortar, etc.
2. Clean the inside of the sleeve with water. (Preferably high pressure).
3. Confirm a clear passage by blowing with air.
4. Re-grout.



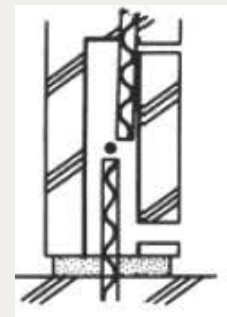
6. Clogging has occurred inside the sleeve such as at point marked during pumping operation

1. Clean the inside with high pressure water
2. After confirming a clear passage by blowing with air, start re-grouting at about half speed of the normal operation



7. Rebar is too close to the outlet port, restricting grout flow

1. Insert heavy punch into outlet grout tube and strike with sledge hammer to reduce restriction



Project Development Showcase

HIGHWAYS FOR LIFE

Accelerating Innovation for the American Driving Experience.

Lagrange, Georgia

I-85 Interchange Design-Build Project

Prefabricated Bridge Elements

May 1, 2008



THANK YOU!!!



SPLICE SLEEVE NORTH AMERICA, INC.
38777 W 6 Mile Road, Suite 205
Livonia, MI
Tel: (734)-838-0420
Fax: (734)-838-0422



Over 22 million NMB Splice-Sleeves® sold world wide

TEMPLATES FOR ALIGNMENT OF FIELD DOWELS

1. The precast concrete manufacturer should furnish the site-work contractor a template for holding the dowels. The template is prepared by drilling holes to accommodate the rebar dowels to match the holes in the side-forms used for making the precast elements. Templates may be of wood or metal. The foundation contractor should use the templates to make dual plate jigs (see Figure IV-1) to hold the dowels in horizontal and vertical alignment. In the case of tilt-up or site precast work, side forms for the panels may be re-used as templates for locating the dowels, or may be fabricated to function as side forms, depending upon the sequence of construction.

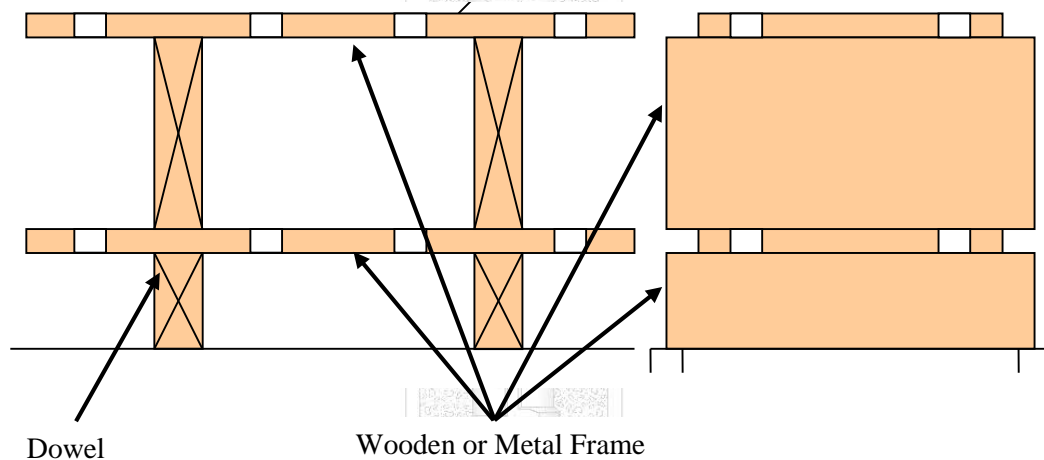
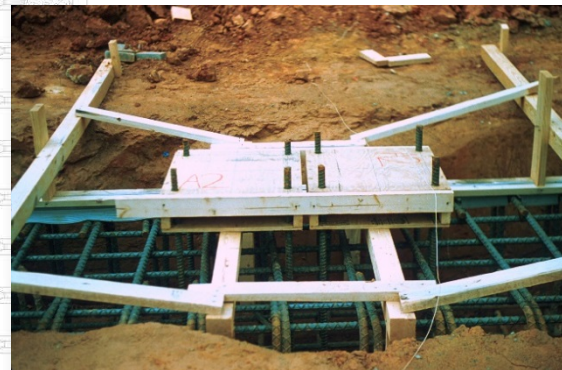


Figure 1: Typical Dual 3D Template Arrangement



Box Jig Template for Column



Double 3D Template for Columns

Figure 2: Typical Templates for Cast-in-Place Construction

2. Anchor dowels tolerance shall be complied with the guidelines of ACI, AISC, and Precast/Prestressed Concrete Institute.
 - Within a group of rebar dowels, each bar should be located within 1/8" of the specified location.
 - Any group of dowels are to be located within 1/4" of the specified location.
3. Rebar dowels protruding from the foundation should be fabricated so that the vertical extension of the dowels is at least 4" longer than required.
4. Templates should be accurately located in place and securely fastened. Patterns of dowels that are separated, but within the same precast member should be positioned with a single template assembly.
5. Vertical rebars should be accurately aligned using dual plates and may be secured by tack-welding a #3 or #4 rebar at the top of the dowel bars. This tack-welded bar will be cut off later and should not be used inside the Splice-Sleeve.
6. The quality control agency or precast concrete manufacturer should check dowels for proper location and alignment before the foundation concrete is placed.
7. Immediately after the concrete in the foundation is poured, the templates and dowels should again be checked to ensure that they have not moved during concrete casting operations.
8. Once the concrete has been cured, the excess length of dowels, along with the tack bars, are cut off. The cut-off point of the bars is determined from the table below and is measured from the top of the shims. Make sure to include joint thickness before cutting rebars.

TABLE 1: Dowel Embedment Length for NMB Splice-Sleeves®

Sleeve Size	Dowel Length (inch)	Dowel Length (mm)
5U-X	4.53	115
6U-X	5.32	135
7U-X	6.11	155
8U-X	6.99	178
9U-X	7.88	200
10U-X	8.66	220
11U-X	9.45	240
SNX-11	8.86	225
A11W	8.96	228
14U-X	11.91	303
18U	17.56	446

HOW TO SET THE TEMPLATE OF DOWEL BARS

A. WALLS

Using plywood (1/2" thick) for securing the alignment

- Template should be easy to disassemble after pouring concrete.
- Wood template should be strong enough to bear the load during concrete pouring and should determine the dowel bar location at upper-and-lower-point (above the forming and below the foundation) to secure the proper alignment.

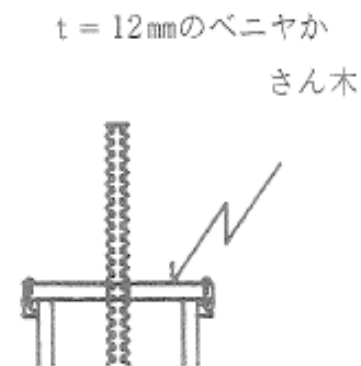
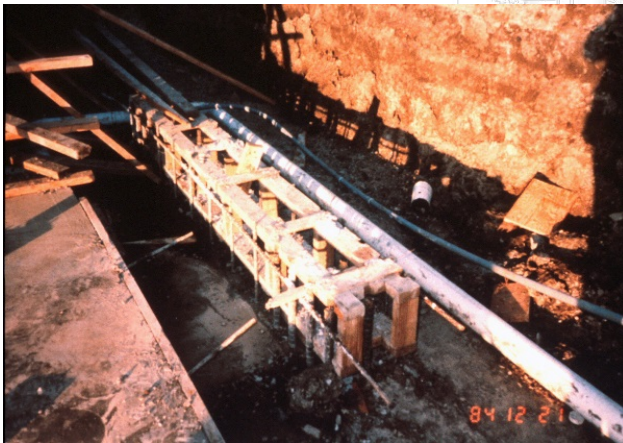


Figure 3: Wooden Templates for Walls

B. COLUMNS

Using wooden or steel template

- Template should be easy to disassemble after pouring concrete.
- Steel template should be strong enough to bear the load during concrete pouring and should maintain the stability by attaching to the horizontal rebars to secure the proper alignment

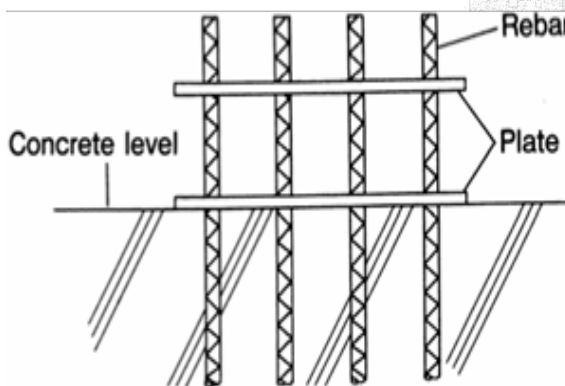
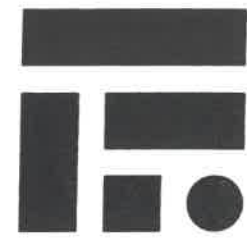


Figure 4: Templates for Columns



FORTERRA™

**STRUCTURAL
PRODUCTS**

**400 Industrial Park Drive
Pelham, AL 35124**

Forterra Project #:

8114

Columns - Caps - Deck Panels

State Project ID:

BRF-0117 (501)

Dekalb Co., AL

Contractor:

Wright Brothers Construction

1500 Lauderdale Memorial Hwy NW

Charleston, TN 37310

Location:

**Bridge Replacement Over The West Fork
of Little River on State Route 117**

In The City of Mentone

Sta. 11+14 ~ Sta. 12+70



DRAWING INDEX ~ COLUMNS-CAPS-DECK PANELS			
SHEET	ID	TYPE	DWG. FILE
1	Cover	-	8114 Cover
2	Index	-	8114 Index
3	Erection Plan	Columns	8114 CL EP
4	CL-8114-ALL	Columns	8114 CL
5	Materials	Columns	8114 CL M
6	Erection Plan	Caps	8114 CP EP
7	CP-8114-2-9	Caps	8114 CP 2-9
8	CP-8114-10	Caps	8114 CP 10
9	CP-8114-11	Caps	8114 CP 11
10	CP-8114-12	Caps	8114 CP 12
11	CP-8114-13	Caps	8114 CP 13
12	Materials	Caps	8114 CP M
13	Erection Plan	Deck Panels	8114 DP EP
14	DP-8114-1, 3, 4, 6	Deck Panels	8114 DP A-D F-I
15	DP-8114-2, 5, 7-9	Deck Panels	8114 DP E
16	Elongations & Materials	Deck Panels	8114 DP EM


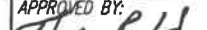
ALABAMA DOT
BRIDGE BUREAU
APPROVED
Subject To Contract Requirements

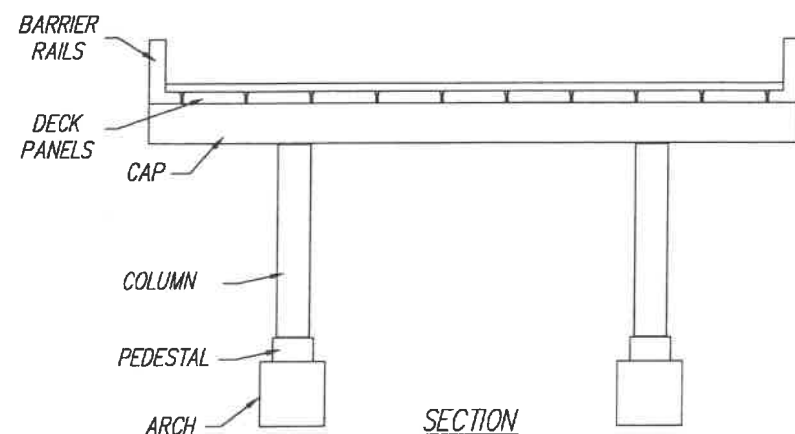
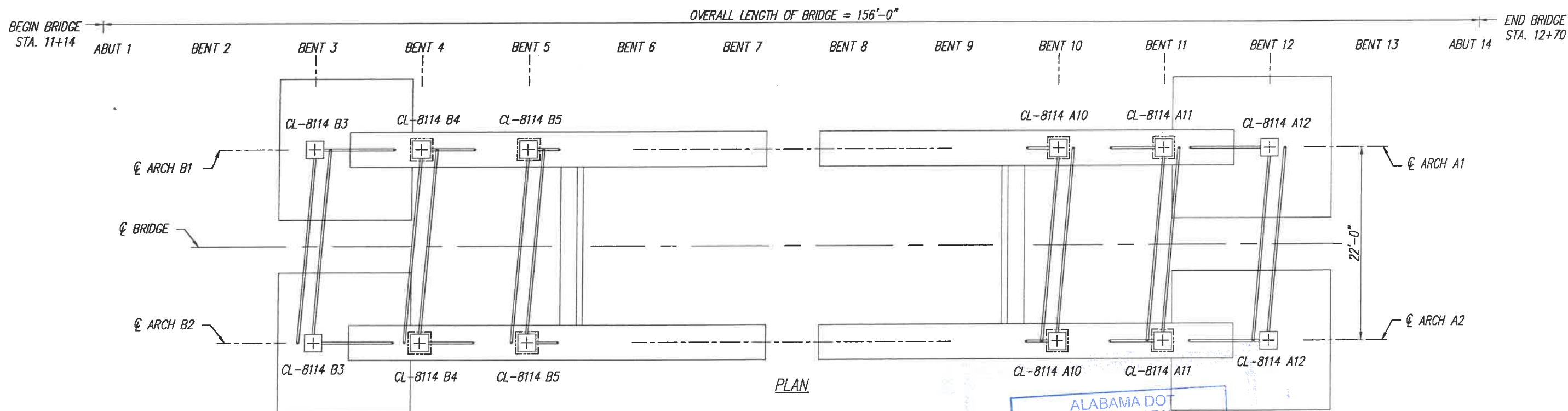
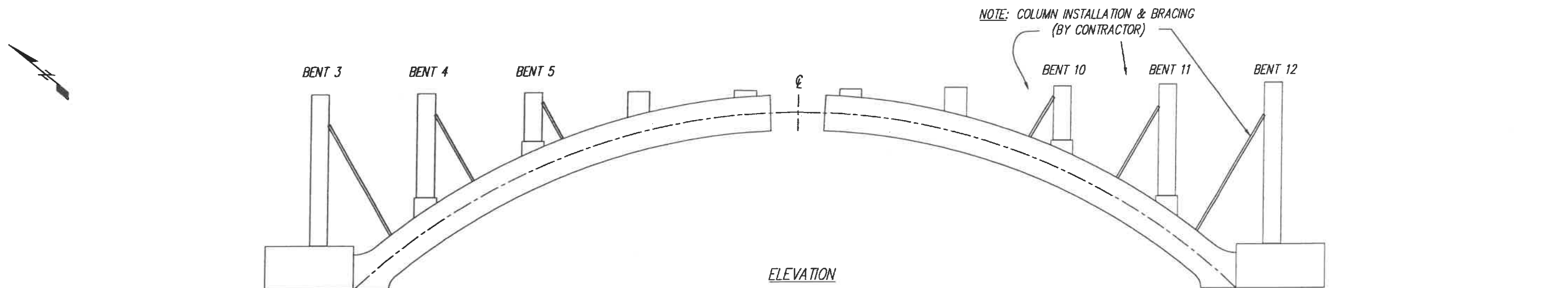
Will T. Gagnier

BRIDGE ENGINEER

DATE MAY 10 2018

VAS

REVISIONS		 FORTERRA™		FORTERRA STRUCTURAL PRODUCTS PELHAM, ALABAMA PLANT 400 INDUSTRIAL PARK DR. PH. 205 663-4681 PELHAM, ALABAMA 35124 FAX 205 663-4459	
PROJECT: BRF-0117 (501) DEKALB CO., AL					
CONTRACTOR: WRIGHT BROTHERS CONSTRUCTION					
SCALE: N.T.S.	DATE: 5/1/18	APPROVED BY: 		DRAWN BY: T.L.S.	
INDEX PRECAST DRAWINGS		COLUMNS, CAPS, & DECK PANELS		FORTERRA JOB NO. 8114	
FORTERRA DWG. FILE 8114 Index CL CP DP		CHECKED BY: D.R.H.		SHEET 2 OF 16	


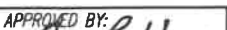



ERECTION PLAN (PRECAST COLUMNS)
BRIDGE REPLACEMENT OVER THE WEST FORK
OF LITTLE RIVER ON STATE ROUTE 117
IN THE CITY OF MENTONE
STA. 11+14 ~ STA. 12+70
DEKALB COUNTY, ALABAMA



SPECIAL NOTES:

1. COLUMNS FOR BENTS 2 & 13 ARE POURED IN PLACE.
2. REQUIRED CONCRETE STRENGTH FOR PRECAST COLUMNS:
 f'_{ci} (STRIPPING) = 4,000 psi
 f'_c (28 DAYS) = 5,000 psi

REVISIONS		QUALITY CONTROL		FORTERRA STRUCTURAL PRODUCTS PELHAM, ALABAMA PLANT	
	POUR #	 FORTERRA	400 INDUSTRIAL PARK DR. PH. 205 663-4681 PELHAM, ALABAMA 35124 FAX 205 663-4459		
	MARK #		PROJECT: BRF-0117 (501) DEKALB CO., AL		
			CONTRACTOR: WRIGHT BROTHERS CONSTRUCTION		
	GIRDER #		SCALE: N.T.S.	DATE: 5/1/18	APPROVED BY: 
		ERECTION PLAN (PRECAST COLUMNS)		FORTERRA JOB NO. 8114	
		FORTERRA DWG. FILE		CHECKED BY: 	
				SHEET 3 OF 16	

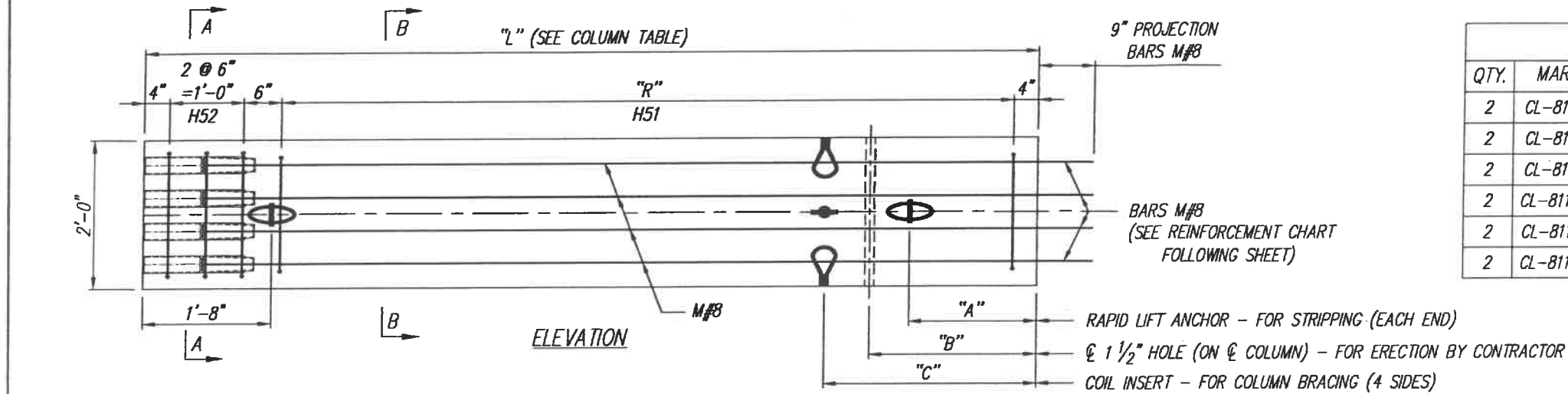
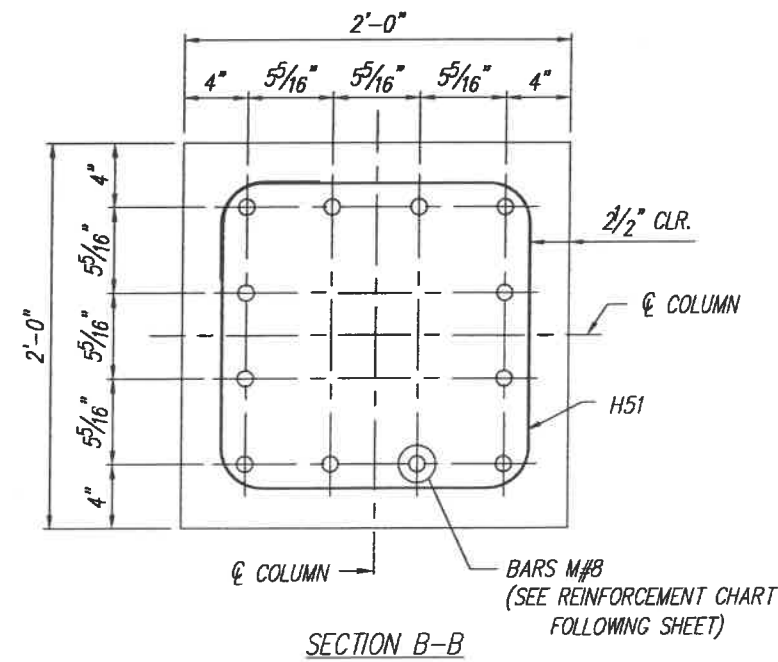
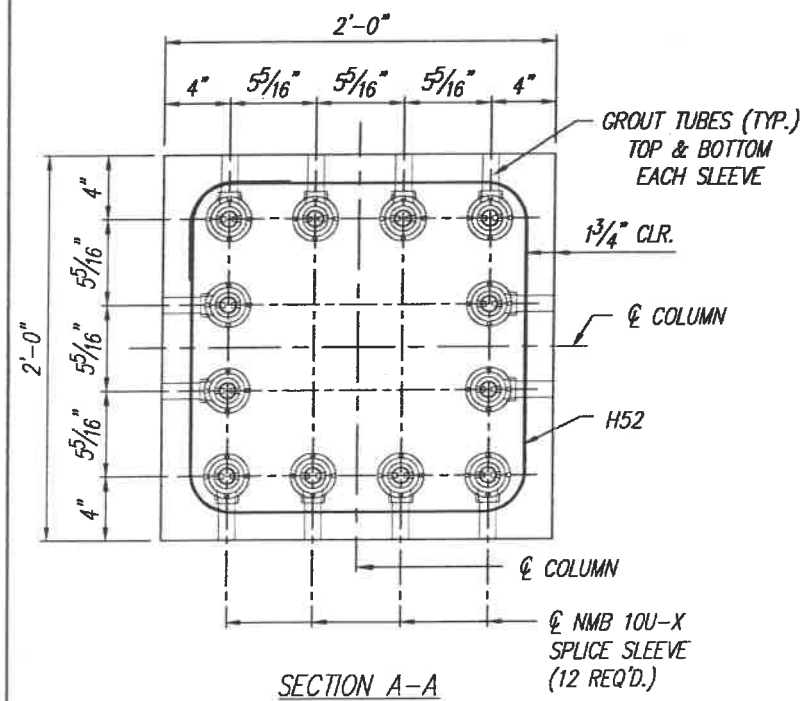
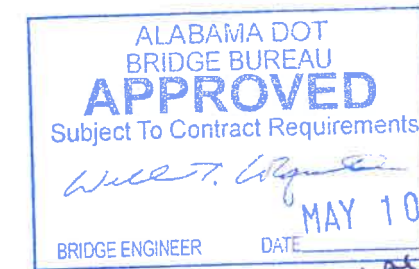
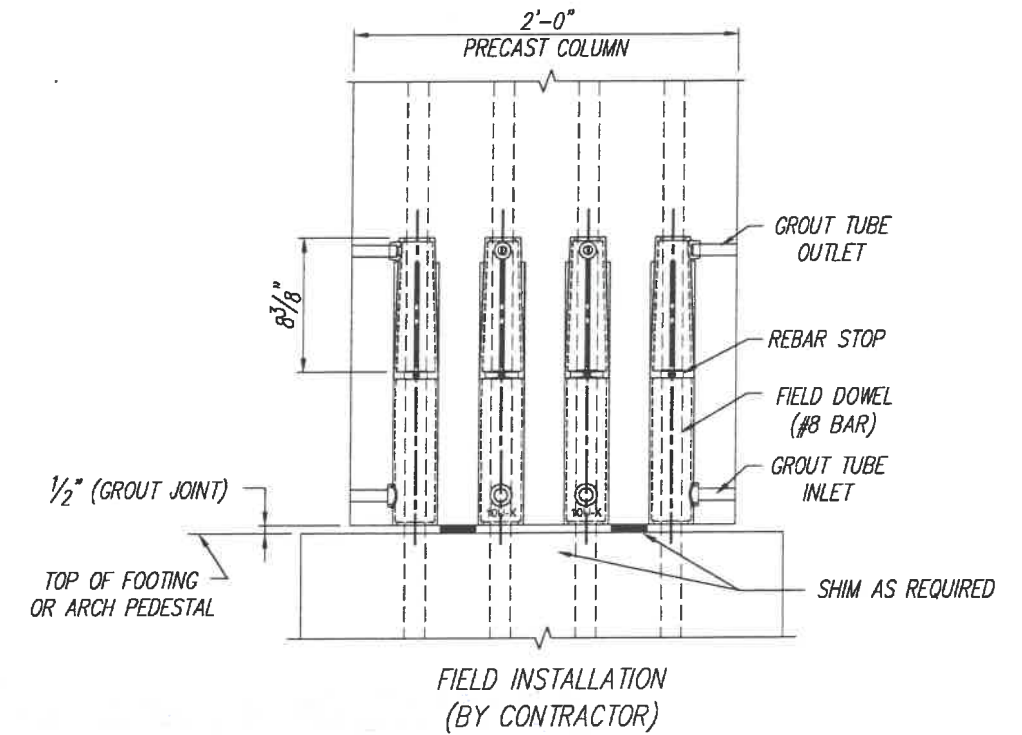


TABLE OF COLUMN DIMENSIONS						
QTY.	MARK #	"L"	"A"	"B"	"C"	"R"
2	CL-8114 B3	17'-1"	1'-6"	2'-6"	3'-6"	30 @ 5 15/16" (+) = 14'-11"
2	CL-8114 B4	11'-8 1/2"	1'-0"	1'-9"	2'-6"	20 @ 5 11/16" (+) = 9'-6 1/2"
2	CL-8114 B5	5'-5 1/2"	8"	1'-1"	1'-6"	7 @ 5 5/8" (+) = 3'-3 1/2"
2	CL-8114 A10	6'-1"	8"	1'-1"	1'-6"	8 @ 5 7/8" = 3'-11"
2	CL-8114 A11	12'-7"	1'-0"	1'-9"	2'-6"	21 @ 5 15/16" (+) = 10'-5"
2	CL-8114 A12	18'-2 1/2"	1'-6"	2'-6"	3'-6"	33 @ 5 13/16" (+) = 16'-0 1/2"



COLUMN STEEL REINFORCEMENT

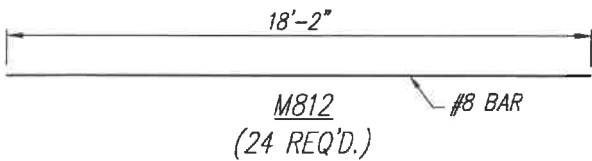
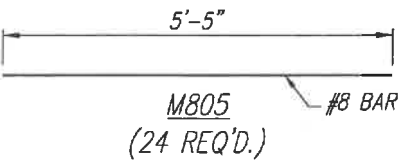
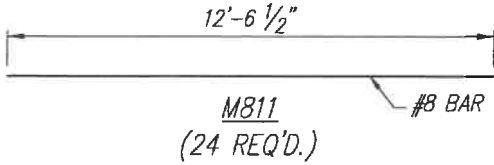
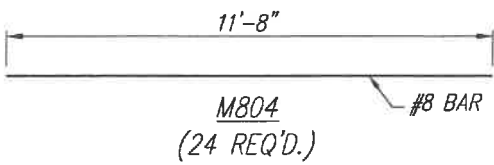
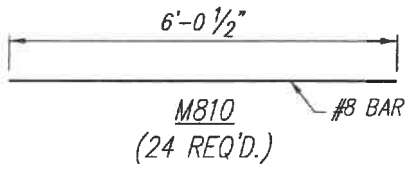
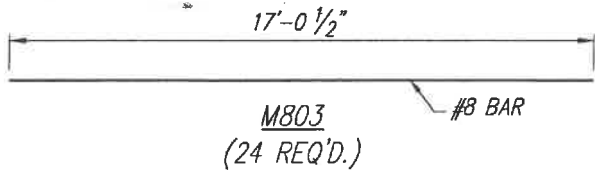
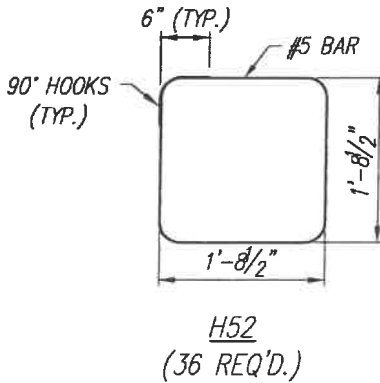
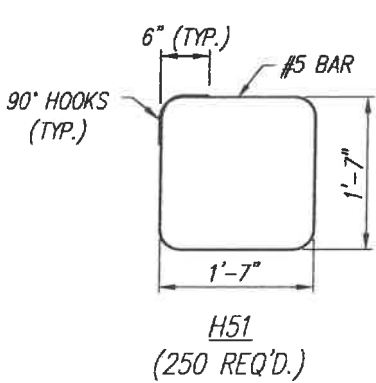


SPECIAL NOTES:

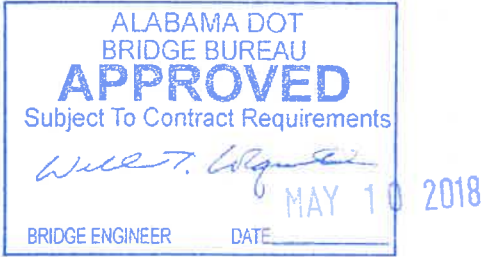
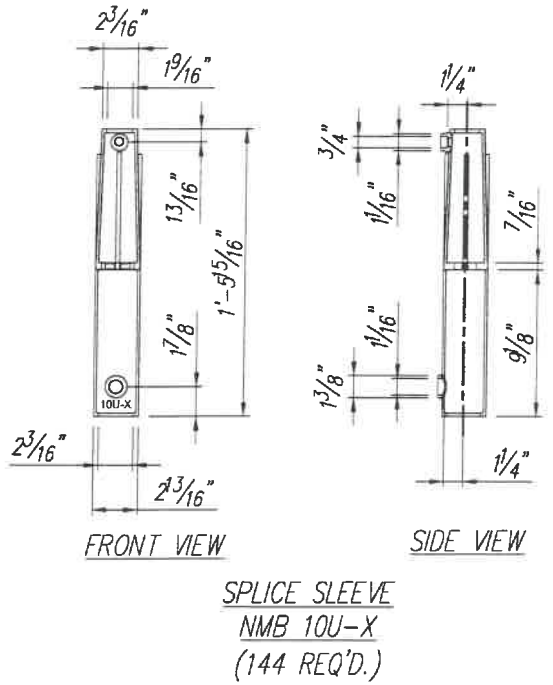
1. NMB 10U-X SPLICE SLEEVE INLET AND OUTLET HOLES TO BE TURNED TO EXTERIOR OF FORMS. HOLES MUST BE ACCESSIBLE AND CLEAR OF DEBRIS WHEN FORMS ARE STRIPPED.

REVISIONS		QUALITY CONTROL		FORTERRA STRUCTURAL PRODUCTS	
				PELHAM, ALABAMA PLANT	
				400 INDUSTRIAL PARK DR. PH. 205 663-4681	
				PELHAM, ALABAMA 35124 FAX 205 663-4459	
				PROJECT: BRF-0117 (501) DEKALB CO., AL	
				CONTRACTOR: WRIGHT BROTHERS CONSTRUCTION	
				SCALE: N.T.S. DATE: 5/1/18 APPROVED BY: [Signature] DRAWN BY: T.L.S.	
				PRECAST COLUMN REINFORCEMENT DETAILS FORTERRA JOB NO. 8114	
				FORTERRA DWG. FILE CHECKED BY: [Signature] SHEET 4 OF 16	

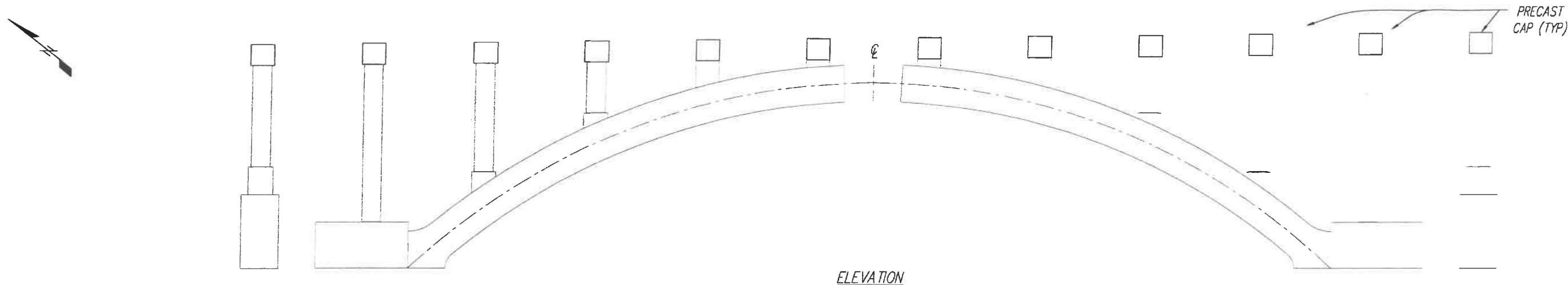
STEEL REINFORCEMENT									
PRECAST COLUMNS (12 TOTAL COLUMNS REQ'D.)									
QTY.	MARK #	H51	H52	M803	M804	M805	M810	M811	M812
2	B3	62	6	24	-	-	-	-	-
2	B4	42	6	-	24	-	-	-	-
2	B5	16	6	-	-	24	-	-	-
2	A10	18	6	-	-	-	24	-	-
2	A11	44	6	-	-	-	-	24	-
2	A12	68	6	-	-	-	-	-	24
TOTALS		(250)	(36)	(24)	(24)	(24)	(24)	(24)	(24)



PRECAST COLUMNS MISC. MATERIALS		
ITEM #	QTY.	REMARKS
SPLICE SLEEVE	144	NMB 10U-X
ERECTION ANCHOR	24	MEADOW-BURKE RL-6 ERECTION ANCHOR 8T/10T (FOR STRIPPING)
COIL INSERT	48	MEADOW-BURKE CX-4 COIL LOOP INSERT 3/4" x 9" (FOR BRACING)
HOLE	12	1 1/2"Ø x 2'-0" HOLE (FOR CONTRACTOR ERECTION)

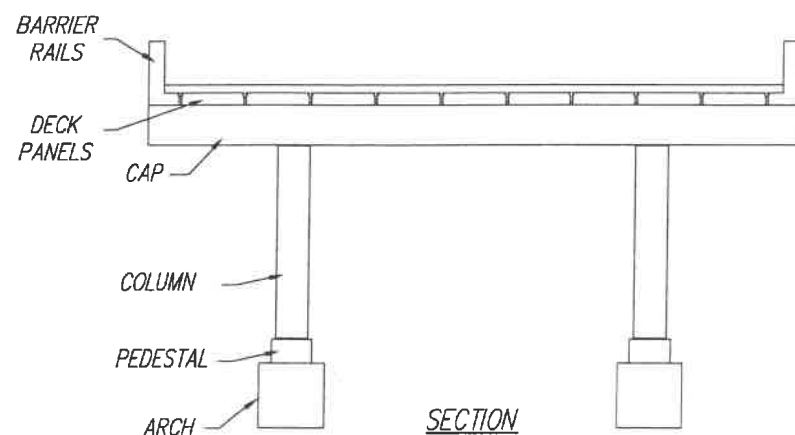
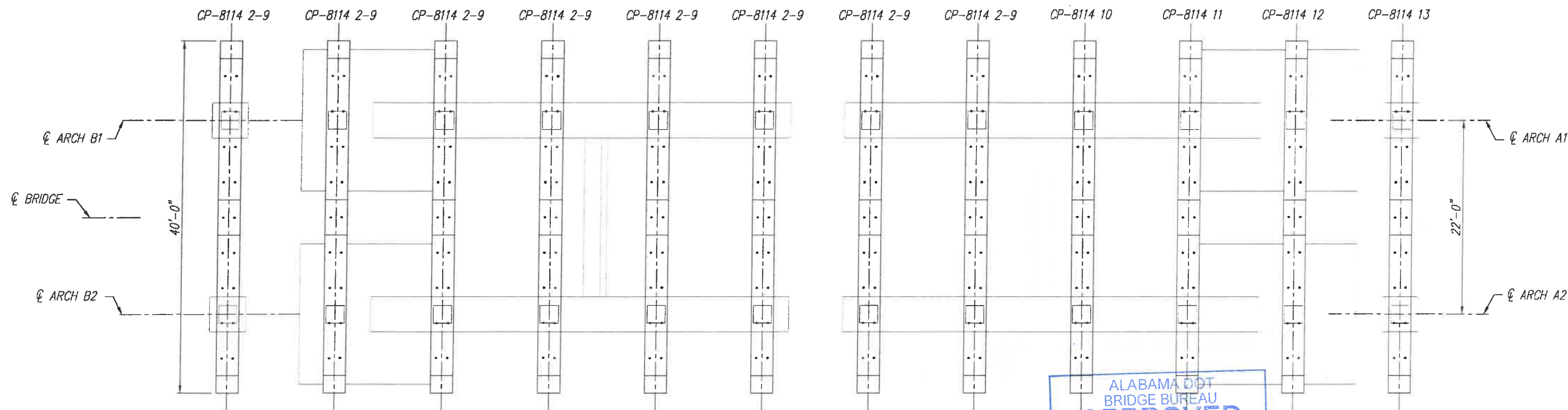


REVISIONS		QUALITY CONTROL		FORTERRA STRUCTURAL PRODUCTS	
		POUR #		PROJECT: BRF-0117 (501) DEKALB CO., AL	
		MARK #		CONTRACTOR: WRIGHT BROTHERS CONSTRUCTION	
		GIRDER #		SCALE: N.T.S. DATE: 5/1/18 APPROVED BY: [Signature] DRAWN BY: T.L.S.	
		DATE:		PRECAST COLUMN MATERIALS	
		INITIAL:		FORTERRA DWG. FILE 8114 CL M CHECKED BY: D.R.H.	
				FORTERRA JOB NO. 8114 SHEET 5 OF 16	



BEGIN BRIDGE STA. 11+14 ABUT 1 BENT 2 BENT 3 BENT 4 BENT 5 BENT 6 BENT 7 BENT 8 BENT 9 BENT 10 BENT 11 BENT 12 BENT 13 ABUT 14 END BRIDGE STA. 12+70

OVERALL LENGTH OF BRIDGE = 156'-0"



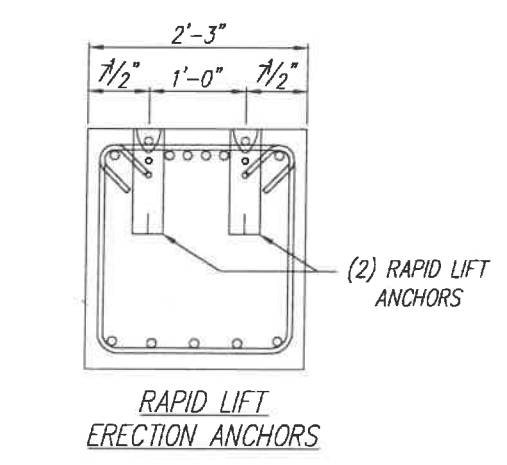
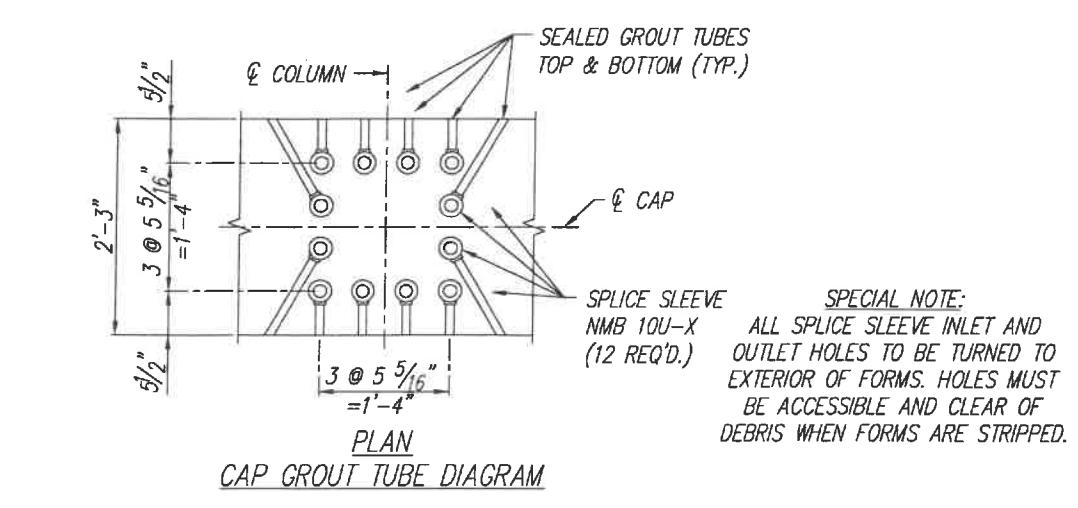
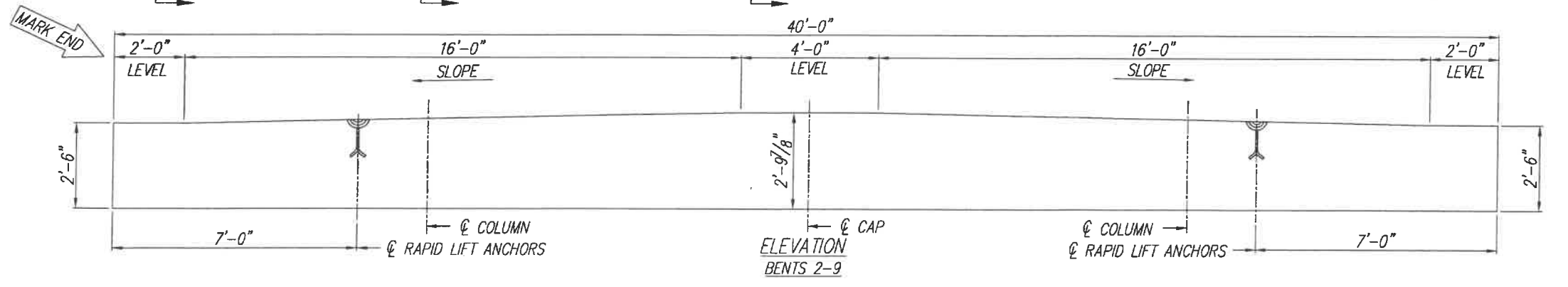
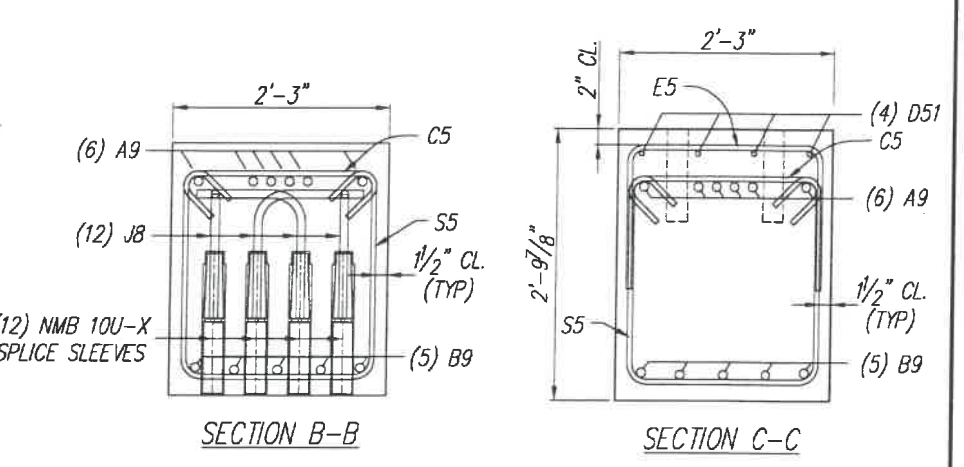
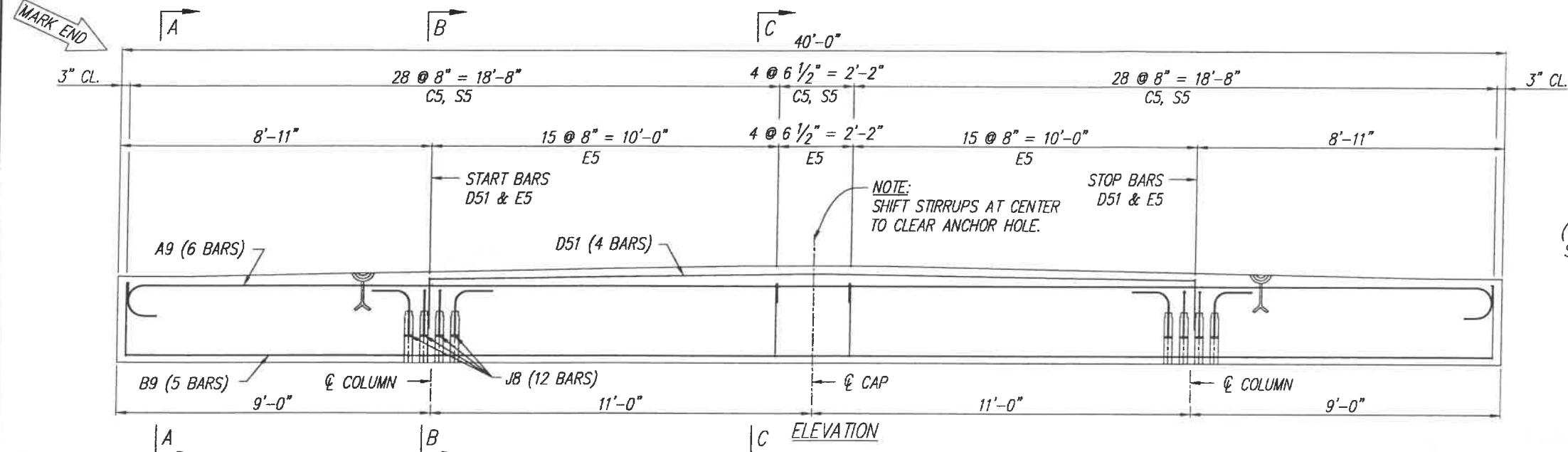
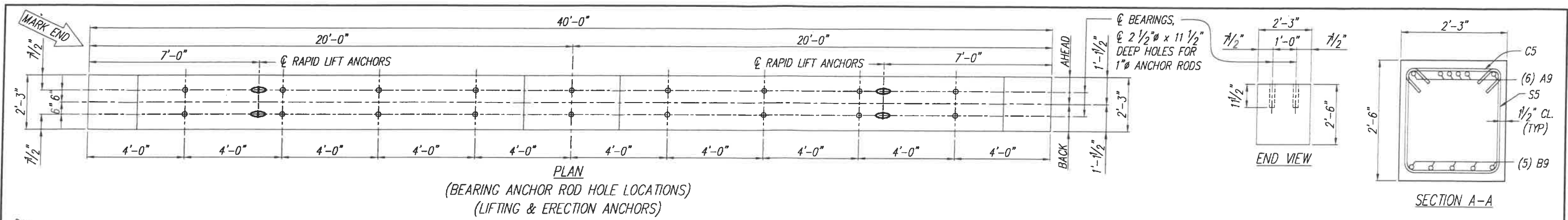
ERECTION PLAN (PRECAST COLUMNS)
BRIDGE REPLACEMENT OVER THE WEST FORK
OF LITTLE RIVER ON STATE ROUTE 117
IN THE CITY OF MENTONE
STA. 11+14 ~ STA. 12+70
DEKALB COUNTY, ALABAMA

ALABAMA DOT
BRIDGE BUREAU
APPROVED
Subject To Contract Requirements
W. T. Wright
BRIDGE ENGINEER DATE MAY 10 2018

SPECIAL NOTES:

1. CAPS FOR ABUTMENTS 1 & 14 ARE POURED IN PLACE.
2. REQUIRED CONCRETE STRENGTH FOR PRECAST CAPS:
f'ci (STRIPPING) = 4,000 psi
f'c (28 DAYS) = 5,000 psi

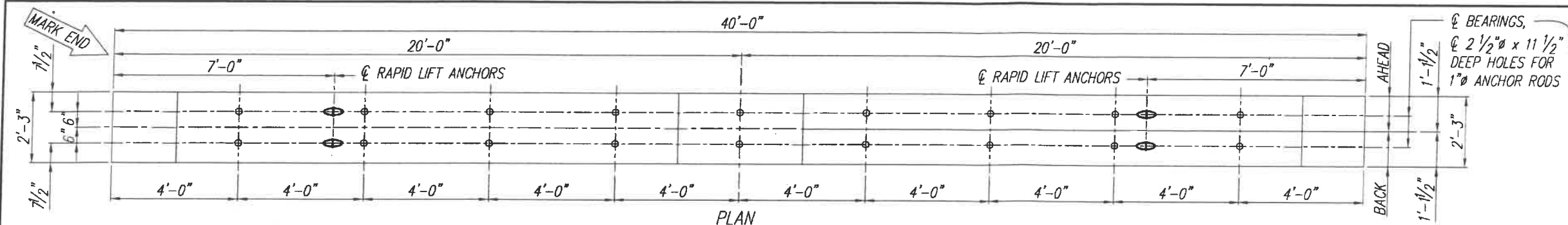
REVISIONS		QUALITY CONTROL		FORTERRA STRUCTURAL PRODUCTS PELHAM, ALABAMA PLANT	
		POUR #		400 INDUSTRIAL PARK DR. PH. 205 663-4681 PELHAM, ALABAMA 35124 FAX 205 663-4459	
		MARK #		PROJECT: BR-0117 (501) DEKALB CO., AL	
				CONTRACTOR: WRIGHT BROTHERS CONSTRUCTION	
		ORDER #		SCALE: N.T.S.	DATE: 5/1/18
				APPROVED BY: <i>[Signature]</i>	
				DRAWN BY: T.L.S.	
				ERECTION PLAN (PRECAST CAPS)	
				FORTERRA DWG. FILE 8114 CP EP	
		DATE:	INITIAL:	CHECKED BY: D.R.H.	
				SHEET 6 OF 16	



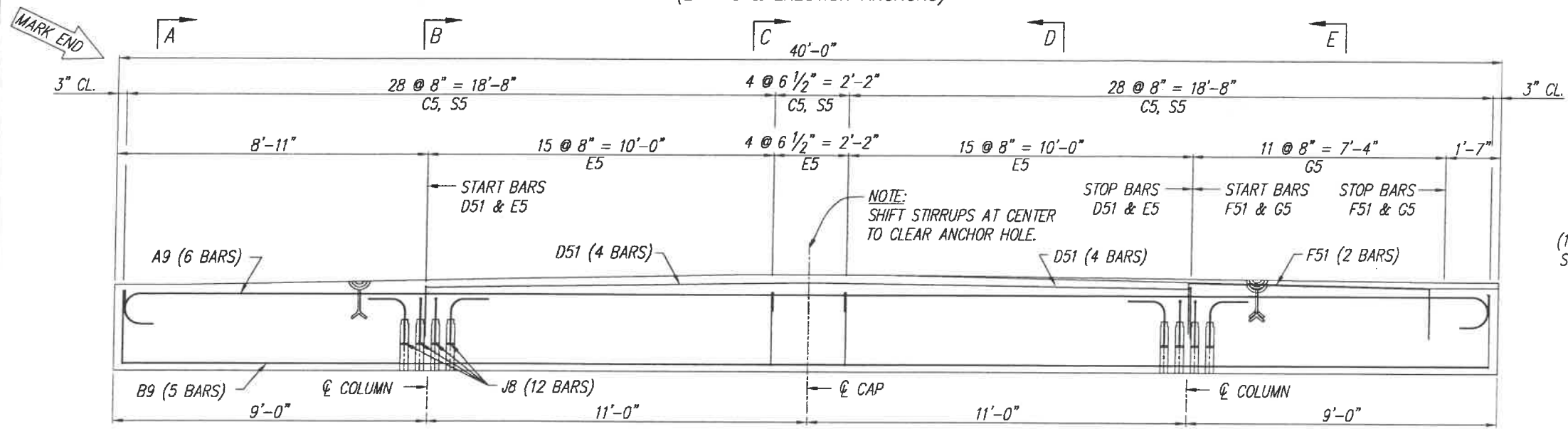
ALABAMA DOT
BRIDGE BUREAU
APPROVED
Subject To Contract Requirements
Will T. [Signature]
MAY 10 2018
BRIDGE ENGINEER DATE

QTY.	MARK #
8	CP-8114 2-9

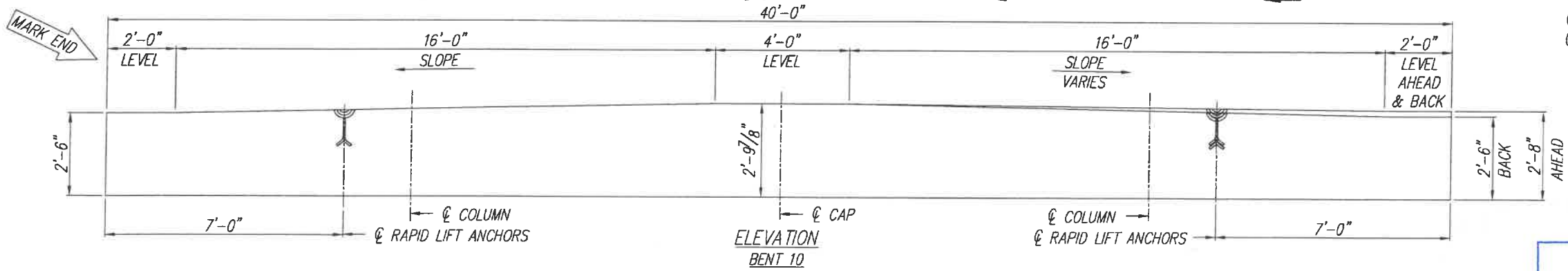
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	POUR #		400 INDUSTRIAL PARK DR. PH. 205 663-4681 PELHAM, ALABAMA 35124 FAX 205 663-4459
	MARK #		PROJECT: BR-0117 (501) DEKALB CO., AL
	GIRDER #		CONTRACTOR: WRIGHT BROTHERS CONSTRUCTION
	DATE:	DATE: 5/1/18	APPROVED BY: <i>[Signature]</i> DRAWN BY: T.L.S.
	INITIAL:		FORTELLA JOB NO. 8114
			FORTELLA DWG. FILE 8114 CP 2-9 CHECKED BY: D.R.H. SHEET 7 OF 16



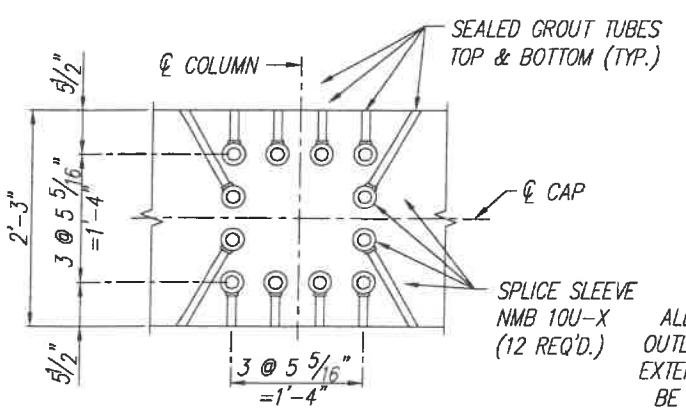
PLAN
(BEARING ANCHOR ROD HOLE LOCATIONS)
(LIFTING & ERECTION ANCHORS)



ELEVATION
BENT 10

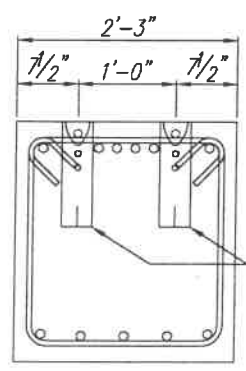


ELEVATION
BENT 10



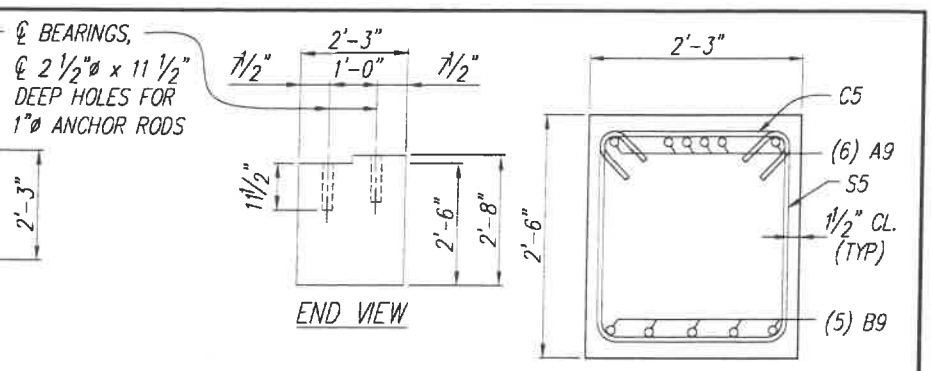
PLAN
CAP GROUT TUBE DIAGRAM

SPECIAL NOTE:
ALL SPLICE SLEEVE INLET AND
OUTLET HOLES TO BE TURNED TO
EXTERIOR OF FORMS. HOLES MUST
BE ACCESSIBLE AND CLEAR OF
DEBRIS WHEN FORMS ARE STRIPPED.



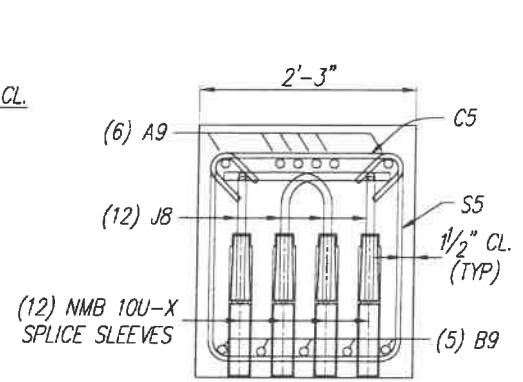
RAPID LIFT
ERECTION ANCHORS

(2) RAPID LIFT
ANCHORS

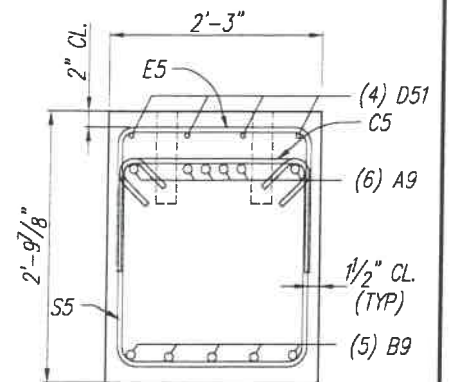


END VIEW

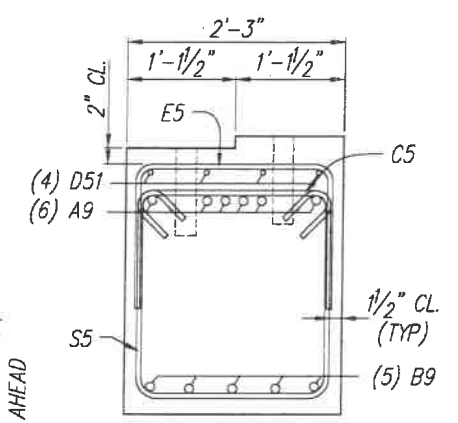
SECTION A-A



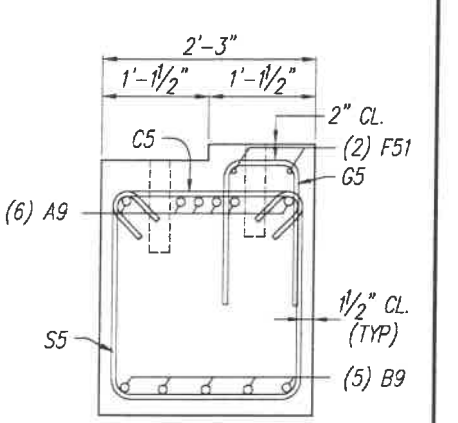
SECTION B-B



SECTION C-C



SECTION D-D

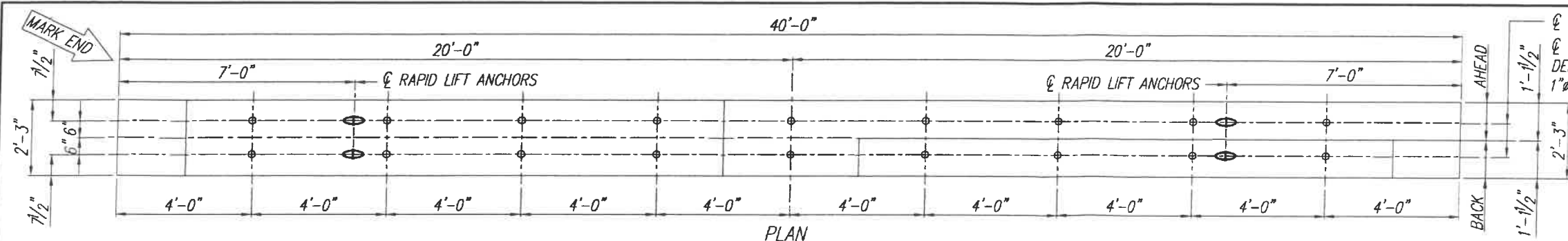


SECTION E-E

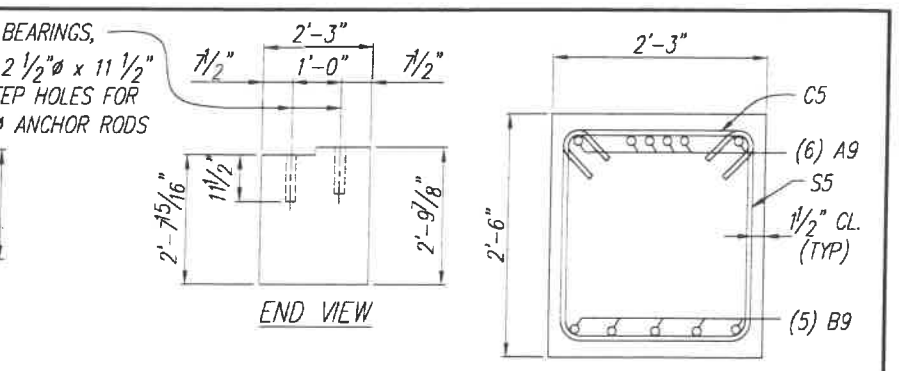
ALABAMA DOT
BRIDGE BUREAU
APPROVED
Subject To Contract Requirements
W. T. Wright
BRIDGE ENGINEER DATE MAY 10 2018

QTY.	MARK #
1	CP-8114 10

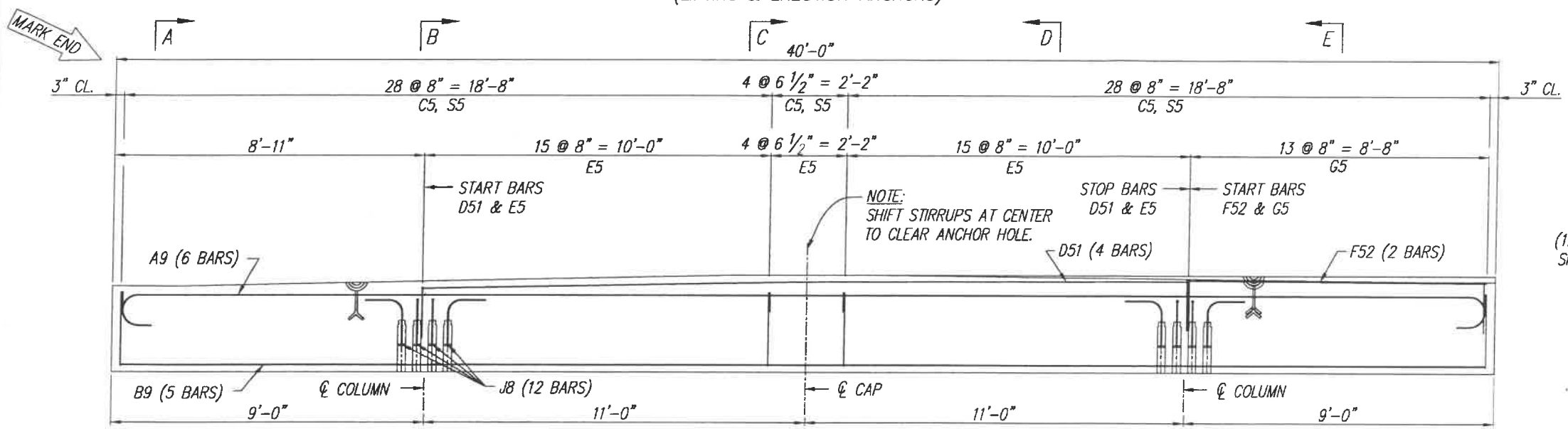
REVISIONS	QUALITY CONTROL	FORTErrA	FORTErrA STRUCTURAL PRODUCTS PELHAM, ALABAMA PLANT 400 INDUSTRIAL PARK DR. PH. 205 663-4881 PELHAM, ALABAMA 35124 FAX 205 663-4459
	POUR #		PROJECT: BR-0117 (501) DEKALB CO., AL
	MARK #		CONTRACTOR: WRIGHT BROTHERS CONSTRUCTION
	SCALE:	DATE:	APPROVED BY:
	N.T.S.	5/1/18	<i>W. T. Wright</i>
	GIRDER #		DRAWN BY: T.L.S.
			FORTErrA JOB NO. 8114
	DATE:	INITIAL:	FORTErrA DWG. FILE 8114 CP 10
			CHECKED BY: D.R.H.
			SHEET 8 OF 16



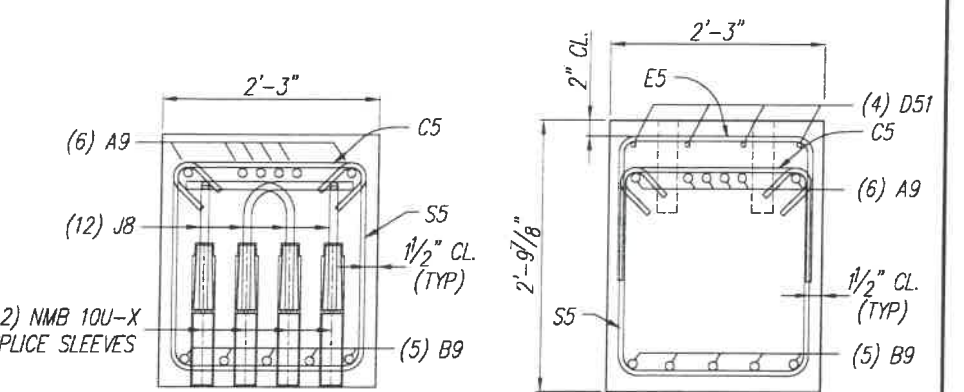
PLAN
(BEARING ANCHOR ROD HOLE LOCATIONS)
(LIFTING & ERECTION ANCHORS)



SECTION A-A

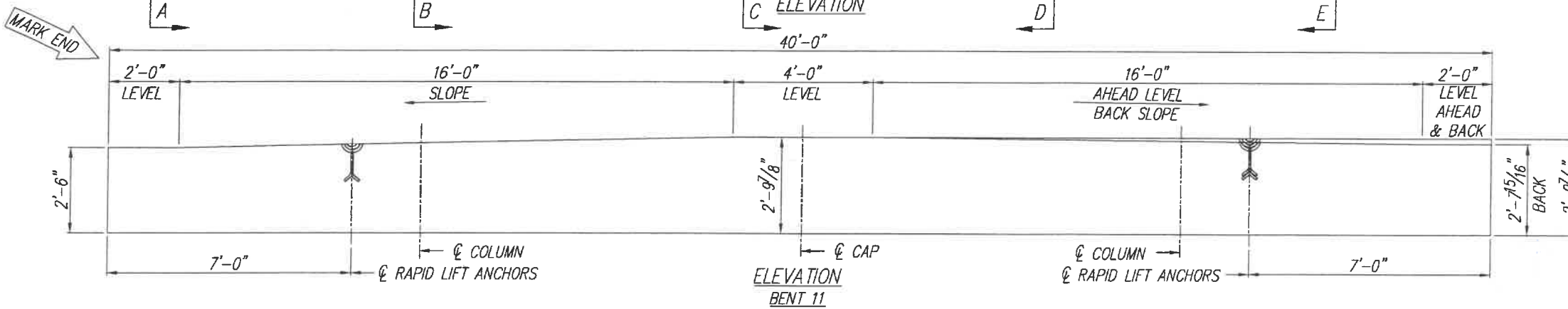


ELEVATION

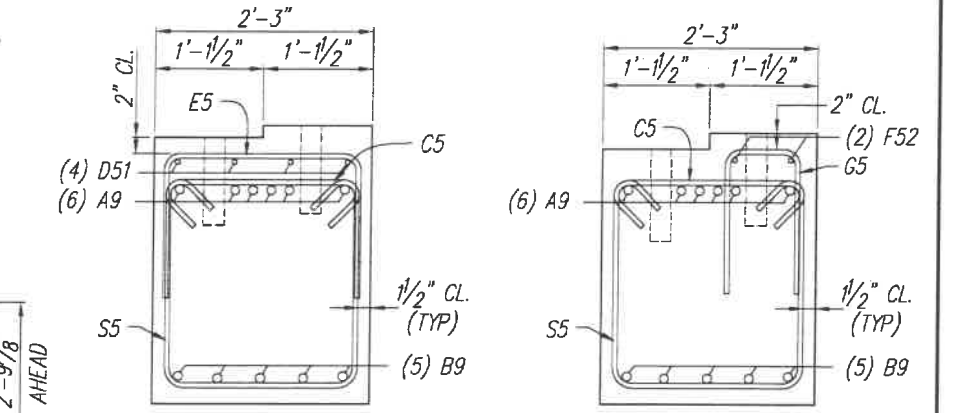


SECTION B-B

SECTION C-C

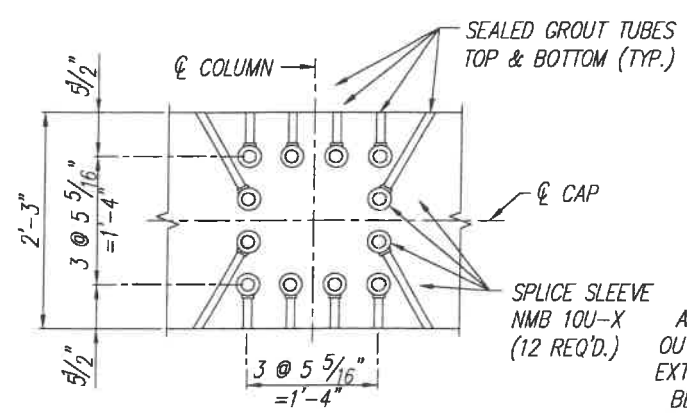


ELEVATION
BENT 11



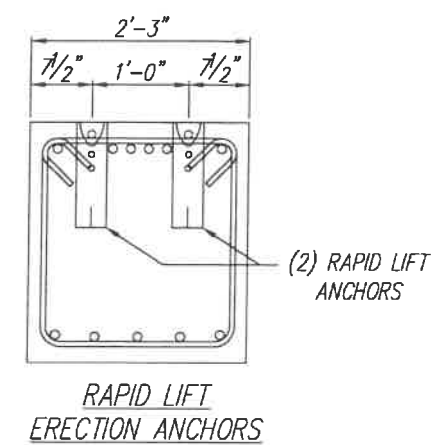
SECTION D-D

SECTION E-E



PLAN
CAP GROUT TUBE DIAGRAM

SPECIAL NOTE:
ALL SPLICE SLEEVE INLET AND
OUTLET HOLES TO BE TURNED TO
EXTERIOR OF FORMS. HOLES MUST
BE ACCESSIBLE AND CLEAR OF
DEBRIS WHEN FORMS ARE STRIPPED.

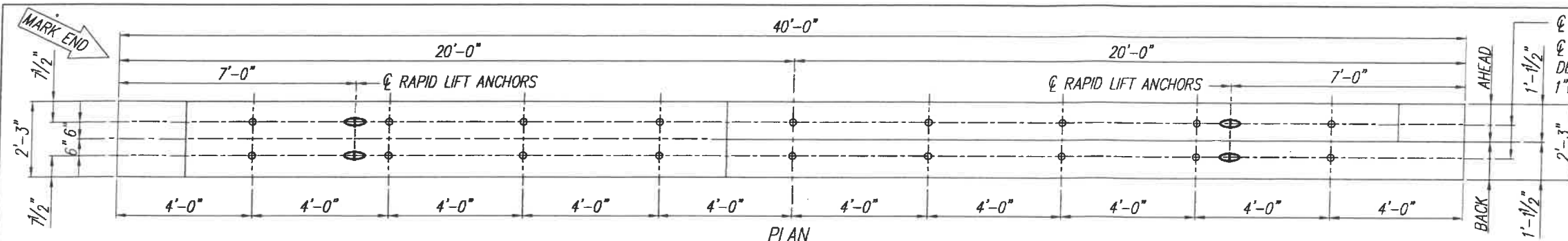


RAPID LIFT
ERECTION ANCHORS

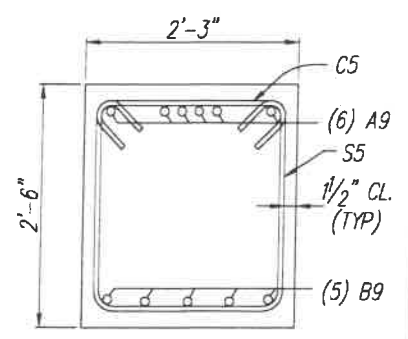
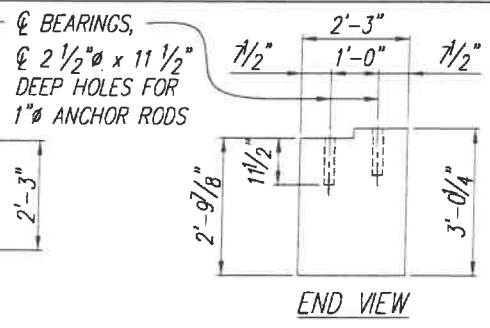
ALABAMA DOT
BRIDGE BUREAU
APPROVED
Subject To Contract Requirements
Will T. Wright
BRIDGE ENGINEER
DATE MAY 10 2018

QTY.	MARK #
1	CP-8114 11

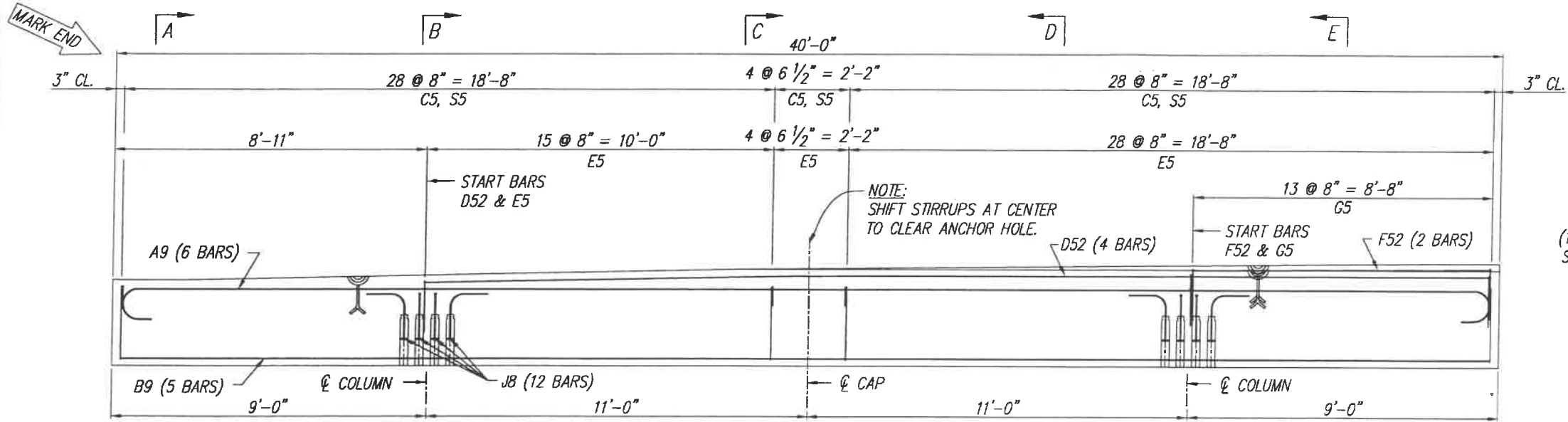
REVISIONS		QUALITY CONTROL		FORTERRA STRUCTURAL PRODUCTS	
POUR #		MARK #		PROJECT: BR-0117 (501) DEKALB CO., AL	
GIRDER #		DATE: 5/1/18		CONTRACTOR: WRIGHT BROTHERS CONSTRUCTION	
DATE:		APPROVED BY: <i>Will T. Wright</i>		SCALE: N.T.S.	
INITIAL:		DRAWN BY: T.L.S.		FORTERRA JOB NO. 8114	
8114 CP 11		CHECKED BY: D.R.H.		SHEET 9 OF 16	



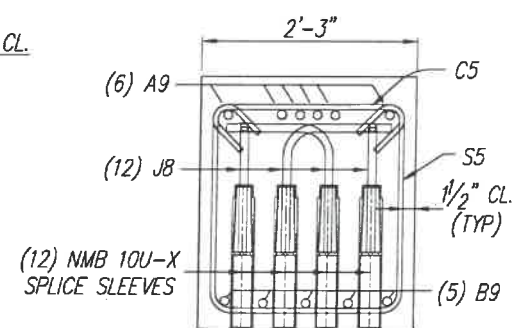
PLAN
(BEARING ANCHOR ROD HOLE LOCATIONS)
(LIFTING & ERECTION ANCHORS)



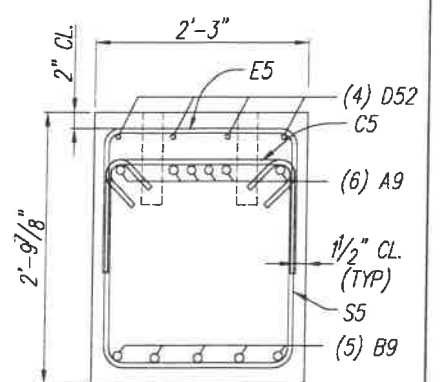
SECTION A-A



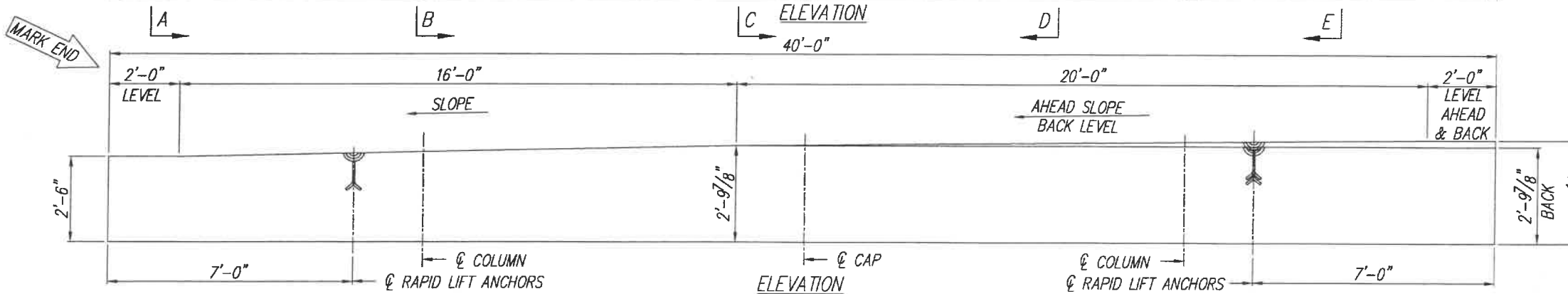
ELEVATION
BENT 13



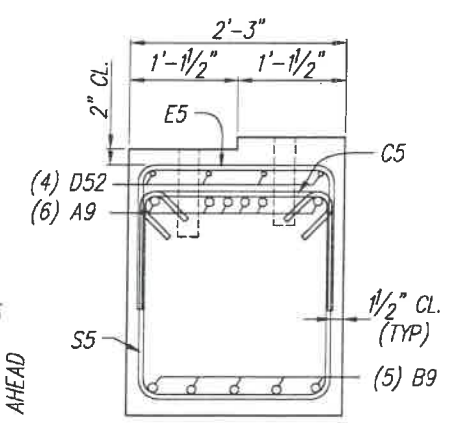
SECTION B-B



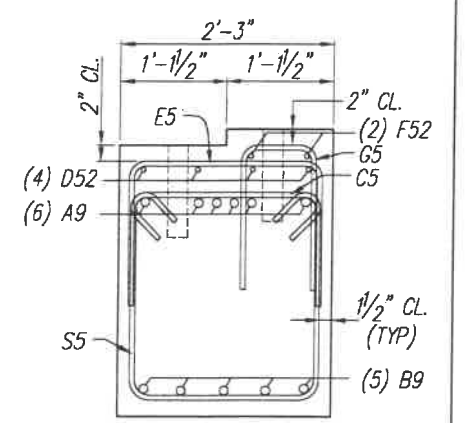
SECTION C-C



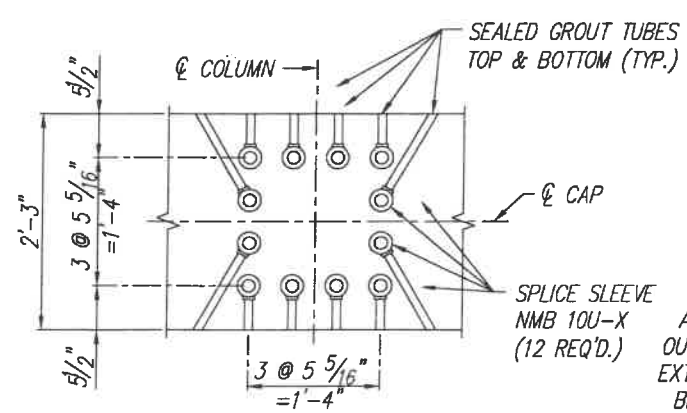
ELEVATION
BENT 13



SECTION D-D

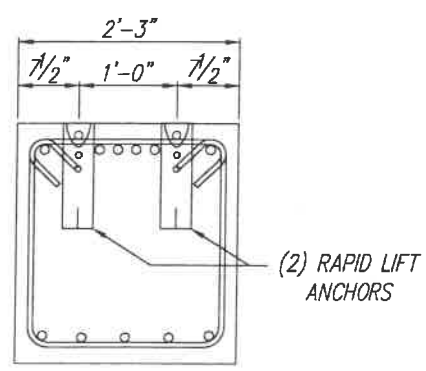


SECTION E-E



PLAN
CAP GROUT TUBE DIAGRAM

SPECIAL NOTE:
ALL SPLICE SLEEVE INLET AND
OUTLET HOLES TO BE TURNED TO
EXTERIOR OF FORMS. HOLES MUST
BE ACCESSIBLE AND CLEAR OF
DEBRIS WHEN FORMS ARE STRIPPED.



RAPID LIFT
ERECTION ANCHORS

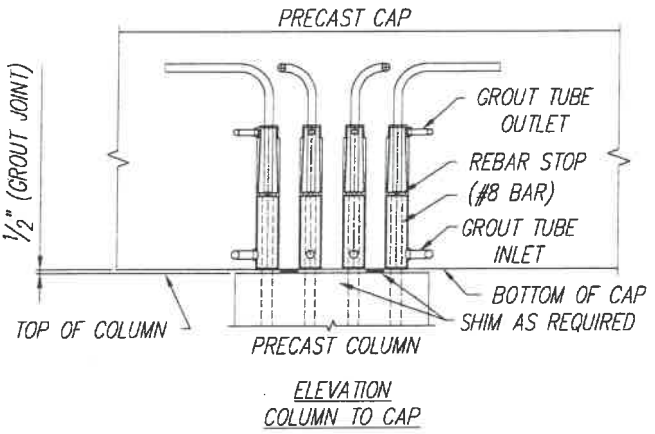
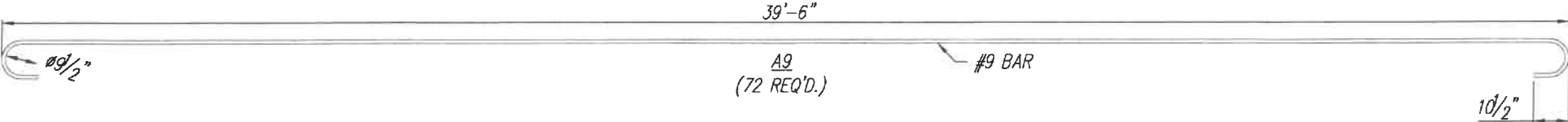
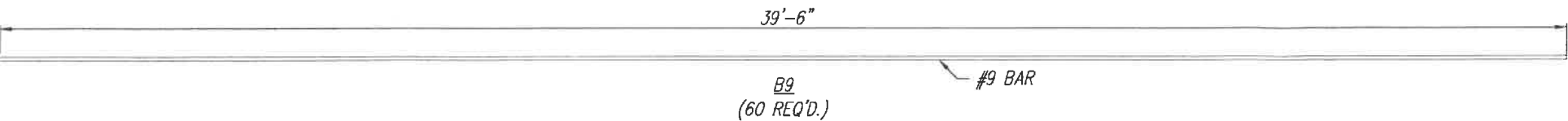
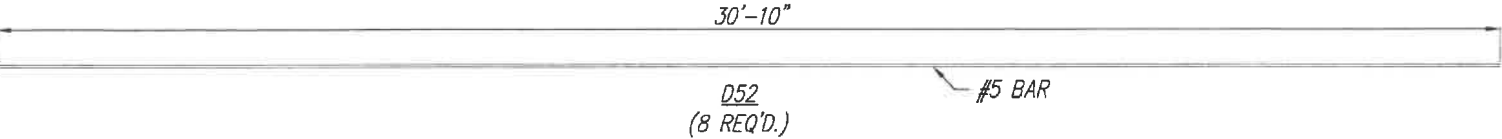
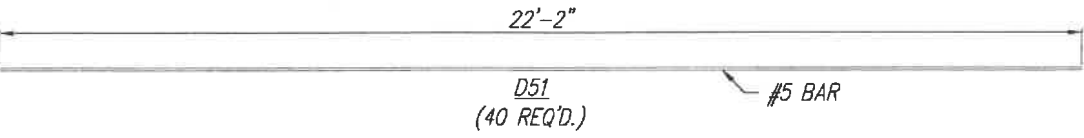
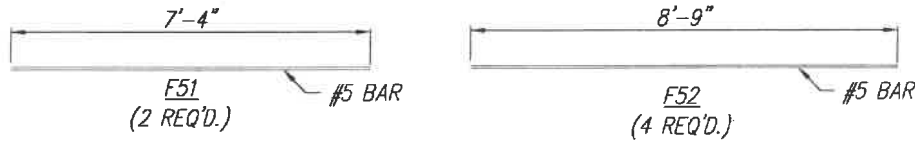
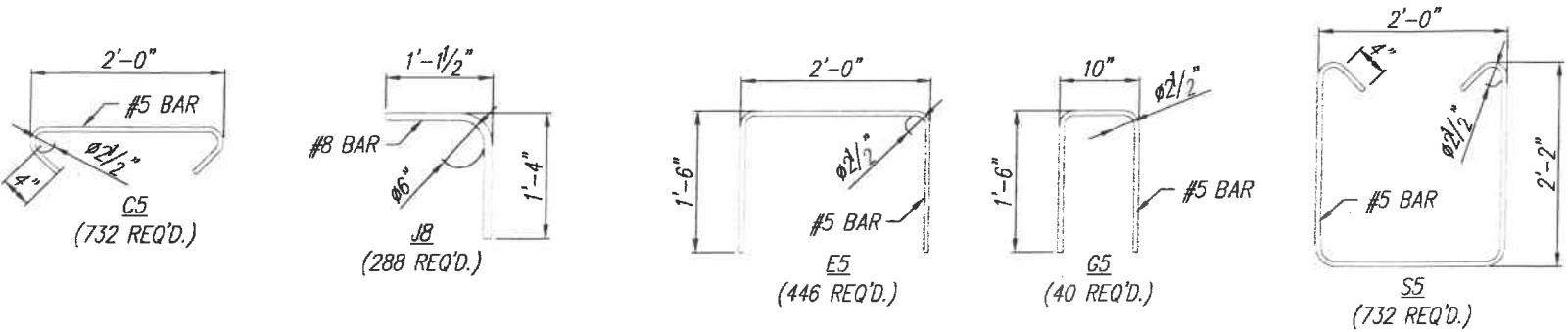
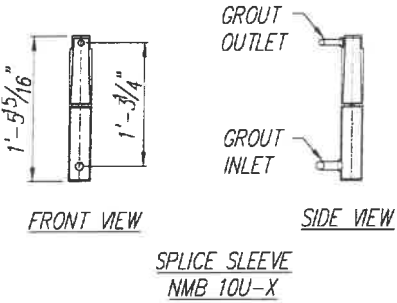
ALABAMA DOT
BRIDGE BUREAU
APPROVED
Subject To Contract Requirements
Will T. Wright
BRIDGE ENGINEER
DATE MAY 10 2018

QTY.	MARK #
1	CP-8114 13

REVISIONS	QUALITY CONTROL	FORTErrA	FORTErrA STRUCTURAL PRODUCTS PELHAM, ALABAMA PLANT
	POUR #		400 INDUSTRIAL PARK DR. PH. 205 663-4681 PELHAM, ALABAMA 35124 FAX 205 663-4459
	MARK #		PROJECT: BR-0117 (501) DEKALB CO., AL
			CONTRACTOR: WRIGHT BROTHERS CONSTRUCTION
	GIRDER #	SCALE: N.T.S.	DATE: 5/1/18
		APPROVED BY: <i>Will T. Wright</i>	DRAWN BY: T.L.S.
			FORTErrA JOB NO. 8114
		FORTErrA DWG. FILE 8114 CP 13	CHECKED BY: D.R.H.
			SHEET 11 OF 16

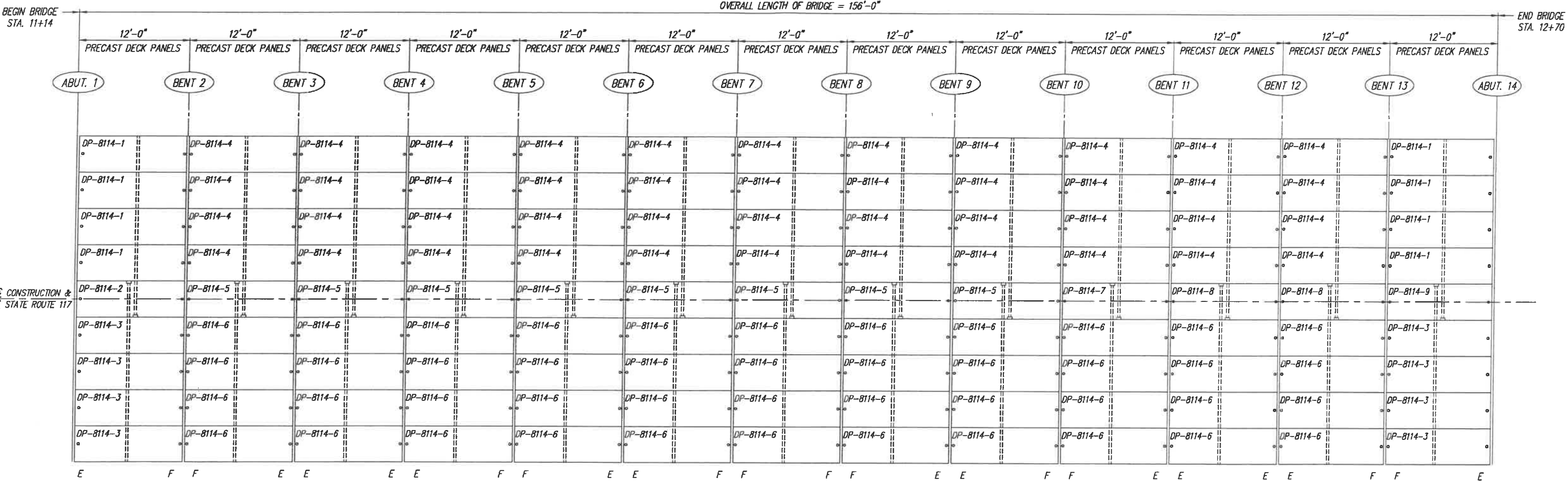
STEEL REINFORCEMENT												
PRECAST CAPS (12 TOTAL CAPS REQ'D.)												
QTY.	MARK #	A9	B9	C5	D51	D52	E5	F51	F52	G5	J8	S5
8	2-9	48	40	488	32	-	280	-	-	-	192	488
1	10	6	5	61	4	-	35	2	-	12	24	61
1	11	6	5	61	4	-	35	-	2	14	24	61
1	12	6	5	61	-	4	48	-	-	-	24	61
1	13	6	5	61	-	4	48	-	2	14	24	61
TOTALS		(72)	(60)	(732)	(40)	(8)	(446)	(2)	(4)	(40)	(288)	(732)

PRECAST CAPS MISC. MATERIALS		
ITEM #	QTY.	REMARKS
SPLICE SLEEVE	288	NMB 10U-X
DOWEL HOLES	216	2 1/2"Ø x 11 1/2" LONG FOR ANCHOR RODS
ERECTION ANCHOR	48	MEADOW-BURKE RL-6 ERECTION ANCHOR 8T/10T (FOR STRIPPING)



ALABAMA DOT
BRIDGE BUREAU
APPROVED
Subject To Contract Requirements
Will T. Colquhoun
BRIDGE ENGINEER
DATE **MAY 10 2018**
VS

REVISIONS		QUALITY CONTROL		FORTERRA STRUCTURAL PRODUCTS PELHAM, ALABAMA PLANT	
		POUR #		PROJECT: BRF-0117 (501) DEKALB CO., AL	
		MARK #		CONTRACTOR: WRIGHT BROTHERS	
		GIRDER #		SCALE: N.T.S. DATE: 5/1/18	
		DATE:		APPROVED BY: <i>Will T. Colquhoun</i>	
		INITIAL:		DRAWN BY: T.L.S.	
				CAP MATERIALS	
				FORTERRA DWG. FILE 8114 CP M	
				CHECKED BY: D.R.H.	
				FORTERRA JOB NO. 8114	
				SHEET 12 OF 16	



ERECTION PLAN (PRECAST DECK PANELS)
BRIDGE REPLACEMENT OVER THE WEST FORK
OF LITTLE RIVER ON STATE ROUTE 117
IN THE CITY OF MENTONE
STA. 11+14 ~ STA. 12+70
DEKALB COUNTY, ALABAMA

GENERAL NOTES

1. GENERAL CONTRACTOR SHALL FIELD CHECK & VERIFY ALL DIMENSIONS & CONDITIONS AT JOBSITE.
2. ERECTION BY OTHERS.
3. CHECK BED SHORTENING & VISE SLIPPAGE. MAKE ADJUSTMENTS TO CALCULATIONS IF NECESSARY.
4. THE ENTIRE TOP OF PANELS SHALL BE CLEAN, FREE OF LAITANCE AND INTENTIONALLY ROUGHENED TRANSVERSELY TO A FULL MAGNITUDE OF APPROX. $\frac{1}{4}$ ".
5. STRANDS INDICATED AS $\sim \frac{1}{2}$ " ϕ 270 K LOW-RELAXATION SHALL HAVE THE FOLLOWING PROPERTIES:
AREA OF STRAND 0.153 sq. in.
MODULUS OF ELASTICITY 28,600,000 psi.

NOTE: PRECAST BARRIER RAILS NOT SHOWN.
RAILS TO BE UNDER SEPARATE SUBMITTAL.

ALABAMA DOT
BRIDGE BUREAU
APPROVED
Subject To Contract Requirements
Will T. [Signature]
BRIDGE ENGINEER
DATE MAY 10 2018

REVISIONS		FORTERRA STRUCTURAL PRODUCTS PELHAM, ALABAMA PLANT	
		400 INDUSTRIAL PARK DR. PH. 205 663-4681 PELHAM, ALABAMA 35124 FAX 205 663-4459	
		PROJECT: BR-0117 (501) DEKALB CO., AL	
		CONTRACTOR: WRIGHT BROTHERS CONSTRUCTION	
SCALE: N.T.S.	DATE: 5/1/18	APPROVED BY: <i>[Signature]</i>	DRAWN BY: T.L.S.
		ERECTION PLAN - PRECAST DECK PANELS	
		FORTERRA JOB NO. 8114	
		SHEET 13 OF 16	

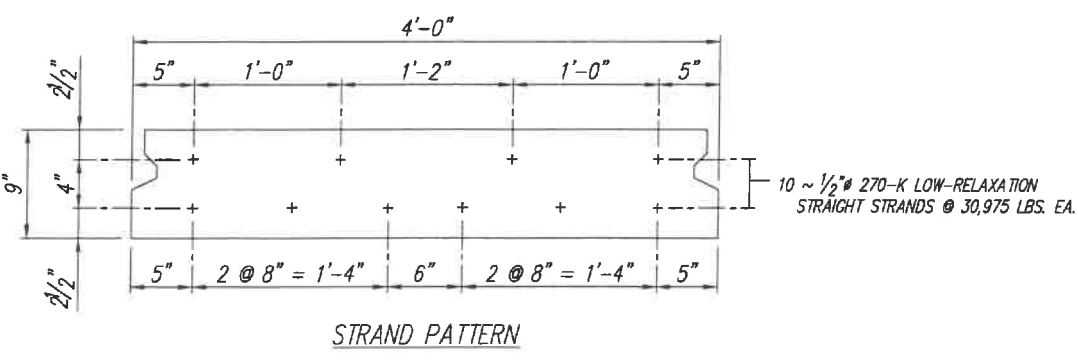
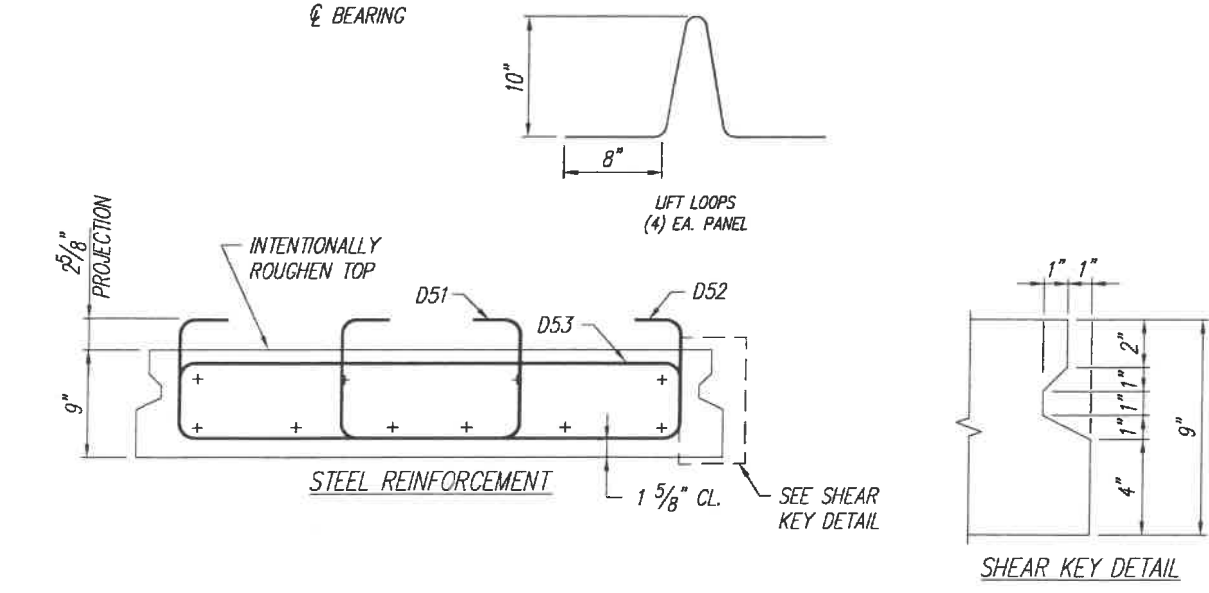
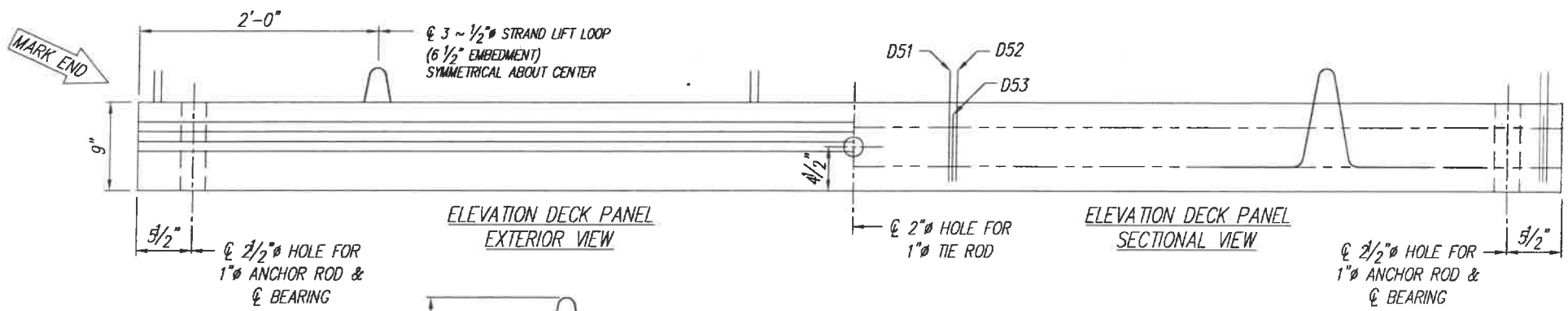
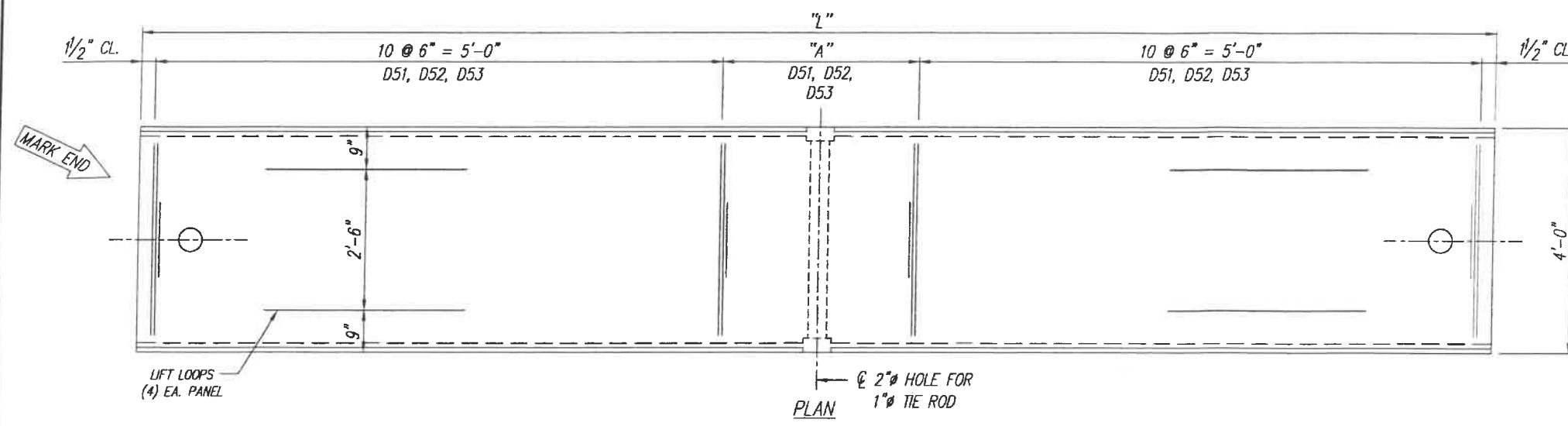
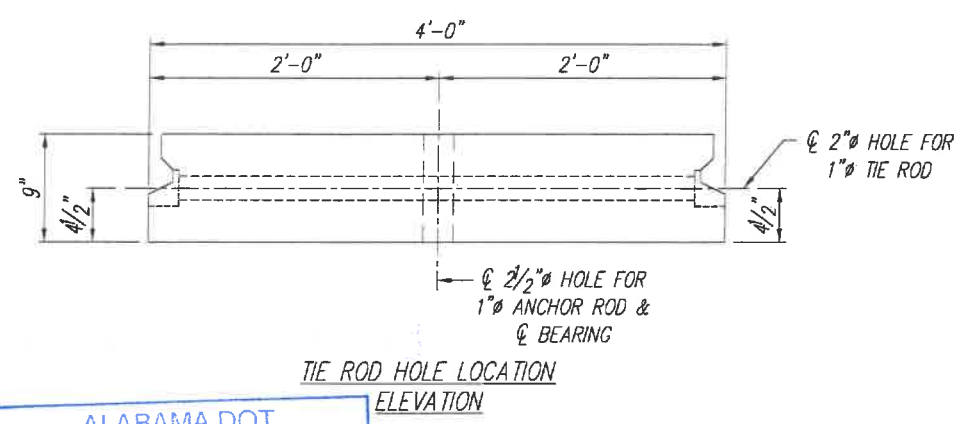
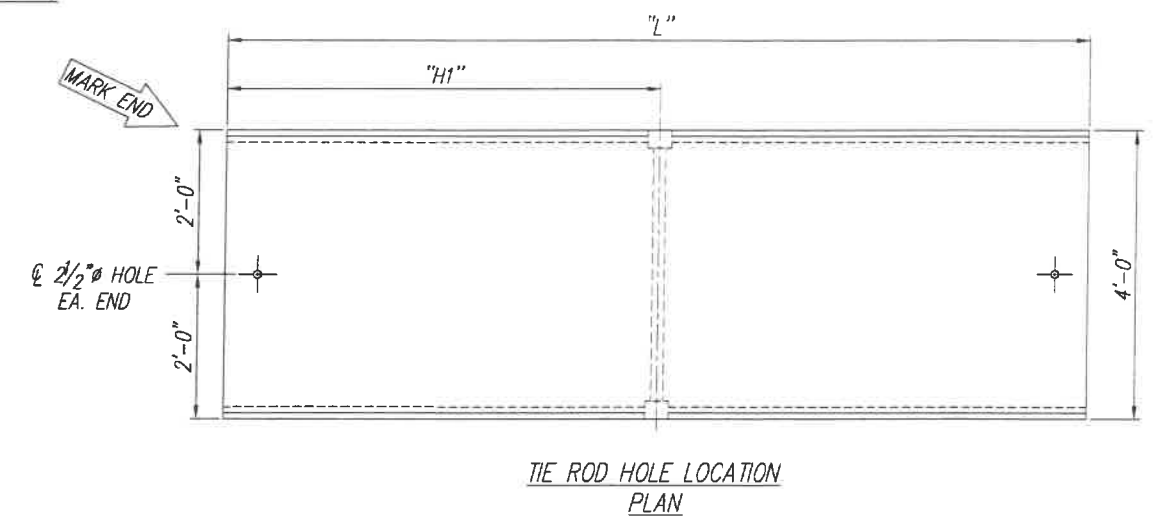


TABLE OF DIMENSIONS				
QTY.	MARK #	"L"	"A"	"H1"
8	DP-8114-1	11'-1 1/2"	3 @ 3 1/2" = 10 1/2"	6'-0 3/4"
8	DP-8114-3	11'-1 1/2"	3 @ 3 1/2" = 10 1/2"	5'-0 3/4"
44	DP-8114-4	11'-11"	5 @ 4" = 1'-8"	6'-5 1/2"
44	DP-8114-6	11'-11"	5 @ 4" = 1'-8"	5'-5 1/2"



ALABAMA DOT
BRIDGE BUREAU
APPROVED
Subject To Contract Requirements
Will T. [Signature]
MAY 10 2018
BRIDGE ENGINEER DATE

SPECIAL NOTES

1. CONCRETE STRENGTH SHALL BE 5,000 PSI MIN. @ RELEASE.
2. CONCRETE STRENGTH SHALL BE 6,000 PSI MIN. @ 28 DAYS.
3. ALL STRANDS SHALL BE CUT FLUSH AT EACH END OF PANEL. COAT ENDS OF STRANDS WHERE CUT WITH AN APPROVED EPOXY COATING.

REVISIONS		QUALITY CONTROL		FORTERRA STRUCTURAL PRODUCTS	
		POUR #		FORTERRA PELHAM, ALABAMA PLANT	
		MARK #		400 INDUSTRIAL PARK DR. PH. 205 663-4681	
		GIRDER #		PELHAM, ALABAMA 35124 FAX 205 663-4459	
		DATE:		PROJECT: BR-0017 (501) DEKALB CO., AL	
		INITIAL:		CONTRACTOR: WRIGHT BROTHERS CONSTRUCTION	
				SCALE: N.T.S. DATE: 5/1/18 APPROVED BY: <i>[Signature]</i> DRAWN BY: T.L.S.	
				DECK PANEL DETAILS (1, 3, 4, 6) FORTERRA JOB NO. 8114	
				FORTERRA DWG. FILE 8114 DP A-D F-1 CHECKED BY: D.R.H. SHEET 14 OF 16	

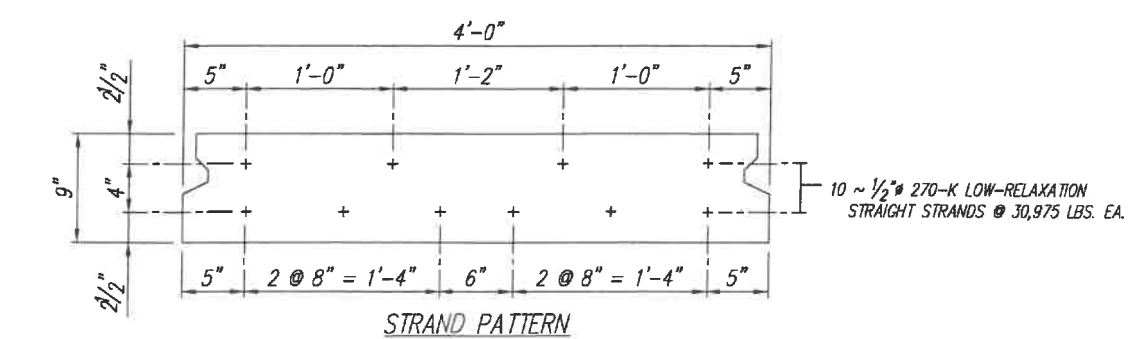
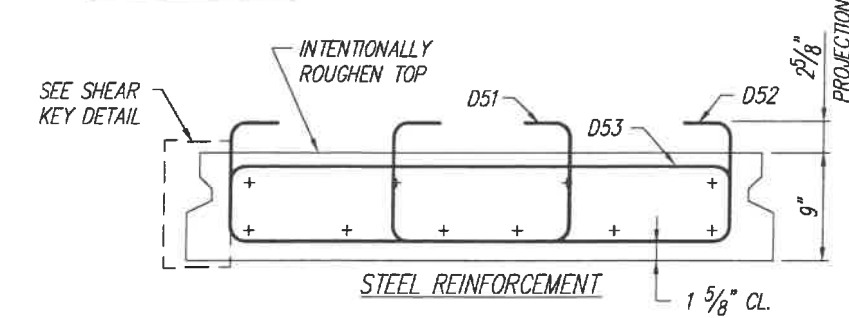
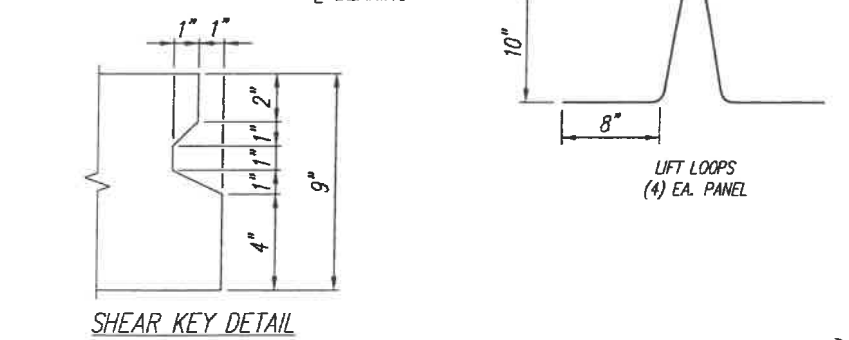
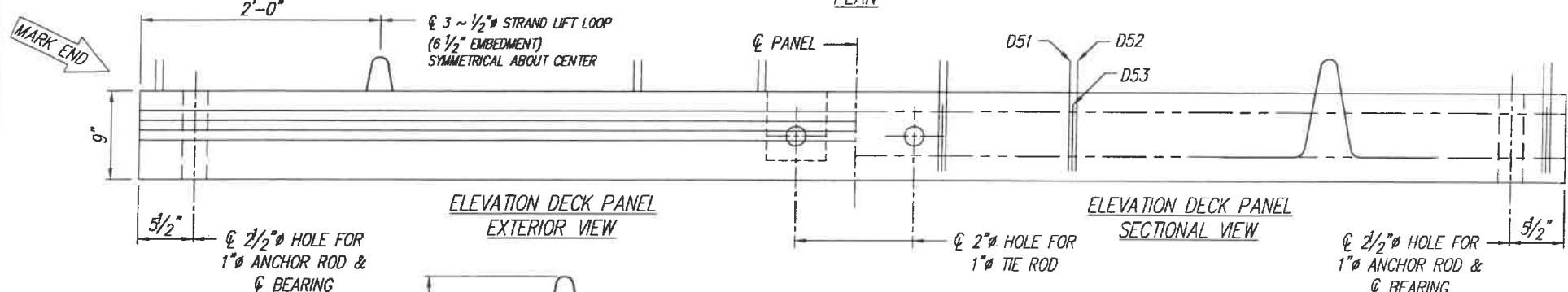
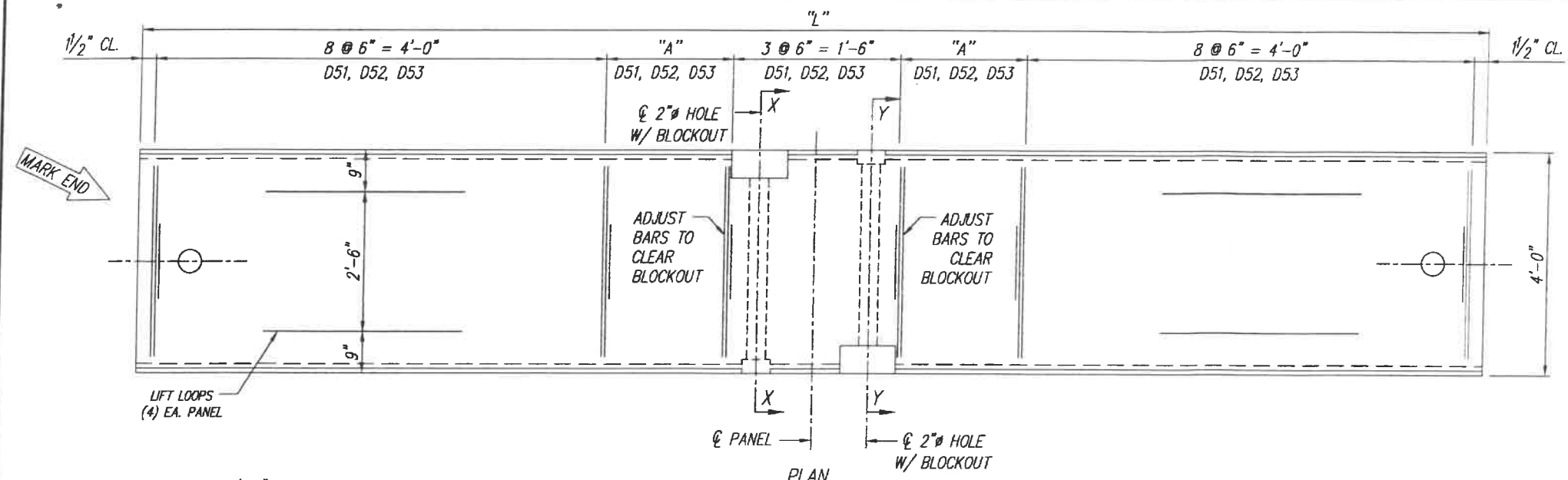
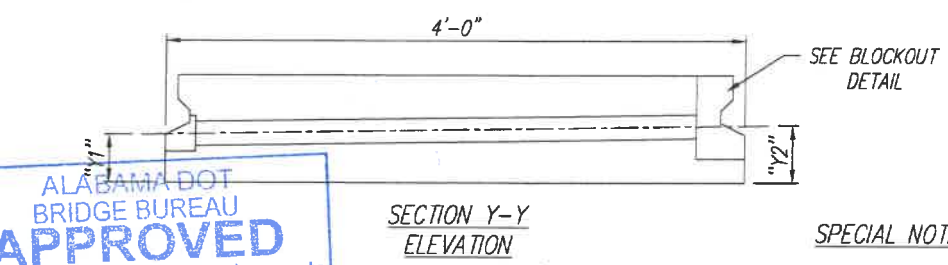
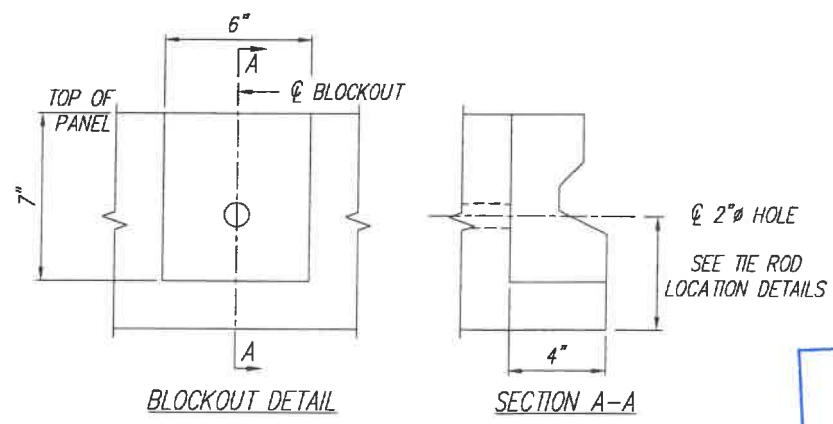
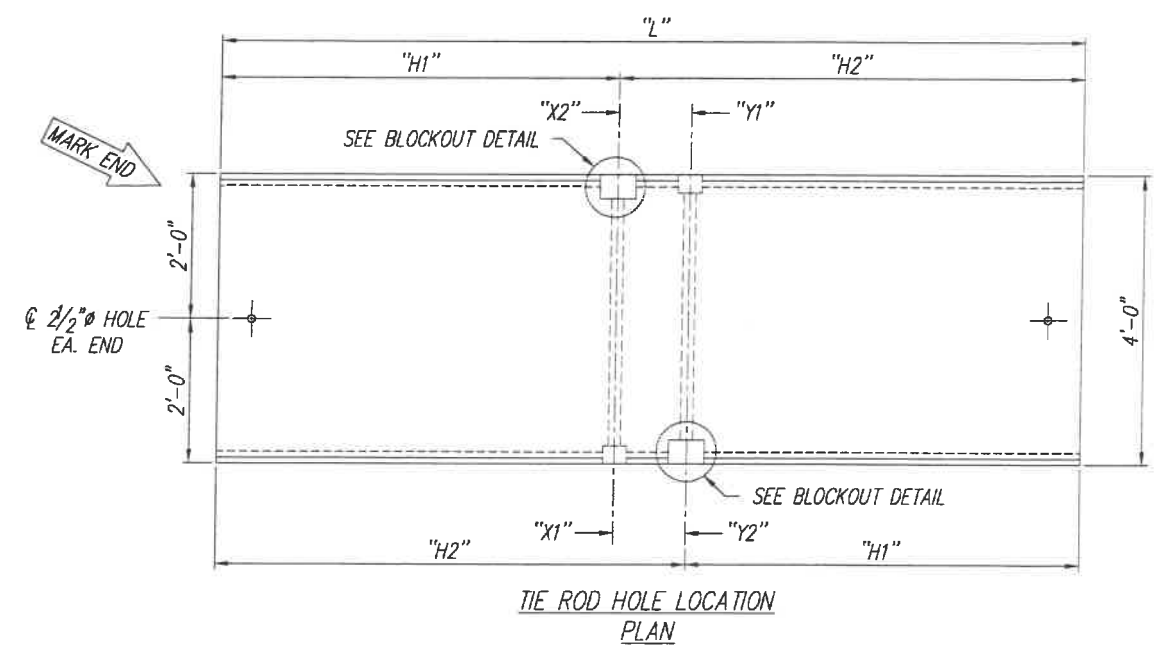
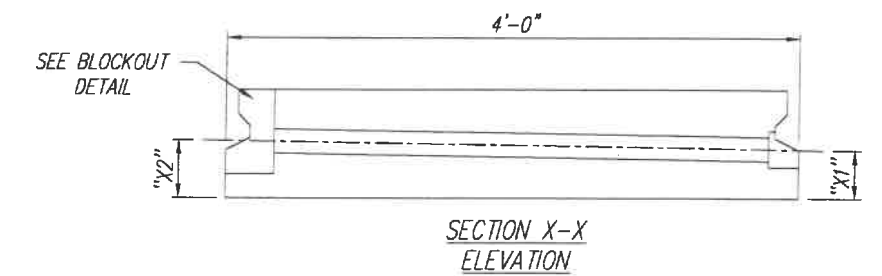


TABLE OF DIMENSIONS									
QTY.	MARK #	"L"	"A"	"H1"	"H2"	"X1"	"X2"	"Y1"	"Y2"
1	DP-8114-2	11'-1 1/2"	2 @ 4 1/8" = 8 1/4"	5'-0 3/4"	6'-0 3/4"	4 1/2"	5 1/2"	4 1/2"	5 1/2"
8	DP-8114-5	11'-11"	3 @ 4 5/16" = 1'-1"	5'-5 1/2"	6'-5 1/2"	4 1/2"	5 1/2"	4 1/2"	5 1/2"
1	DP-8114-7	11'-11"	3 @ 4 5/16" = 1'-1"	5'-5 1/2"	6'-5 1/2"	4 1/2"	5"	4 1/2"	5 1/2"
2	DP-8114-8	11'-11"	3 @ 4 5/16" = 1'-1"	5'-5 1/2"	6'-5 1/2"	4 1/2"	4 1/2"	4 1/2"	5 1/2"
1	DP-8114-9	11'-1 1/2"	2 @ 4 1/8" = 8 1/4"	5'-0 3/4"	6'-0 3/4"	4 5/8"	4 1/2"	4 1/2"	5"

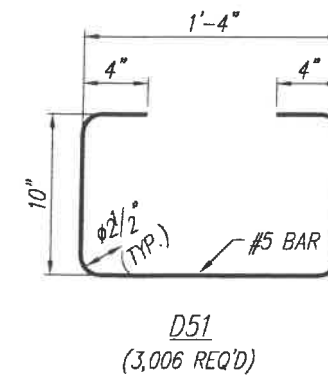
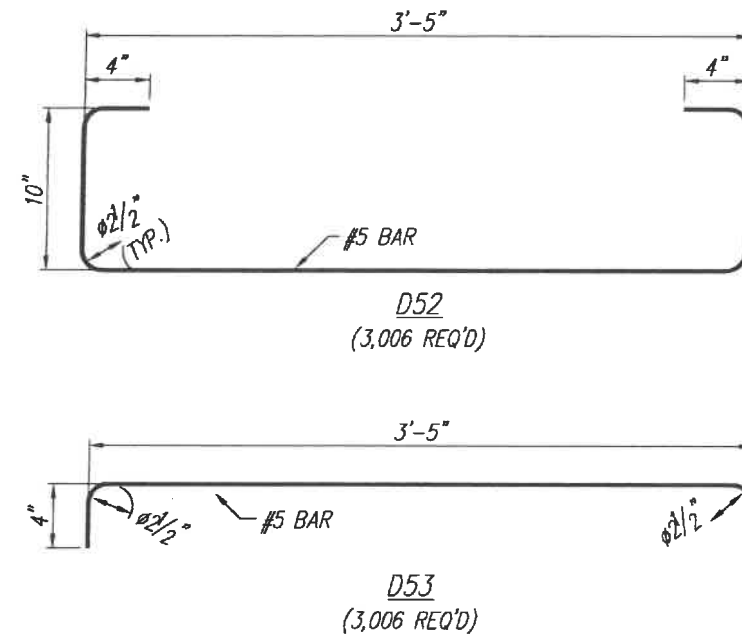


ALABAMA DOT
BRIDGE BUREAU
APPROVED
Subject To Contract Requirements
Will T. Wiggins
BRIDGE ENGINEER
DATE MAY 10 2018

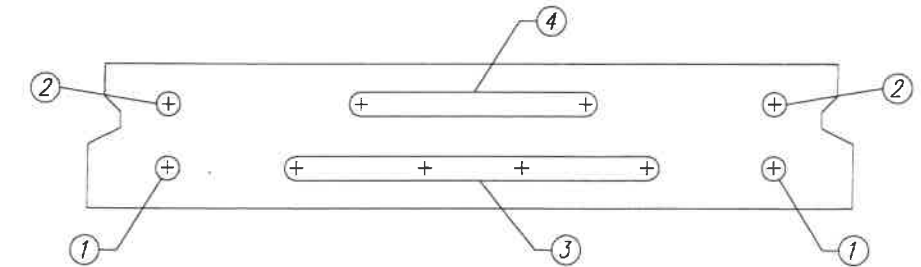
- SPECIAL NOTES**
1. CONCRETE STRENGTH SHALL BE 5,000 PSI MIN. @ RELEASE.
 2. CONCRETE STRENGTH SHALL BE 6,000 PSI MIN. @ 28 DAYS.
 3. ALL STRANDS SHALL BE CUT FLUSH AT EACH END OF PANEL. COAT ENDS OF STRANDS WHERE CUT WITH AN APPROVED EPOXY COATING.

REVISIONS		QUALITY CONTROL		FORTERRA STRUCTURAL PRODUCTS	
		POUR #		PELHAM, ALABAMA PLANT	
		MARK #		400 INDUSTRIAL PARK DR. PH. 205 663-4681	
		GIRDER #		PELHAM, ALABAMA 35124 FAX 205 663-4459	
		DATE:		PROJECT: BR-0017 (501) DEKALB CO., AL	
		INITIAL:		CONTRACTOR: WRIGHT BROTHERS CONSTRUCTION	
				SCALE: N.T.S. DATE: 5/1/18 APPROVED BY: <i>[Signature]</i> DRAWN BY: T.L.S.	
				FORTERRA DWG. FILE: 8114 DP E CHECKED BY: D.R.H. FORTERRA JOB NO. 8114	
				SHEET 15 OF 16	

STEEL REINFORCEMENT PER PANEL				
DECK PANELS DP-8114-1 thru 9 (117 PANELS)				
QTY.	MARK #	D51	D52	D53
18	1, 2, 3, 9	432	432	432
99	4, 5, 6, 7, 8	2,574	2,574	2,574
TOTALS		(3,006)	(3,006)	(3,006)



MISC. MATERIALS		
ITEM #	QTY.	REMARKS
STRAND-270 K 1/2"	10	LOW-RELAXATION (A = .153 SQ. IN.)
2 1/2" x 9" LONG HOLE	234	FOR 1" ANCHOR ROD (PVC PIPE)
2" x 4'-0" LONG HOLE	130	FOR 1" TIE ROD (PVC PIPE)



CUTTING SEQUENCE
12'-0" DECK PANELS

ELONGATION CALCULATIONS

BASIC ELONGATION = $\frac{\text{FORCE REQ'D BEYOND INITIAL TENSION} \times \text{LENGTH OF STRAND BETWEEN ANCHORAGE}}{\text{AREA OF STRAND} \times \text{MODULUS OF ELASTICITY}}$
THEORETICAL ELONGATION = BASIC ELONGATION COMBINED WITH APPROPRIATE CORRECTIONS.

TYPICAL ELONGATIONS (STRAIGHT STRANDS)

$$\begin{aligned} \text{BED LENGTH (in.)} &= 2,265 \\ \text{Es STRAND MODULUS (psi)} &= 28,600,000 \\ \text{STRAND AREA (in.}^2\text{)} &= .153 \\ \text{BASIC ELONGATION (in.)} &= \frac{(30,975 - 5,000) (2,265)}{(.153) (28,600,000)} = 13.4452 \end{aligned}$$

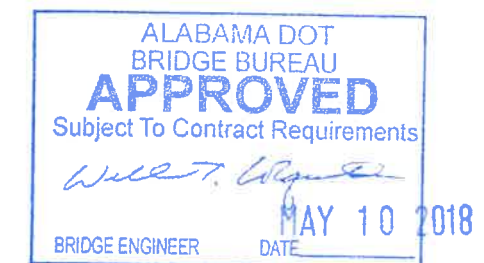
	*GROSS THEORETICAL ELONGATION	*NET THEORETICAL ELONGATION
BASIC ELONGATION (in.) =	13.4452	13.4452
SLIPPAGE @ DEAD END (in.) =	.125	.125
SEATING LOSS @ LIVE END (in.) =	.375	
Σ =	13.9452	13.5702

LIVE END SEATING - OVER PULL BY 3/8". ADJUST FOR ACCORDINGLY.

$$P_{ls} = \frac{(.375) (.153) (28,600,000)}{2,265} = 724 \text{ LBS.}$$

$$\text{GAGE FORCE} = 30,975 + 724 = 31,699 \text{ LBS.}$$

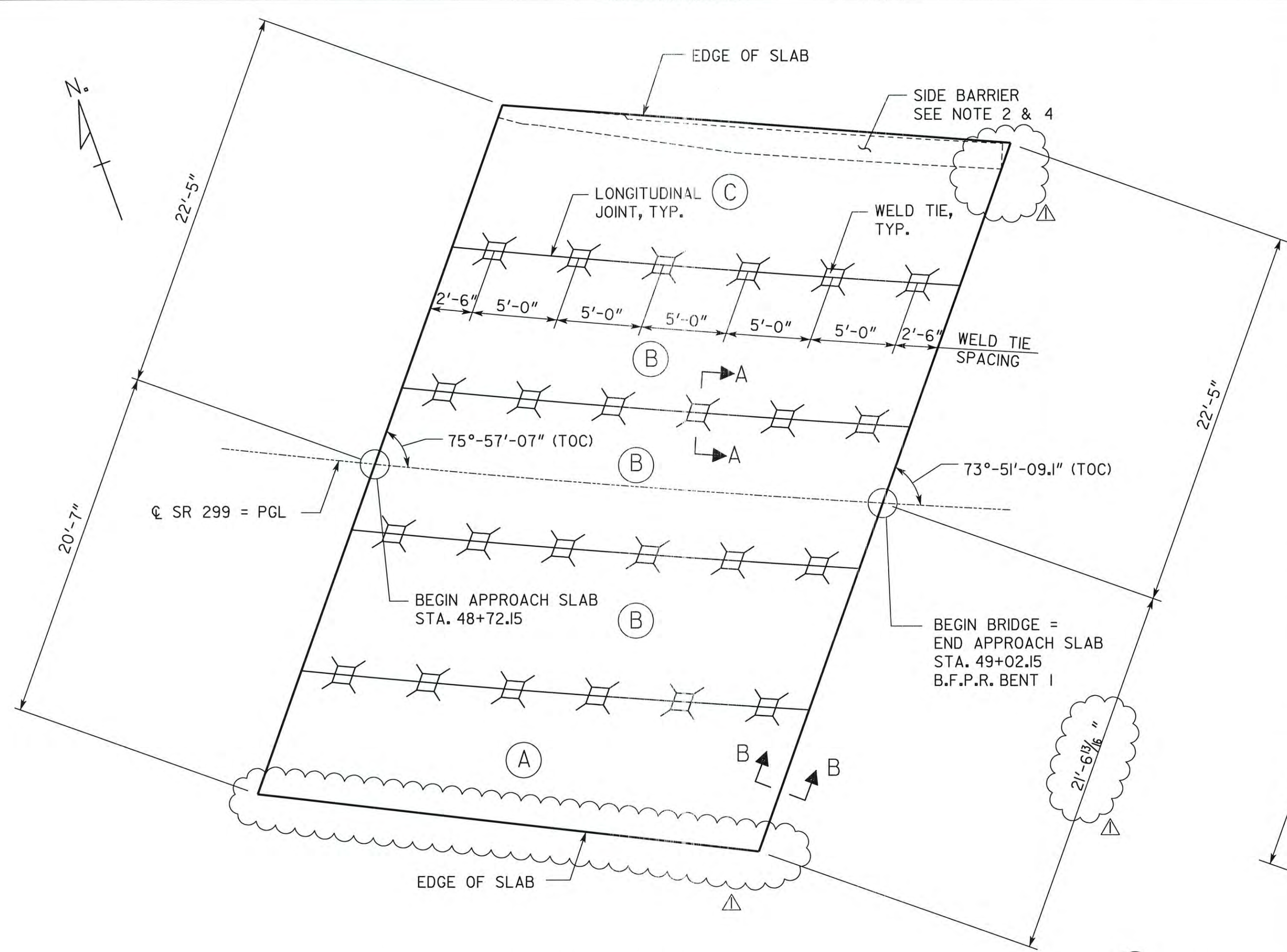
NOTES: *1. USE GROSS THEORETICAL ELONGATION FOR MONITORING TRAVEL OF RAM AND COMPARE GAGE FORCE ABOVE. USE NET THEORETICAL ELONGATION FOR COMPARISON AGAINST MOVEMENT OF MARK ON STRAND FROM INITIAL (WHEN MARKED) TO AFTER SEATING.
2. 5,000 LB. INITIAL TENSION TO BE PULLED BY GAGE ONLY.



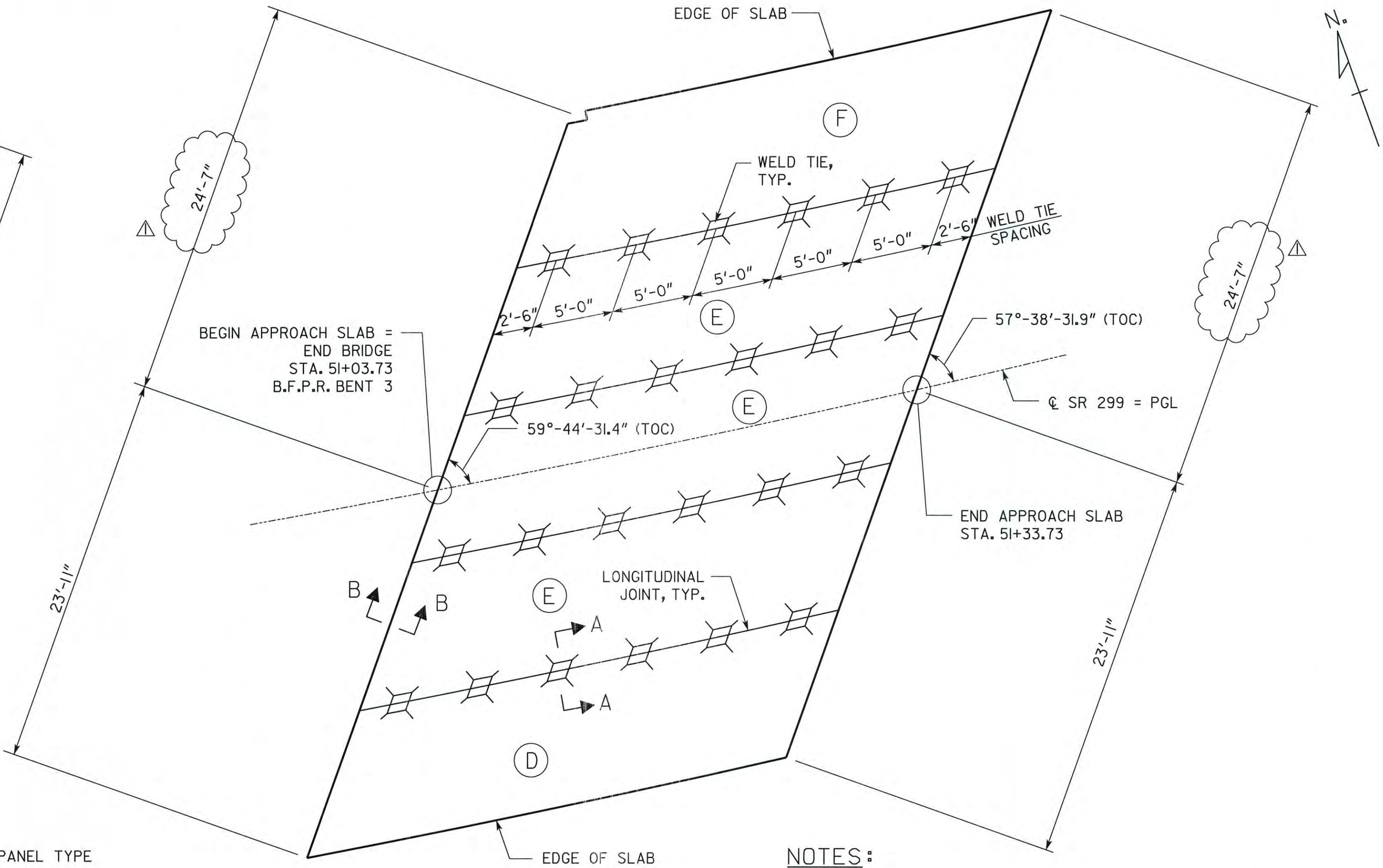
REVISIONS		QUALITY CONTROL		FORTERRA STRUCTURAL PRODUCTS	
		POUR #		PELHAM, ALABAMA PLANT	
		MARK #		400 INDUSTRIAL PARK DR. PH. 205 663-4681	
		GIRDER #		PELHAM, ALABAMA 35124 FAX 205 663-4459	
		DATE:		PROJECT: BR-0117 (501) DEKALB CO., AL	
		INITIAL:		CONTRACTOR: WRIGHT BROTHERS CONSTRUCTION	
				SCALE: N.T.S. DATE: 5/1/18 APPROVED BY: [Signature] DRAWN BY: T.L.S.	
				DECK PANELS - ELONGATIONS & MATERIALS	
				FORTERRA DWG. FILE 8114 DP EM CHECKED BY: D.R.H. SHEET 16 OF 16	

Precast Approach Slab Details

GDOT SR 299 at I-24 ABC Project (Wright Brothers)



PRECAST APPROACH SLAB
 AT BEGIN OF THE BRIDGE
 SCALE: 2" = 10'-0"

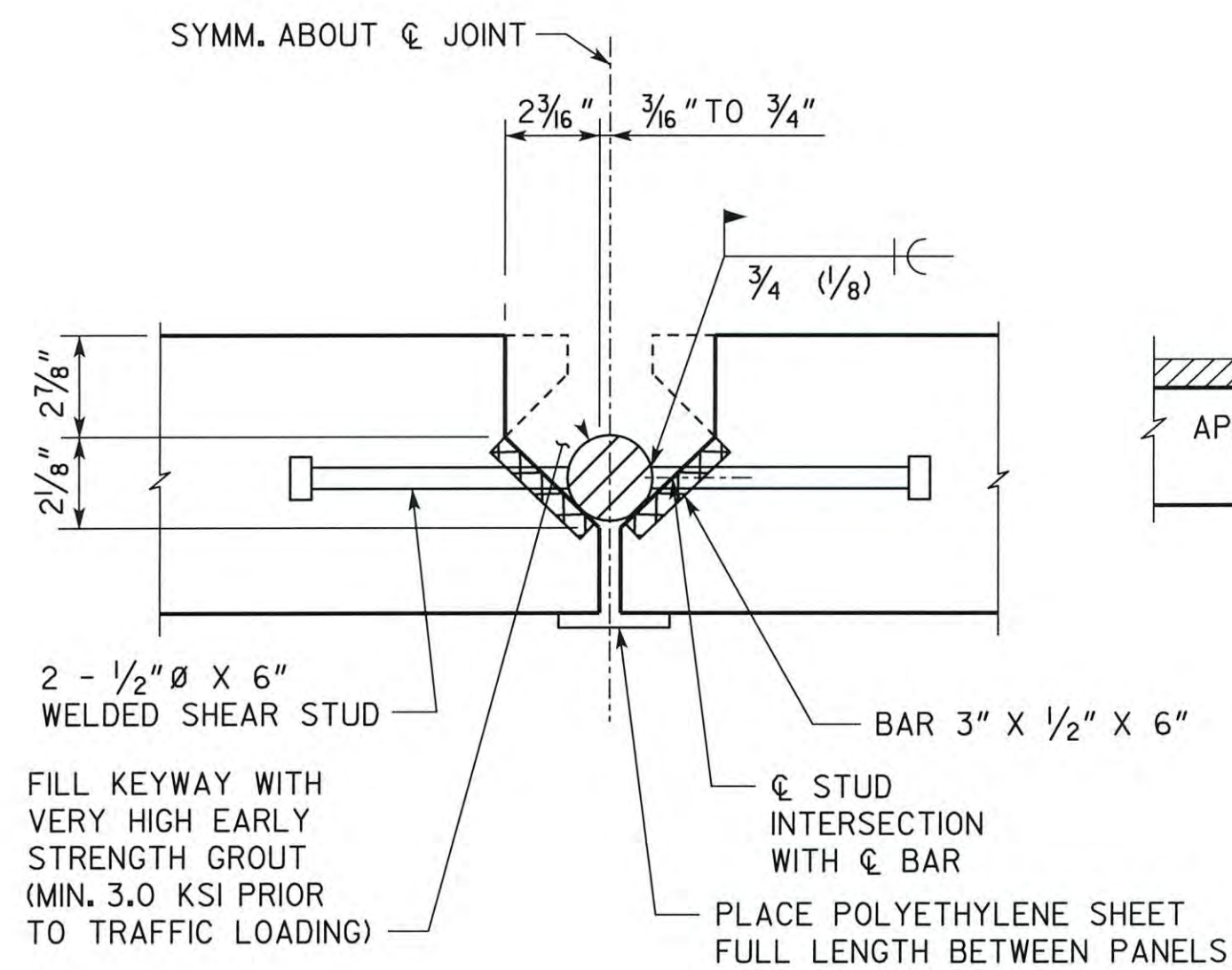


PRECAST APPROACH SLAB
 AT END OF THE BRIDGE
 SCALE: 2" = 10'-0"

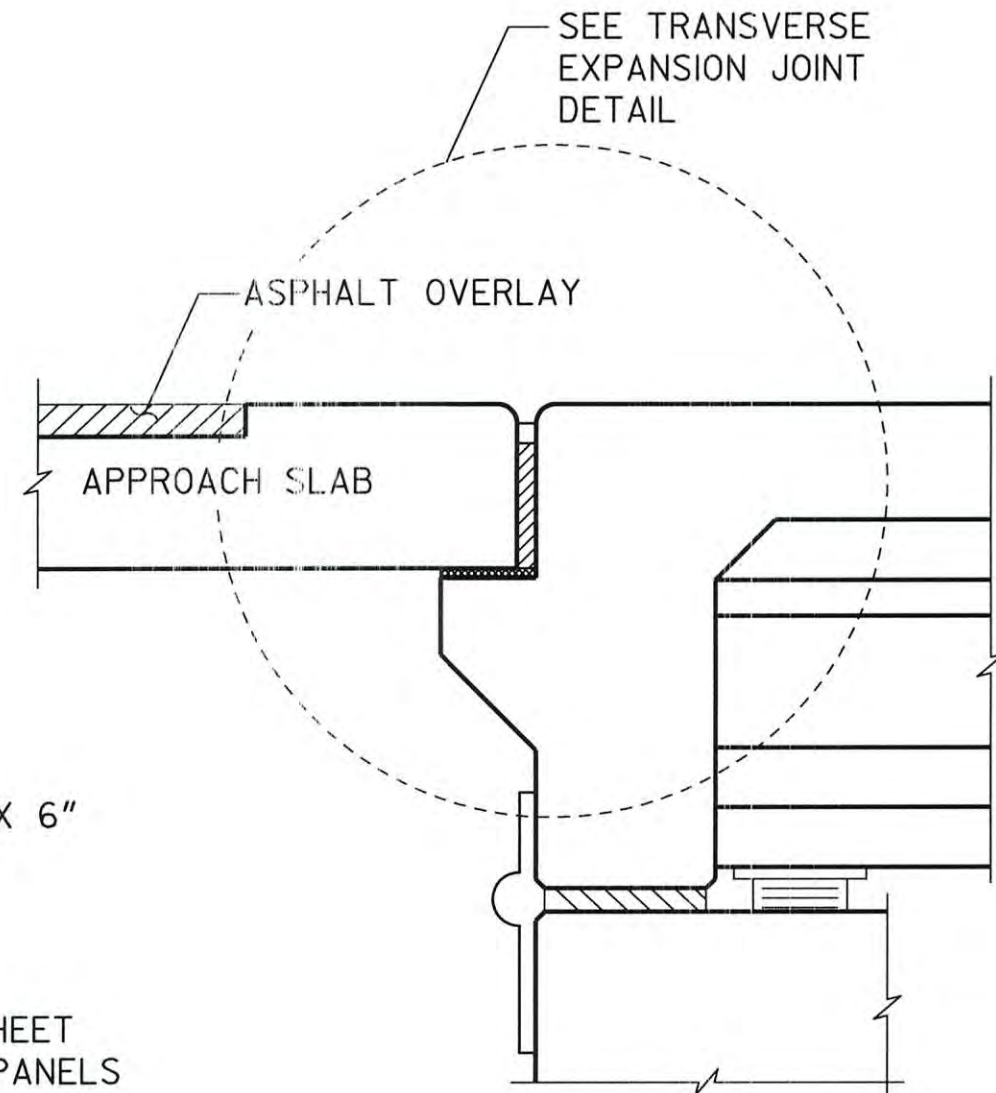
NOTES:

1. PRECAST APPROACH SLAB ELEMENTS ARE DESIGNED IN ACCORDANCE WITH AASHTO LRFD 7TH EDITION, 2014 FOR ALL TEMPORARY LOADS WITHOUT DISCERNIBLE CRACKS (CRACK WIDTH LESS THAN 0.007IN.) DURING FORM REMOVAL, STORAGE, TRANSPORTATION, AND ERECTION.
2. ALL REBAR FOR SIDE BARRIER SHALL BE EPOXY-COATED AND PLACED DURING APPROACH SLAB CASTING.
3. MINIMUM CONCRETE COMPRESSIVE STRENGTH FOR PRECAST APPROACH SLAB PANEL SHALL BE $f'_c = 5000\text{PSI}$ (MIN.)
4. SEE GDOT STANDARD 9017M FOR SIDE BARRIER TRANSITION FOR GUARDRAIL ATTACHMENT AND BAR DETAIL ON SIDE BARRIER.
5. \otimes SEE SECTION 833, THICKNESS SHALL BE AS PER MANUFACTURER'S RECOMMENDATIONS BASED ON JOINT WIDTH.

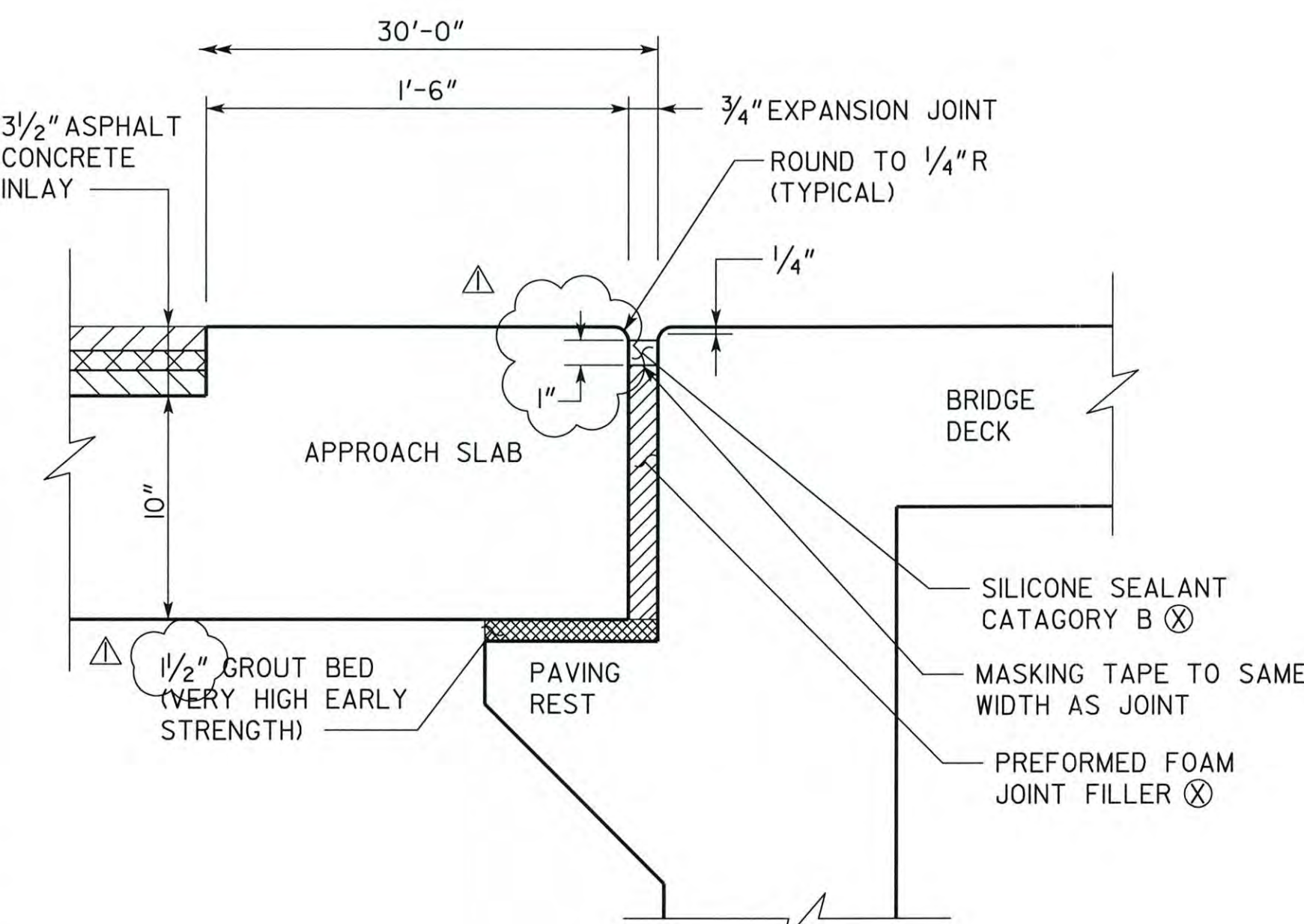
BRIDGE NO. 1



SECTION A-A
 NOT TO SCALE



SECTION B-B
 NOT TO SCALE



TRANSVERSE EXPANSION JOINT DETAIL
 NOT TO SCALE



DRAWING NO.
 35-0024
 BRIDGE SHEET
 24 OF 38



GEORGIA
 DEPARTMENT OF TRANSPORTATION
 ENGINEERING DIVISION-OFFICE OF BRIDGES AND STRUCTURES

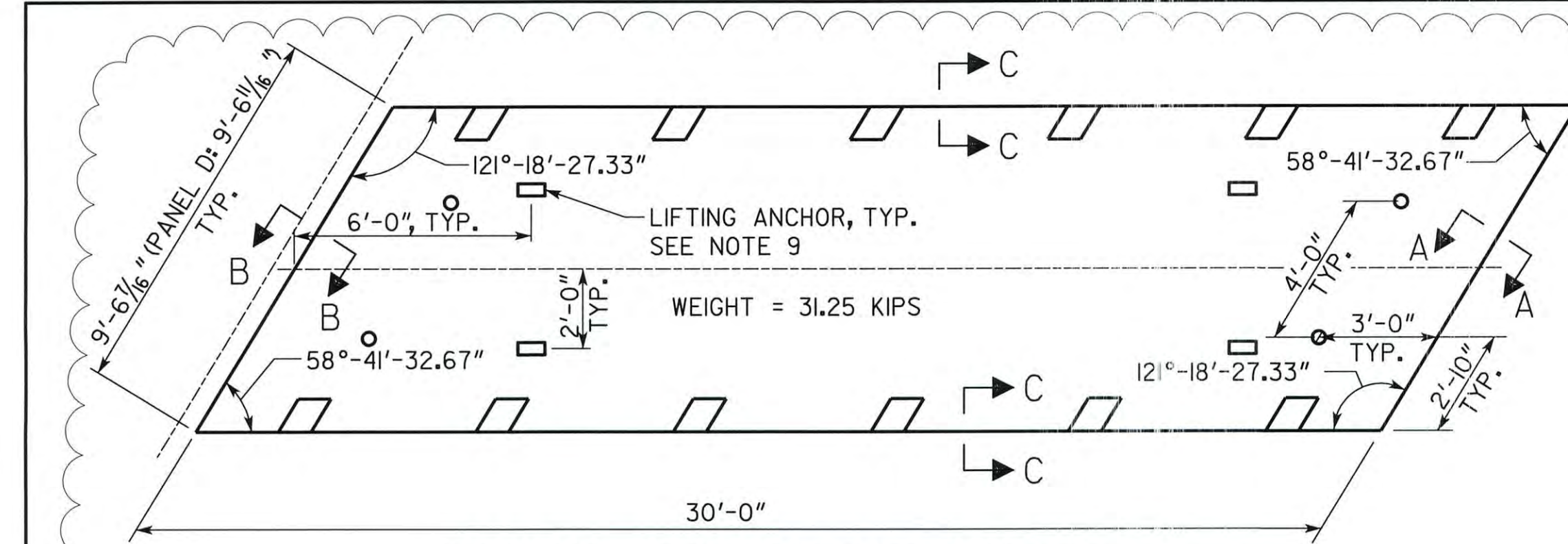
PRECAST APPROACH SLAB (1 OF 2)
 SR 299 OVER I-24
 (ACCELERATED BRIDGE CONSTRUCTION)
 DADE COUNTY 0011682

SCALE: 1" = 10'-0" SEPTEMBER 2016

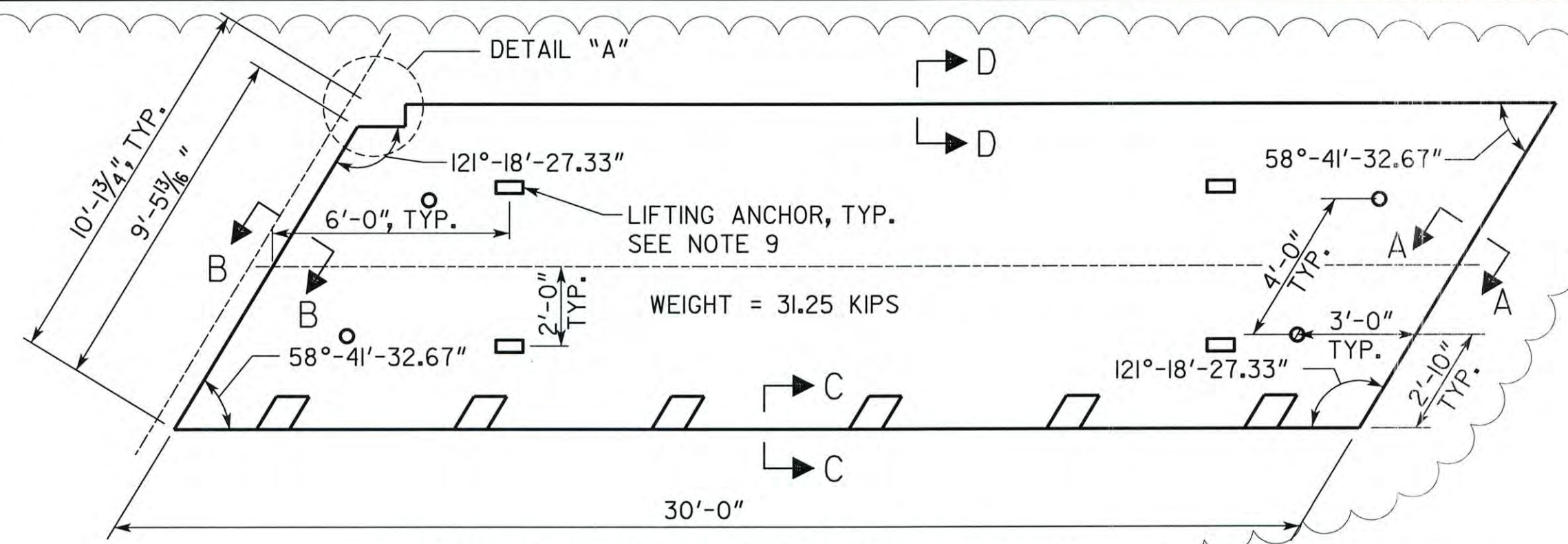
DESIGNED: PAA
 DRAWN: JBH
 CHECKED: SMJ
 DESIGN GROUP: SKG
 REVIEWED: DLC/SKG
 APPROVED: WMD

1 INCH WHEN PRINTED FULL SIZE

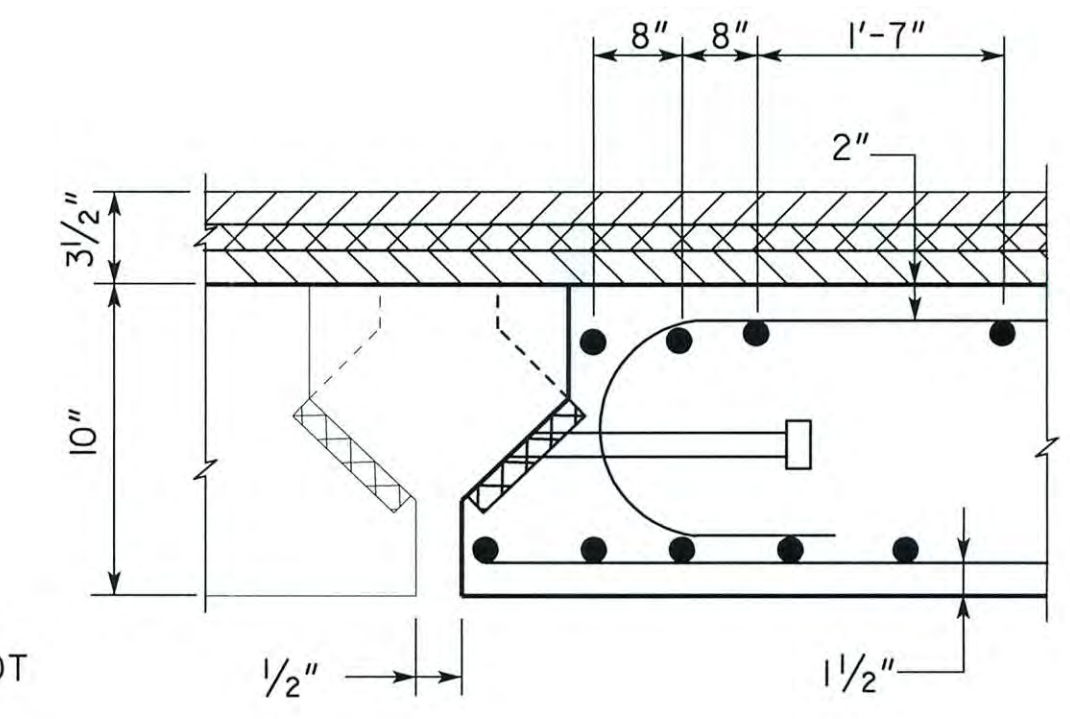
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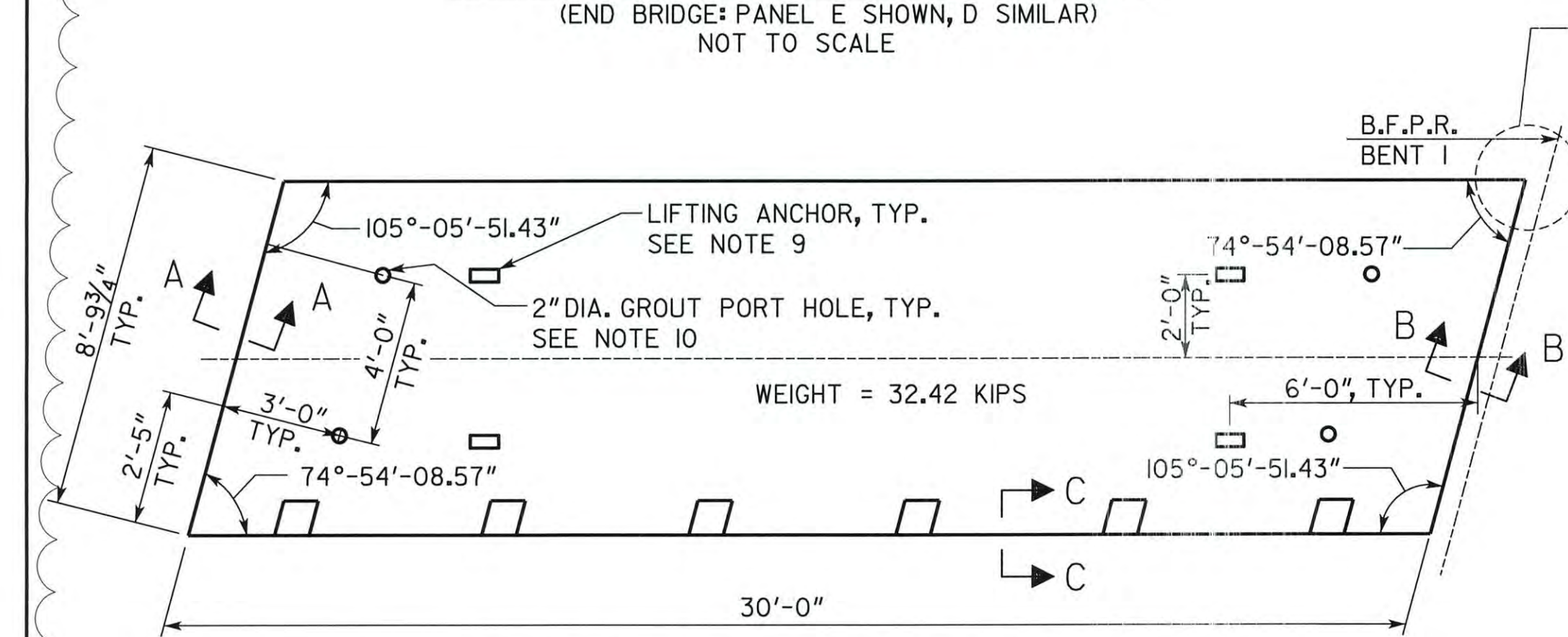
APPROACH SLAB PRECAST PANEL E
(END BRIDGE: PANEL E SHOWN, D SIMILAR)
NOT TO SCALE



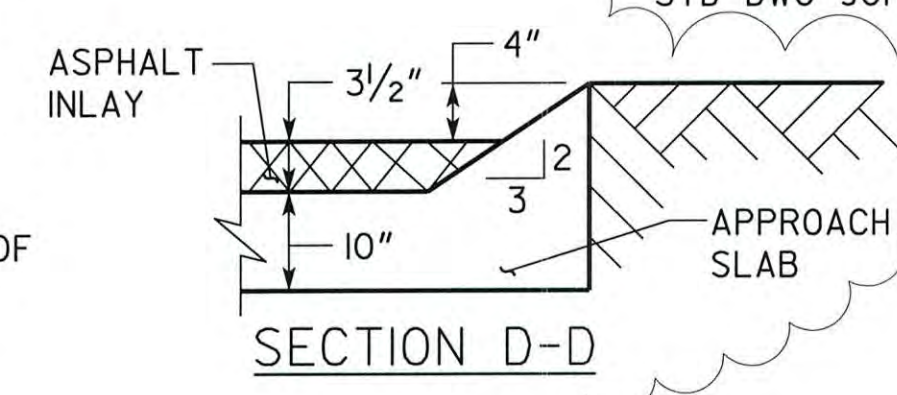
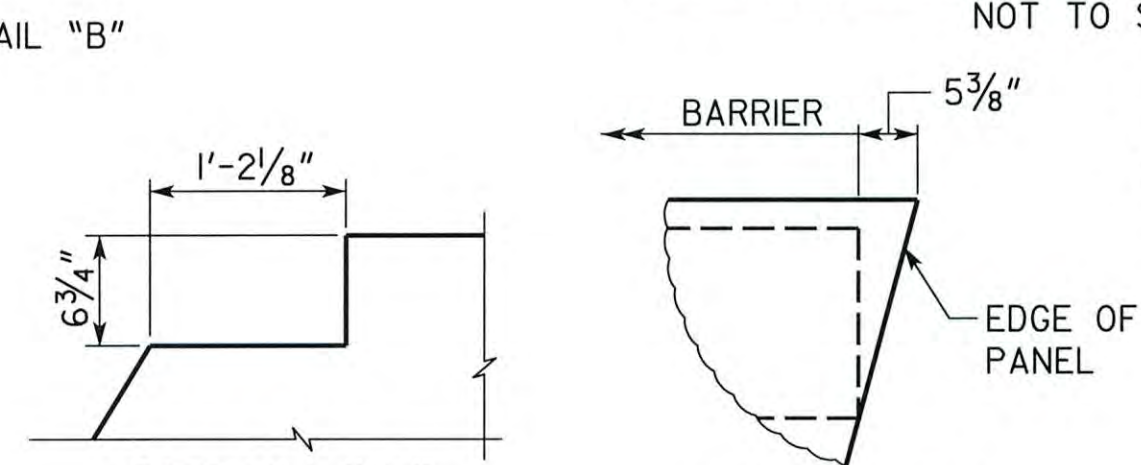
APPROACH SLAB PRECAST PANEL F
NOT TO SCALE



SECTION C-C
NOT TO SCALE



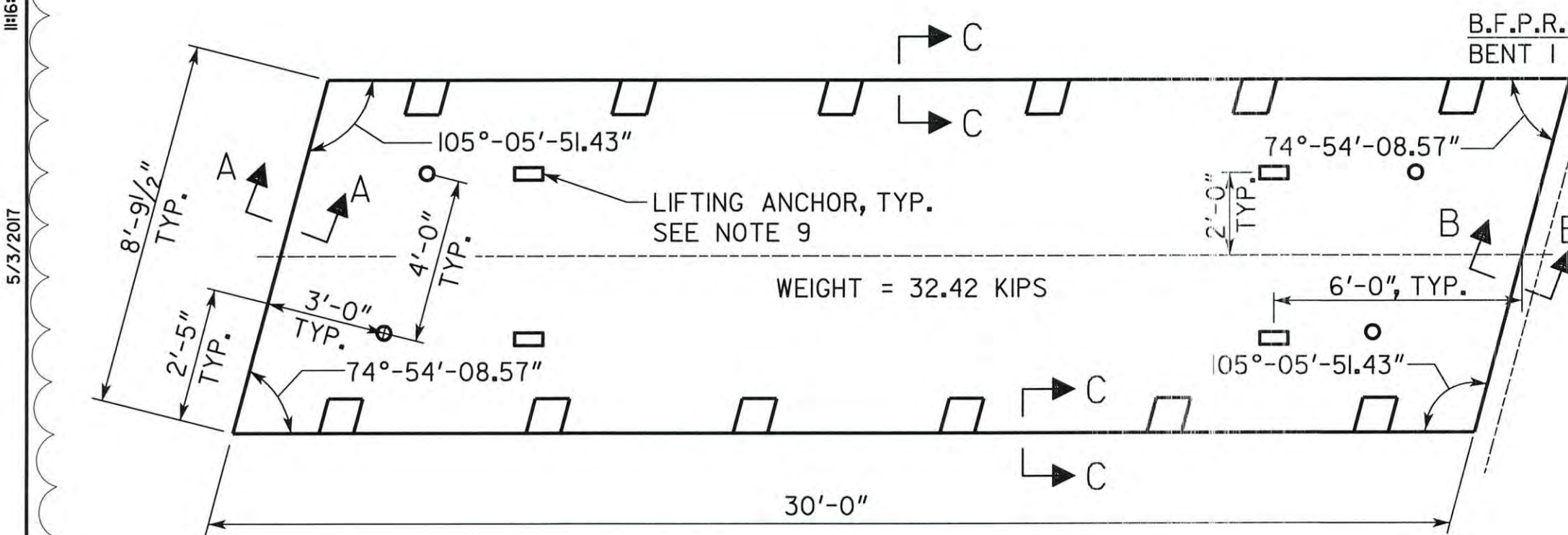
APPROACH SLAB PRECAST PANEL C
(BEGIN BRIDGE)
NOT TO SCALE



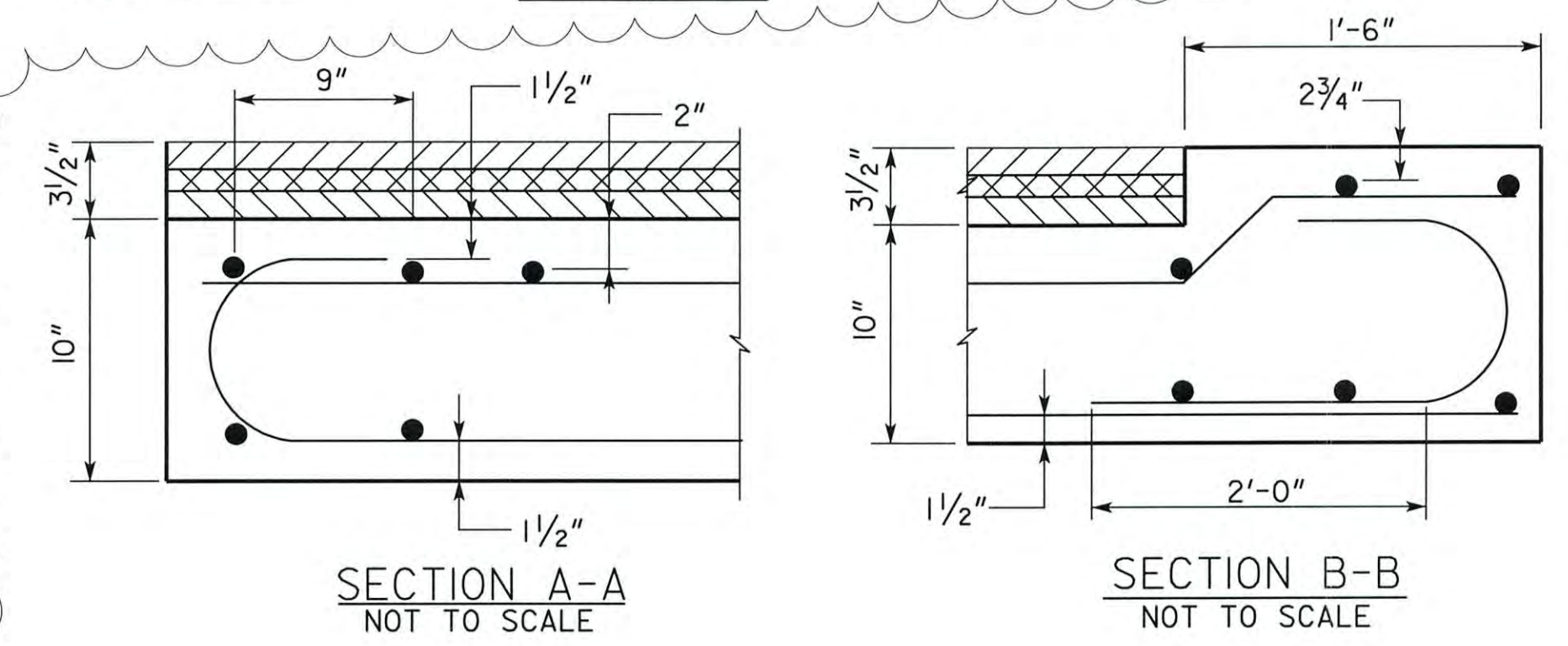
SECTION D-D

NOTES:

- MINIMUM COMPRESSIVE STRENGTH OF PRECAST ELEMENTS SHALL BE 5000PSI.
- THE DESIGNER HAS REVIEWED GDOT STANDARD DRAWING 9017R, AND THE REINFORCEMENT SIZE AND SPACING SHOWN IS SATISFACTORY FOR THE LOADINGS DURING EACH PHASE OF CONSTRUCTION OF THE INDIVIDUAL PRECAST APPROACH SLAB PANELS.
- PANELS SHALL NOT BE STRIPPED FROM THE FORMS UNTIL THE CONCRETE HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI.
- PRECAST PANELS MUST BE MAINTAINED IN A FLAT POSITION AT ALL TIMES AND SHALL BE PICKED UP FROM POINTS LOCATED AS DEPICTED ON THE PANELS.
- RECOMMENDED LIFTING POINTS ARE SHOWN ON THE PRECAST PANELS. IF LIFTING POINTS ARE LOCATED AT ALTERNATE LOCATIONS, CALCULATIONS SHALL BE SUBMITTED SHOWING THAT THE LOCATION MEETS THE FOLLOWING REQUIREMENTS:
-MAXIMUM FLEXURAL TENSION STRESS SHALL BE LIMITED TO THE MODULUS OF RUPTURE, MODIFIED BY A SAFETY FACTOR OF 1.5 FOR ALL PHASES OF LOADING.
- CHAMFER ALL EXPOSED EDGES AND CORNERS 3/4".
- PRECAST SLAB SHALL BE STORED ON ADEQUATE DUNNAGE AND SUPPORTED DURING TRANSIT BETWEEN 5.75' AND 6.75' FROM EACH END. PANELS SHALL BE A MINIMUM OF 6 DAYS OLD BEFORE SHIPPING WITH A MINIMUM COMPRESSION STRENGTH OF 5000 PSI.
- EACH PRECAST APPROACH SLAB PANEL SHALL INCORPORATE FOUR RECESSED LIFTING HOOKS. USE DAYTON SUPERIOR P75, TYPE 80A67I UTILITY ANCHOR TOGETHER WITH DAYTON SUPERIOR UTILITY ANCHOR SETTING PLUGS P76, TYPE 90P67I. AFTER PANELS ARE LIFTED TO FINAL LOCATION, LIFTING HOOK RECESSES SHALL BE SEALED WITH A NON-SHRINK RAPID CURING CEMENTITIOUS GROUT SIKAGROUT 212 OR EQUIVALENT.
- THE CONTRACTOR MAY SUBSTITUTE ALTERNATE LEVELING DEVICES BETWEEN THE SUBGRADE AND THE PRECAST PANELS PROVIDED THEY CAN PRODUCE A STRUCTURE WITHIN THE SPECIFIED ERECTION TOLERANCES.
- FLOWABLE GROUT USE TO FILL VOIDS BETWEEN SUBGRADE AND PRECAST SLAB PANELS SHALL ACHIEVE MINIMUM 3 KSI PRIOR TO TRAFFIC LOADING.

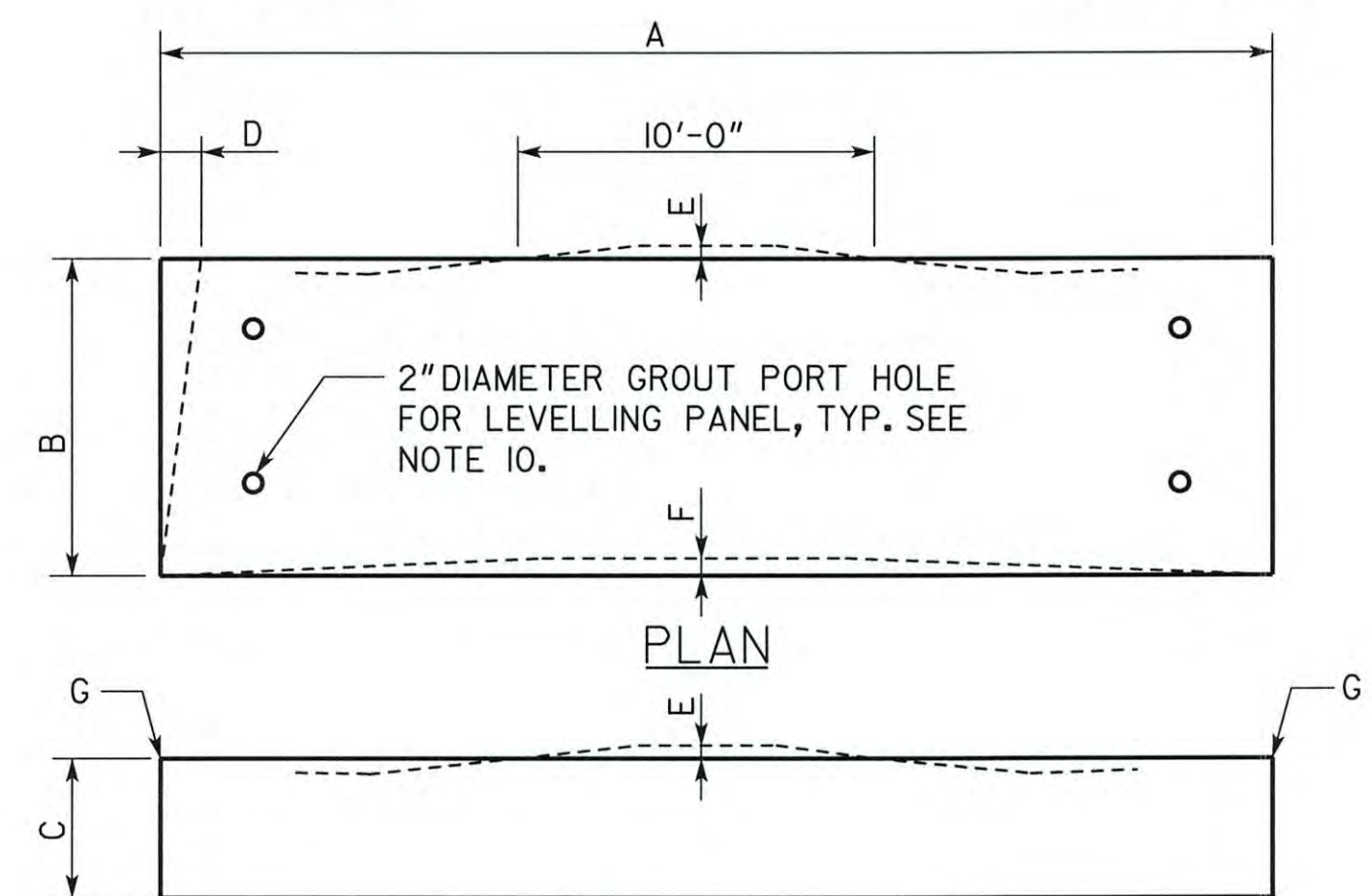


APPROACH SLAB PRECAST PANEL B
(BEGIN BRIDGE)
NOT TO SCALE



SECTION A-A
NOT TO SCALE

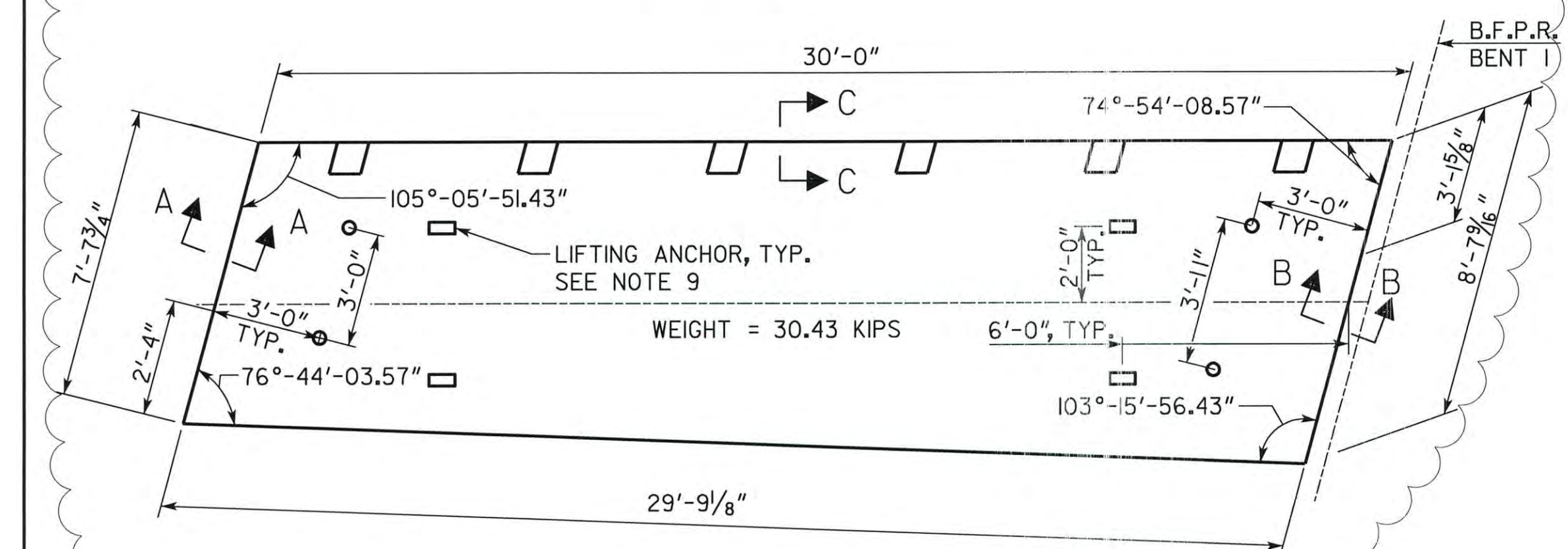
SECTION B-B
NOT TO SCALE



ELEVATION

APPROACH SLAB TOLERANCES

A	LENGTH	±1/4"
B	WIDTH (OVERALL)	±1/4"
C	DEPTH (OVERALL)	±1/4"
D	VARIATION FROM SPECIFIED PLAN END SQUARENESS OR SKEW	±1/2"
E	LOCAL SMOOTHNESS OF ANY SURFACE	±1/8" IN 10 FEET
F	SWEEP OVER MEMBER LENGTH	±3/8"
G	ERECTION ELEVATION TOLERANCE (SURFACE APPROACH SLABS ONLY)	±1/8"



APPROACH SLAB PRECAST PANEL A
(BEGIN BRIDGE)
NOT TO SCALE

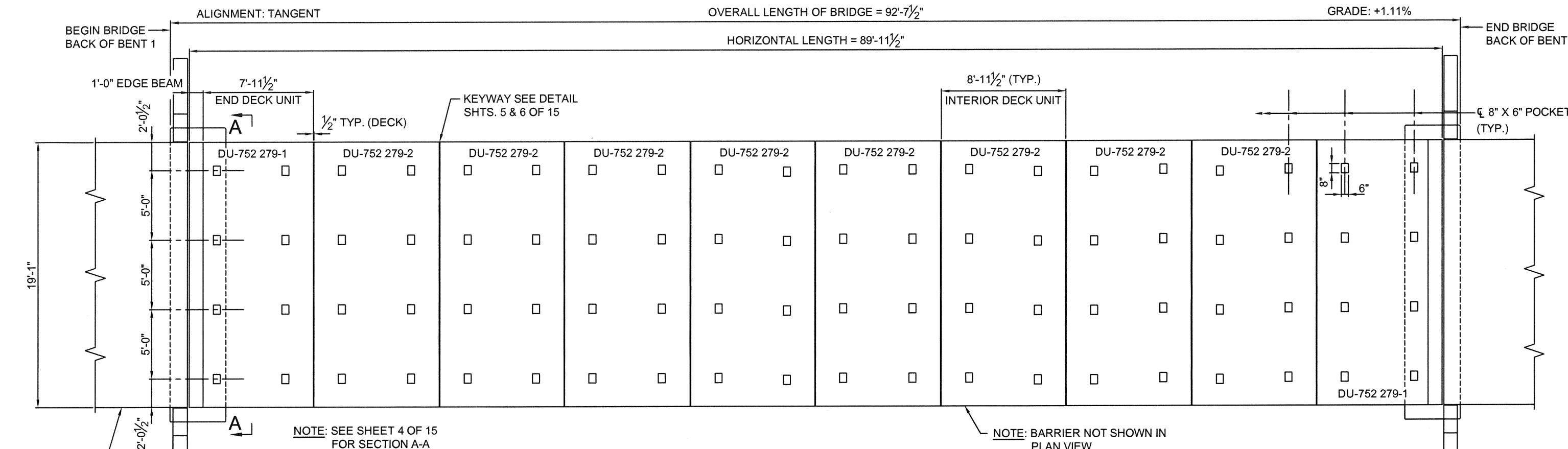


DRAWING NO. 35-0025
BRIDGE SHEET 25 OF 38

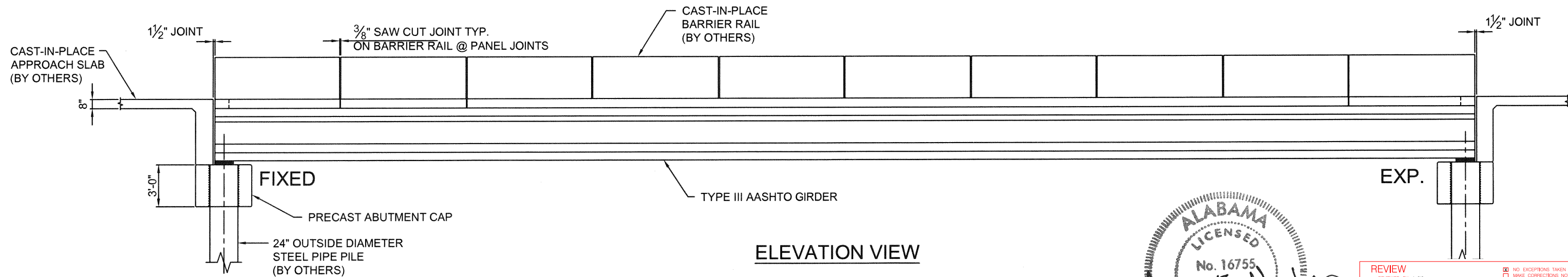
DATE: 01-30-17 REVISIONS: 2 REMOVED NOTE 2 BY: SMJ REVISIONS: 05/03/2017 BY: SMJ		BRIDGE NO. 1 GEORGIA DEPARTMENT OF TRANSPORTATION ENGINEERING DIVISION-OFFICE OF BRIDGES AND STRUCTURES PRECAST APPROACH SLAB (2 OF 2) SR 299 OVER I-24 (ACCELERATED BRIDGE CONSTRUCTION) DADE COUNTY 0011682 SCALE: 1" = 10'-0" SEPTEMBER 2016 DESIGNED: PAA CHECKED: SMJ REVIEWED: DLC/SKG DRAWN: MS DESIGN GROUP: SKG APPROVED: WMD	
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Precast Abutment Details

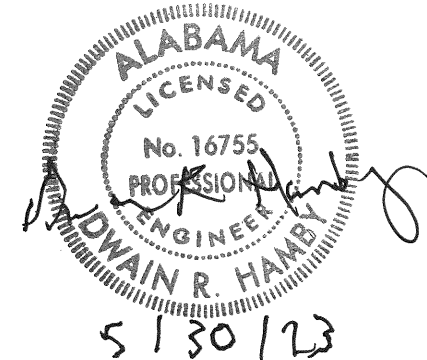
Olin McIntosh WWD Bridge (Wright Brothers)



PLAN VIEW



ELEVATION VIEW



REVIEW



REVIEWED BY: A. O'Connor	<input checked="" type="checkbox"/> NO EXCEPTIONS TAKEN
CHECKED BY: A. Saha & P. Austin	<input checked="" type="checkbox"/> MAKE CORRECTIONS NOTED
DATE: 06-01-2023	<input checked="" type="checkbox"/> AMEND AND RESUBMIT
	<input checked="" type="checkbox"/> REJECTED - SEE REMARKS

The Engineer of Record's review of the shop drawings is for conformity of the requirements of the BD Documents and to the intent of the design. The Engineer of Record's review of shop drawings, which includes means, methods, techniques, sequences and construction procedures is limited to the effects on the permanent works. The Engineer of Record's review of submittals which includes means, methods, techniques, sequences and construction procedures, does not include an in-depth check for the ability to perform the work in a safe or efficient manner.

ENGINEER OF RECORD: *[Signature]* DATE: 06-01-2023

WSP USA
3340 Peachtree Road, NE
Suite 2400, Tower Place 100
Atlanta, Ga 30326 (404) 231-2115

WSP USA

REVISION		QUALITY CONTROL		<div>CONTECH ENGINEERED SOLUTIONS LLC www.ContechES.com 400 Industrial Park Drive, Pelham, Alabama 35124 <hr/>Main Office: 205-663-4681</div>	OLIN CHEMICAL PLANT WRIGHT BROTHERS CONST. ERECTION PLAN (DECK UNITS)	P.I. No.:	CONTECH No.:	DATE:
		POUR #					752 279	05/30/23
		MARK #				DESIGNED:	D.R.H.	DRAWN:
		GIRDER #				CHECKED:	DRH	SHEET NO.:
		DATE:				APPROVED:	1 OF 15	
		CKD:						

GENERAL NOTES

1. GENERAL CONTRACTOR SHALL FIELD CHECK & VERIFY ALL DIMENSIONS & CONDITIONS AT JOBSITE. ALL PSC MEMBERS SHALL BE MANUFACTURED TO MEET THE REQUIREMENTS OF ALDOT STANDARD SPECIFICATIONS.
2. ERECTION BY OTHERS.
3. CHECK BED SHORTENING & VISE SLIPPAGE. MAKE ADJUSTMENTS TO CALCULATIONS IF NECESSARY.
4. ALL REINFORCING STEEL TO BE GRADE 60 MATERIAL A615.
5. STRANDS INDICATED AS ~ 1/2"Ø 270 K LOW-RELAXATION SHALL CONFORM TO ASTM A-416 WITH THE FOLLOWING PROPERTIES
- AREA OF STRAND0.153 SQ. IN.

MODULUS OF ELASTICITY28,600,000 PSI.

STRANDS INDICATED AS ~ 0.6"Ø 270 K LOW-RELAXATION SHALL CONFORM TO ASTM A-416 WITH THE FOLLOWING PROPERTIES

AREA OF STRAND0.217 sq. in.

MODULUS OF ELASTICITY28,800,000 psi.

6. ALL STRUCTURAL STEEL SHALL CONFORM TO AASHTO M270 OR ASTM A709 GRADE 36.
7. CHAMFER EDGES OF GIRDERS 3/4" UNLESS OTHERWISE NOTED. TOPS OF BEAMS SHALL RECEIVE A TROWEL SMOOTH FINISH. OPEN HOLES IN BEAM MAY BE FORMED WITH A TAPERED PIN OR PVC SLEEVE.
8. ALL BEAMS SHALL BE HANDLED, STORED, AND HAULED IN AN UPRIGHT POSITION. BEAMS SHALL BE HANDLED ONLY BY THE LIFT LOOPS AT EACH END OF THE BEAMS. SUPPORT POINTS FOR STORAGE OF THE BEAMS SHALL BE WITHIN 3 FEET OF THE BEAM ENDS. SUPPORT POINTS FOR HAULING THE BEAMS WILL BE BETWEEN THE PICK-UP LOOP AND THE END OF THE BEAM AT BOTH ENDS. UNDER NO CIRCUMSTANCE WILL THE SUPPORTS BE ALLOWED BEYOND THE LIFT LOOPS FROM THE ENDS OF THE BEAM.
9. ALL PRECAST DECK UNITS SHALL BE HANDLED, STORED, AND HAULED IN AN UPRIGHT POSITION. DECK UNITS SHALL BE HANDLED ONLY BY THE LIFTING DEVICES. SUPPORT POINTS FOR STORAGE AND HAULING SHALL BE ALIGNED WITH LIFTING DEVICES.

10. BRIDGE TO BE BUILT WITH STEEL DIAPHRAGMS.

REVIEW

REVIEWED BY: A. O'Connor

CHECKED BY: A. Saha & P. Austin

DATE: 06-01-2023


☒ NO EXCEPTIONS TAKEN

☐ MAKE CORRECTIONS NOTED

☐ AMEND AND RESUBMIT

☐ REJECTED - SEE REMARKS

The Engineer of Record's review of the shop drawings is for conformity of the requirements of the BD Documents and to the intent of the design. The Engineer of Record's review of shop drawings, which includes means, methods, techniques, sequences, and construction procedures, is limited to the effects on the permanent works. The Engineer of Record's review of submittal, which includes means, methods, techniques, sequences, and construction procedures, does not include an in-depth check for the ability to perform the Work in a safe or efficient manner.

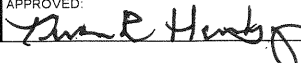


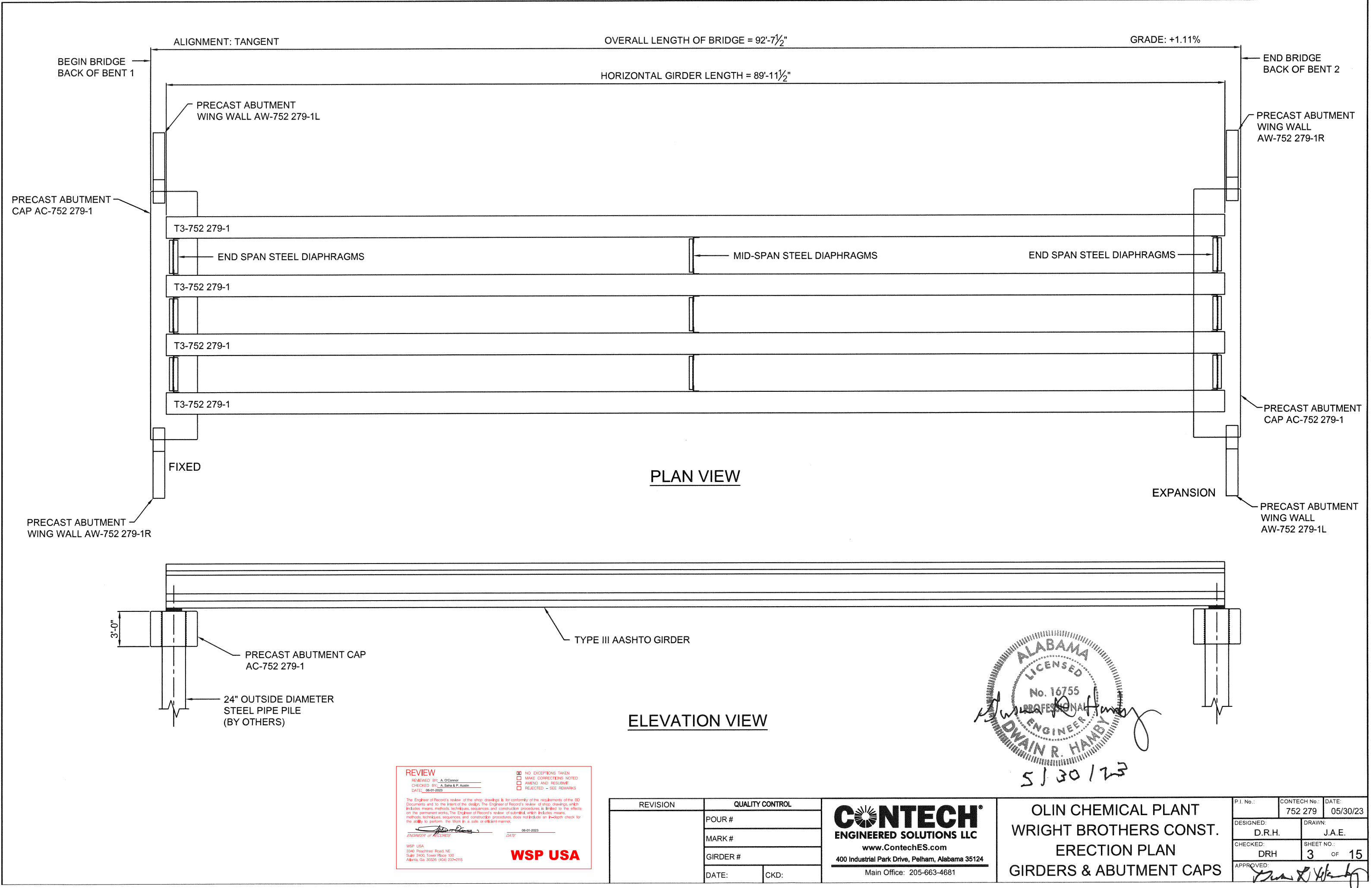
ENGINEER OF RECORD

DATE: 06-01-2023

WSP USA

3340 Peachtree Road, NE
Suite 2400, Tower Place 100
Atlanta, GA 30326 (404) 237-2115

REVISION		QUALITY CONTROL		CONTECH		OLIN CHEMICAL PLANT WRIGHT BROTHERS CONST. GENERAL NOTES		P.I. No.:	CONTECH No.:	DATE:			
		POUR #		<div>ENGINEERED SOLUTIONS LLC</div> <div>www.ContechES.com</div> <div>400 Industrial Park Drive, Pelham, Alabama 35124</div> <div>Main Office: 205-663-4681</div>				752 279		05/30/23			
		MARK #					DESIGNED: D.R.H.						
		GIRDER #					DRAWN: J.A.E.						
		DATE:					CHECKED: DRH						
		CKD:						SHEET NO.: 2 OF 15					
								APPROVED: 					



REVIEW

REVIEWED BY: A. O'Connor
CHECKED BY: A. Saha & P. Austin
DATE: 06-01-2023

☒ NO EXCEPTIONS TAKEN
☐ MAKE CORRECTIONS NOTED
☐ AMEND AND RESUBMIT
☐ REJECTED - SEE REMARKS

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ENGINEER OF RECORD

DATE 06-01-2023

WSP USA
3540 Peachtree Road, NE
Suite 2400, Tower Floor 100
Atlanta, GA 30326 (404) 237-2115

WSP USA

REVISION		QUALITY CONTROL	
		POUR #	
		MARK #	
		GIRDER #	
DATE:		CKD:	

CONTECH


ENGINEERED SOLUTIONS LLC

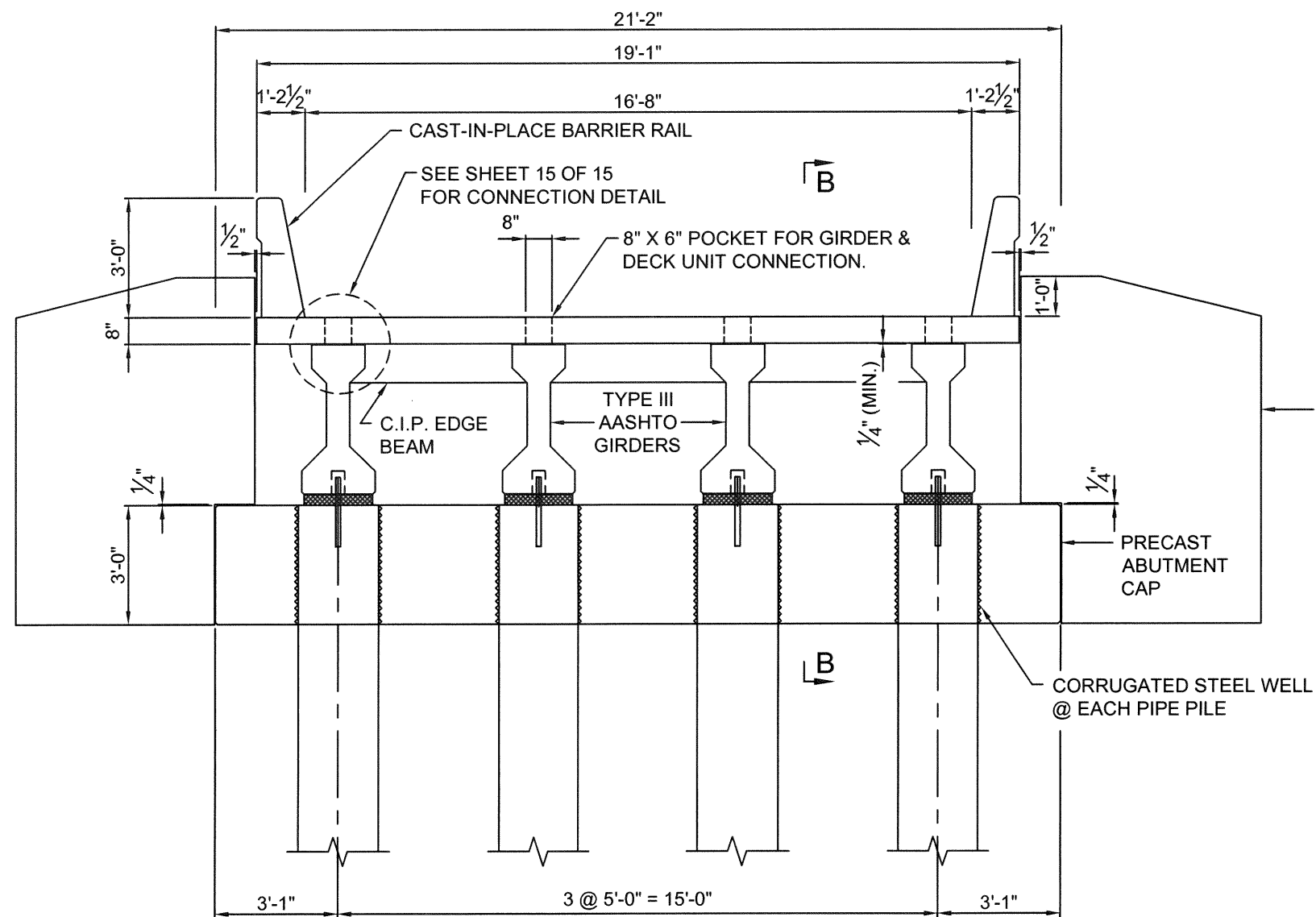
www.ContechES.com

400 Industrial Park Drive, Pelham, Alabama 35124

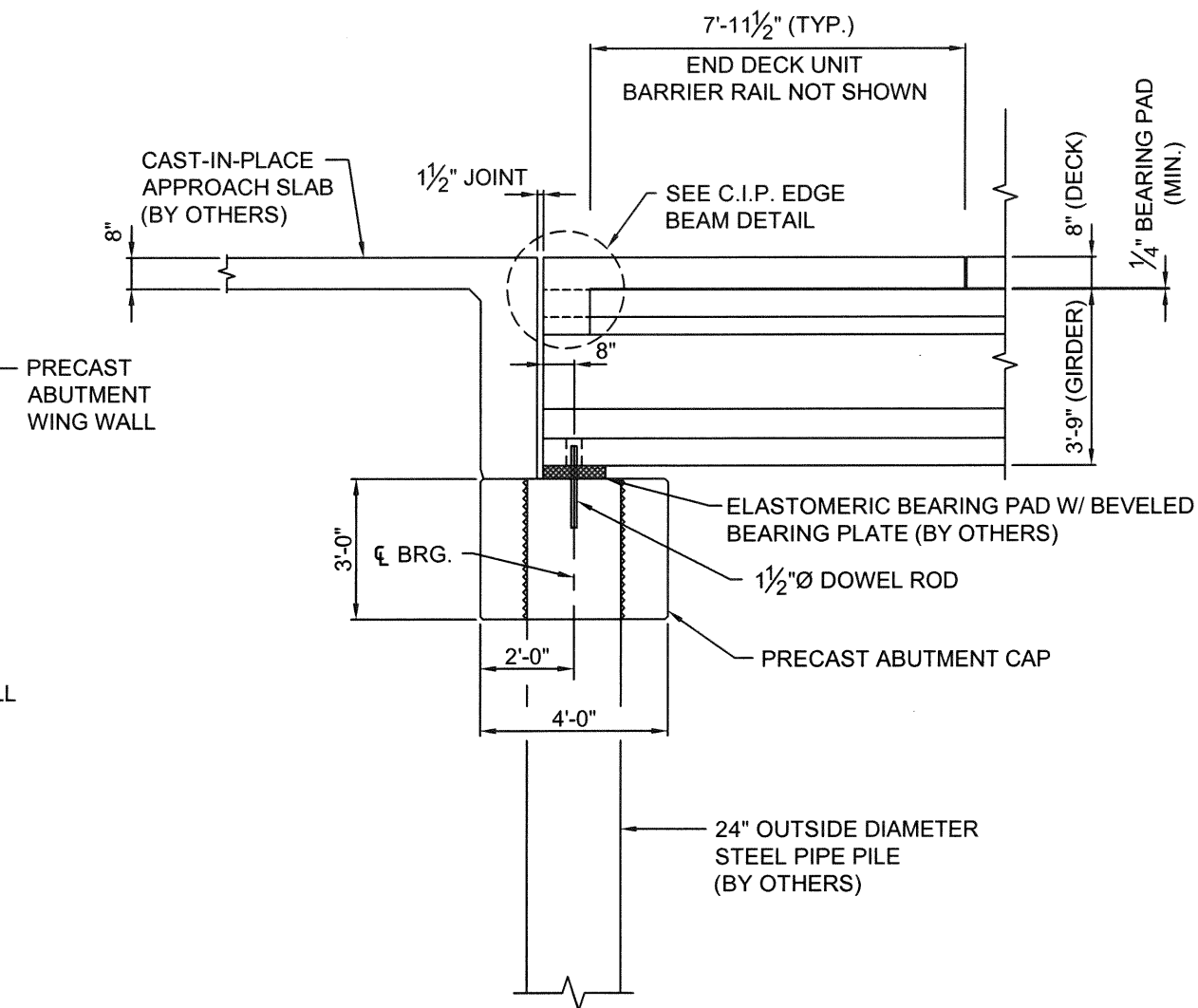
Main Office: 205-663-4681

OLIN CHEMICAL PLANT
WRIGHT BROTHERS CONST.
ERECTION PLAN
GIRDERS & ABUTMENT CAPS

P.I. No.:	CONTECH No.:	DATE:
	752 279	05/30/23
DESIGNED:	DRAWN:	
D.R.H.	J.A.E.	
CHECKED:	SHEET NO.:	
DRH	3 OF 15	
APPROVED:		
		

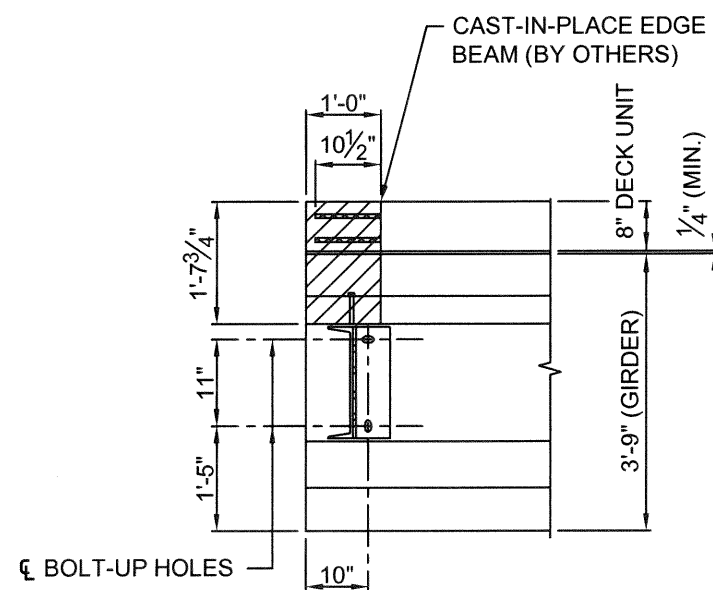


SECTION A-A



SECTION B-B

NOTE: ABUTMENT WING WALL NOT SHOWN.



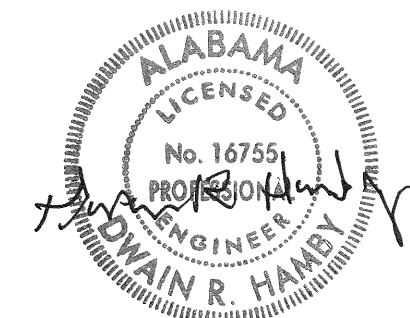
C.I.P. EDGE BEAM DETAIL

REVIEW		NO EXCEPTIONS TAKEN	
REVIEWED BY: A. O'Connor		<input checked="" type="checkbox"/> NO EXCEPTIONS TAKEN	
CHECKED BY: A. Saha & P. Austin		<input type="checkbox"/> MAKE CORRECTIONS NOTED	
DATE: 06-01-2023		<input type="checkbox"/> AMEND AND RESUBMIT	
		<input type="checkbox"/> REJECTED - SEE REMARKS	



The Engineer of Record's review of the shop drawings is for conformity of the requirements of the BD Documents and to the intent of the design. The Engineer of Record's review of shop drawings, which includes means, methods, techniques, sequences and construction procedures, is limited to the effects on the permanent works. The Engineer of Record's review of substantial which includes means, methods, techniques, sequences, and construction procedures, does not include an in-depth check for the ability to perform the work in a safe or efficient manner.

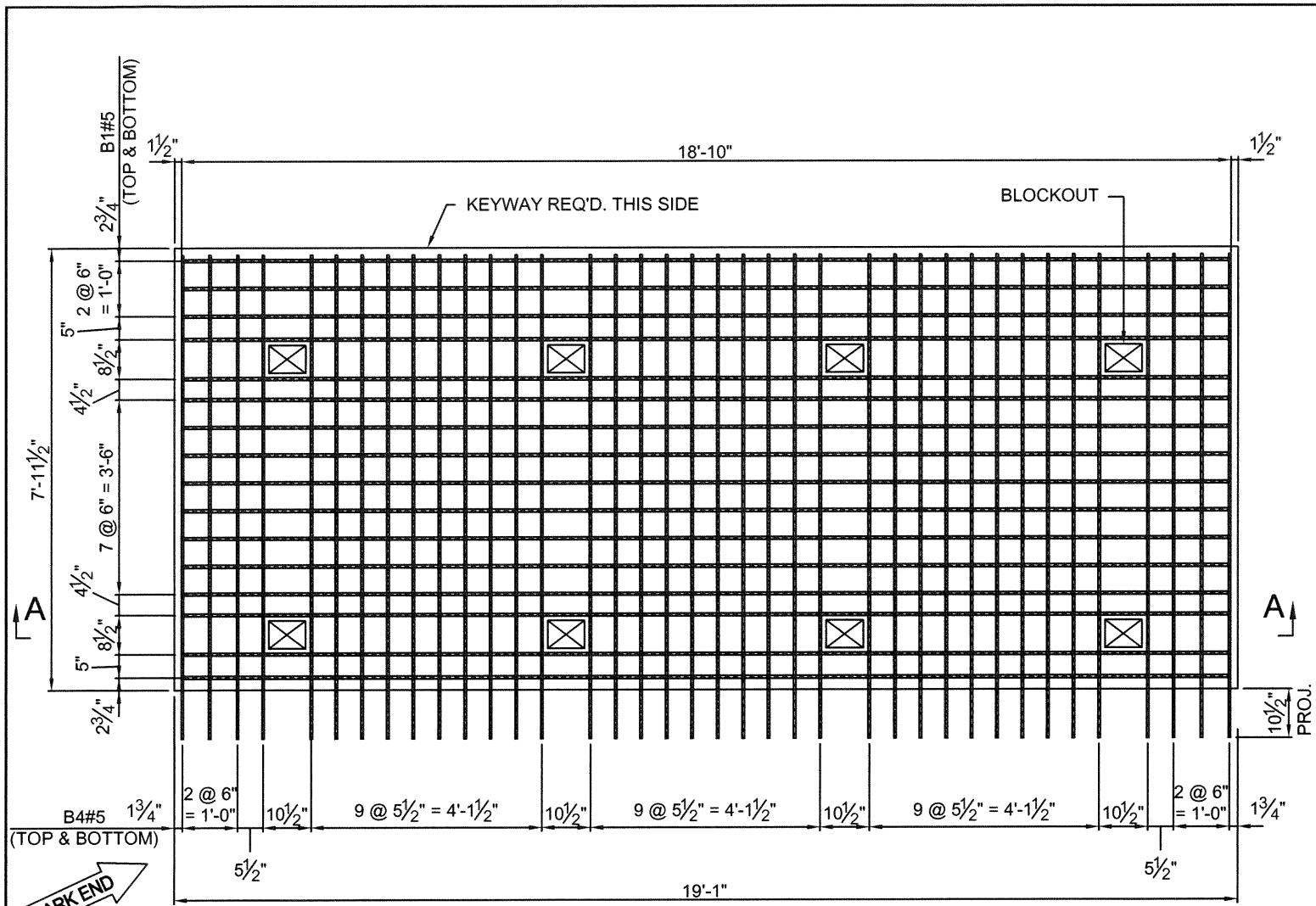
ENGINEER OF RECORD: *[Signature]* DATE: 06-01-2023

WSP USA
3340 Peachtree Road, NE
Suite 2400, Tower Place 100
Atlanta, Ga 30326 (404) 237-2115



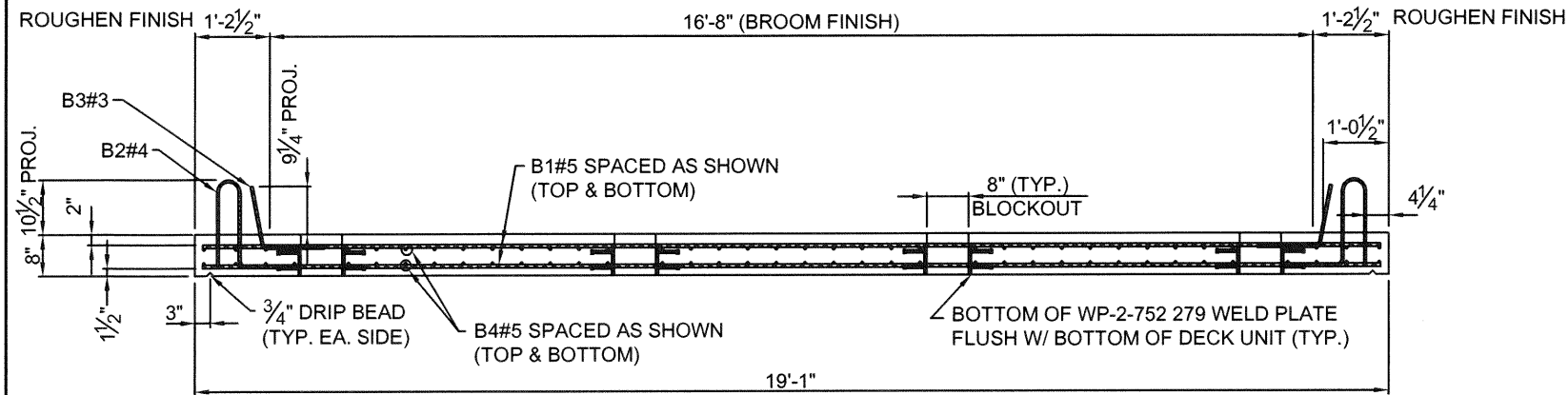
5/30/23

REVISION		QUALITY CONTROL		<div>CONTECH ENGINEERED SOLUTIONS LLC www.ContechES.com 400 Industrial Park Drive, Pelham, Alabama 35124 Main Office: 205-663-4681</div>	<div>OLIN CHEMICAL PLANT WRIGHT BROTHERS CONST. CROSS SECTION A-A & ABUTMENT</div>	P.I. No.:	CONTECH No.:	DATE:
		POUR #				752 279	05/30/23	
		MARK #				DESIGNED:	DRAWN:	
		GIRDER #				D.R.H.	J.A.E.	
		DATE:				CHECKED:	SHEET NO.:	
		CKD:		DRH	4 OF 15			
				APPROVED: 				

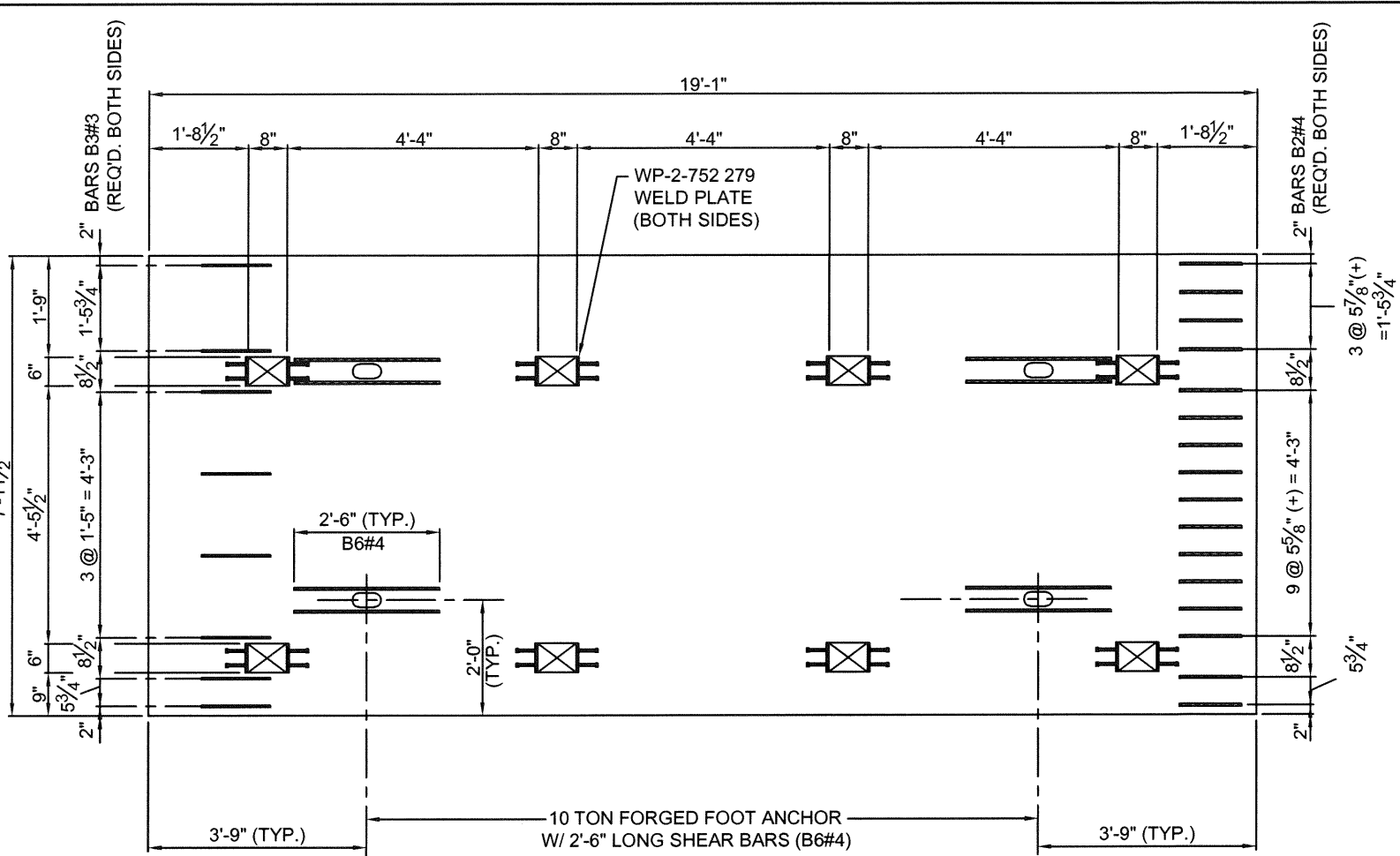


PLAN VIEW (SLAB REINFORCEMENT)

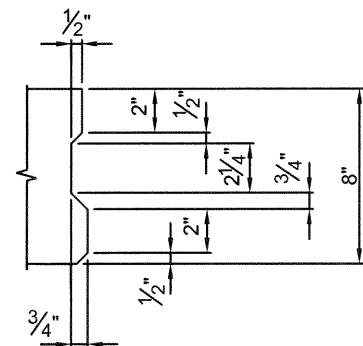
QTY.	MARK #
2	DU-752 279-1



CROSS SECTION A-A



PLAN VIEW (BARRIER REINFORCEMENT)



KEYWAY DETAIL

REVIEW

REVIEWED BY: A. O'Connor
CHECKED BY: A. Saha & P. Austin
DATE: 06-01-2023

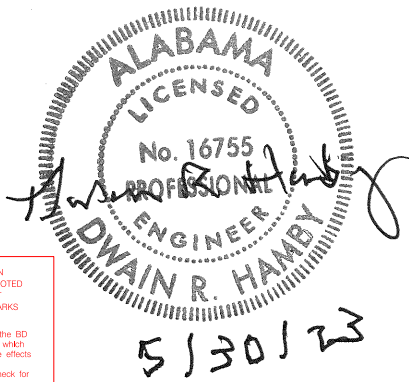
NO EXCEPTIONS TAKEN
MAKE CORRECTIONS NOTED
AMEND AND RESUBMIT
REJECTED - SEE REMARKS

The Engineer of Record's review of the shop drawings is for conformity of the requirements of the BD Documents and to the intent of the design. The Engineer of Record's review of shop drawings, which includes means, methods, techniques, sequences, and construction procedures is limited to the effects on the permanent works. The Engineer of Record's review of submittals, which includes means, methods, techniques, sequences, and construction procedures, does not include an in-situ check for the ability to perform the work in a safe and efficient manner.

ENGINEER OF RECORDS
DATE: 06-01-2023

WSP USA
3340 Peachtree Road, NE
Suite 2400, Tower Place 100
Atlanta, Ga 30326 (404) 237-2115

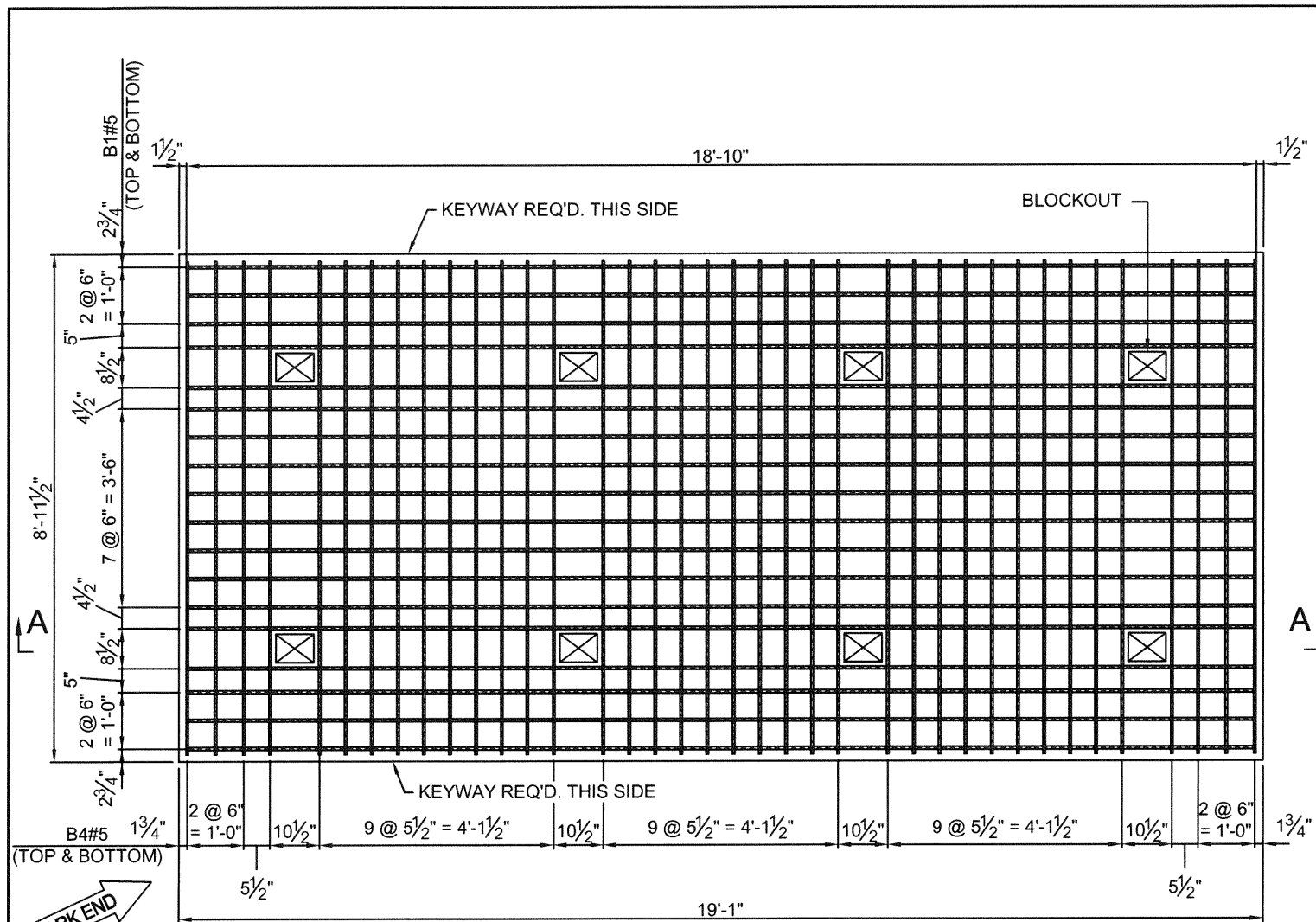
WSP USA



SPECIAL NOTES

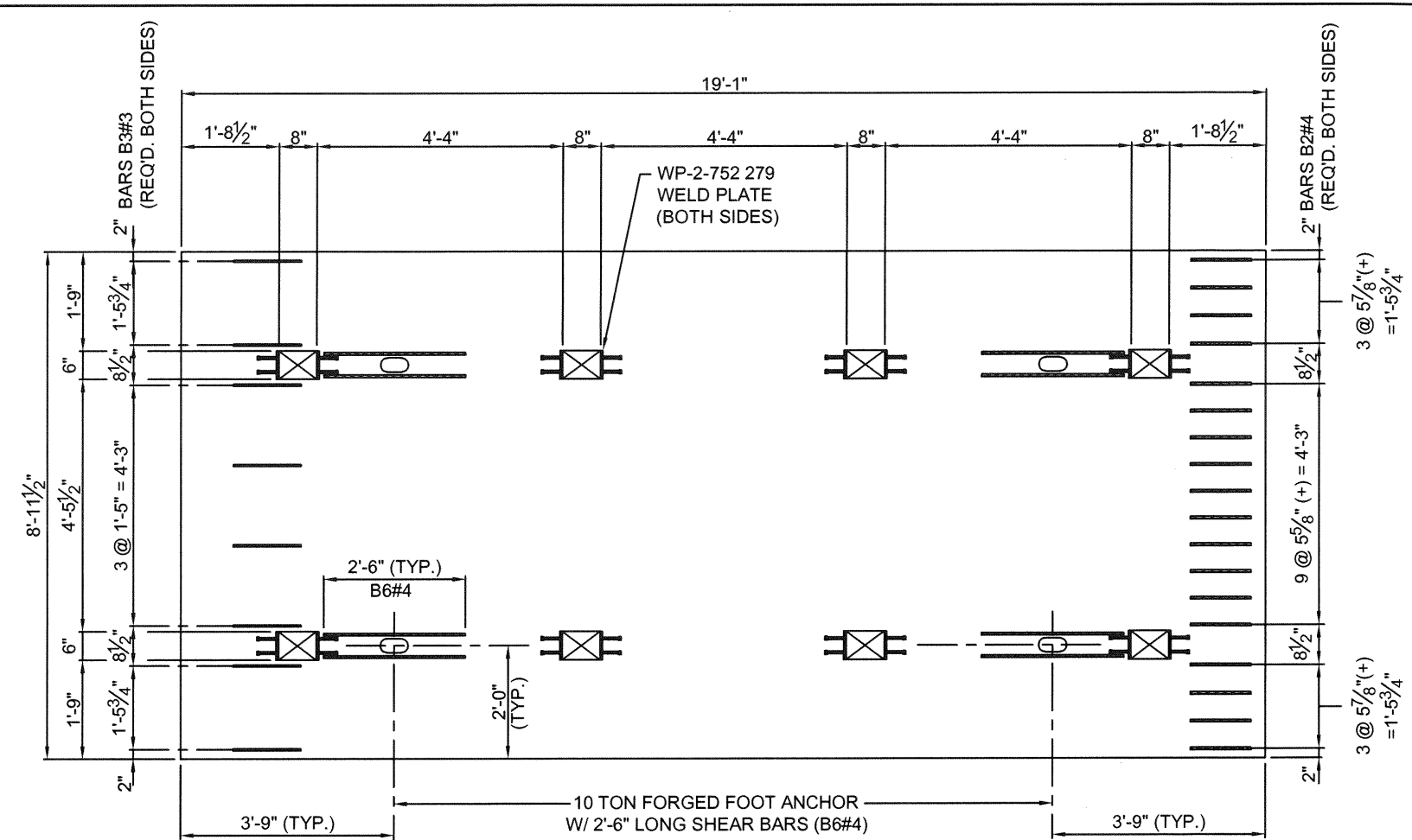
1. CONCRETE STRENGTH SHALL BE 3,500 PSI MIN. (STRIPPING).
2. CONCRETE STRENGTH SHALL BE 6,000 PSI MIN. @ 28 DAYS.

REVISION		QUALITY CONTROL		<div>CONTECH ENGINEERED SOLUTIONS LLC www.ContechES.com 400 Industrial Park Drive, Pelham, Alabama 35124 Main Office: 205-663-4681</div>	<div>OLIN CHEMICAL PLANT WRIGHT BROTHERS CONST. DECK UNIT DETAILS</div>		P.I. No.:	CONTECH No.:	DATE:
		POUR #					752 279	05/30/23	
		MARK #					DESIGNED:	DRAWN:	
		GIRDER #					D.R.H.	J.A.E.	
DATE:		CKD:	CHECKED:				SHEET NO.:	DRH	5
				APPROVED:					

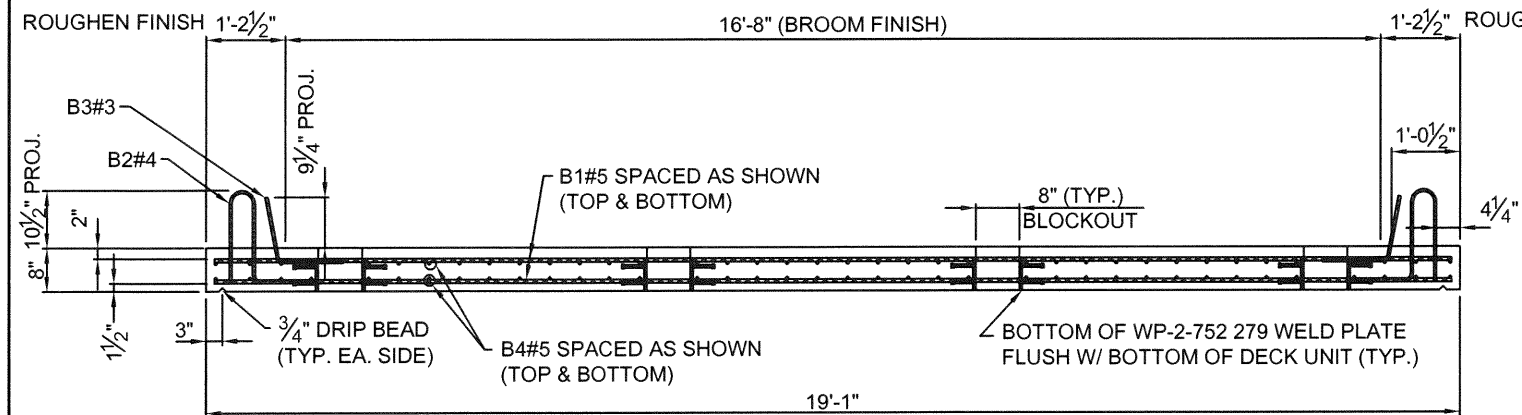


PLAN VIEW (SLAB REINFORCEMENT)

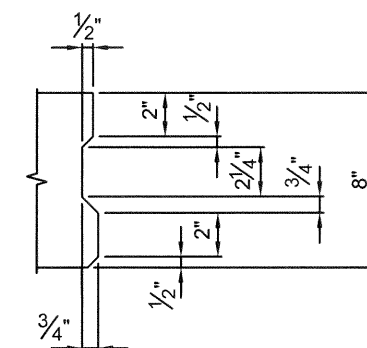
QTY.	MARK #
8	DU-752 279-2



PLAN VIEW (BARRIER REINFORCEMENT)



CROSS SECTION A-A



KEYWAY DETAIL

REVIEW

REVIEWED BY: A. O'Connor
CHECKED BY: A. Saha & P. Austin
DATE: 06-01-2023

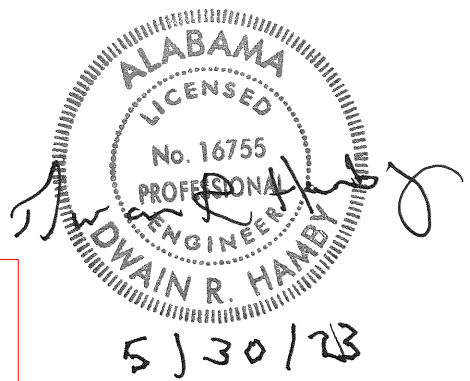
☒ NO EXCEPTIONS TAKEN
☐ MAKE CORRECTIONS NOTED
☐ AMEND AND RESUBMIT
☐ REJECTED - SEE REMARKS

The Engineer of Record's review of the shop drawings is for conformity of the requirements of the BD Documents and to the intent of the design. The Engineer of Record's review of shop drawings, which includes means, methods, techniques, sequences, and construction procedures, is limited to the effects on the permanent work. The Engineer of Record's review of submittals, which includes means, methods, techniques, sequences, and construction procedures, does not include an in-depth check for the ability to perform the work in a safe or efficient manner.

ENGINEER OF RECORD: *[Signature]* DATE: 06-01-2023

WSP USA
3340 Peachtree Road, NE
Suite 2400, Tower Plaza 100
Atlanta, Ga 30326 (404) 237-2115

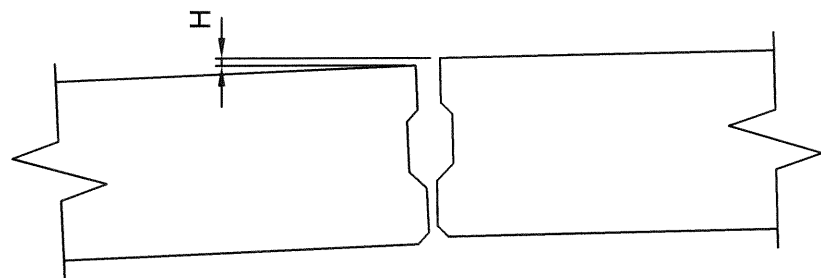
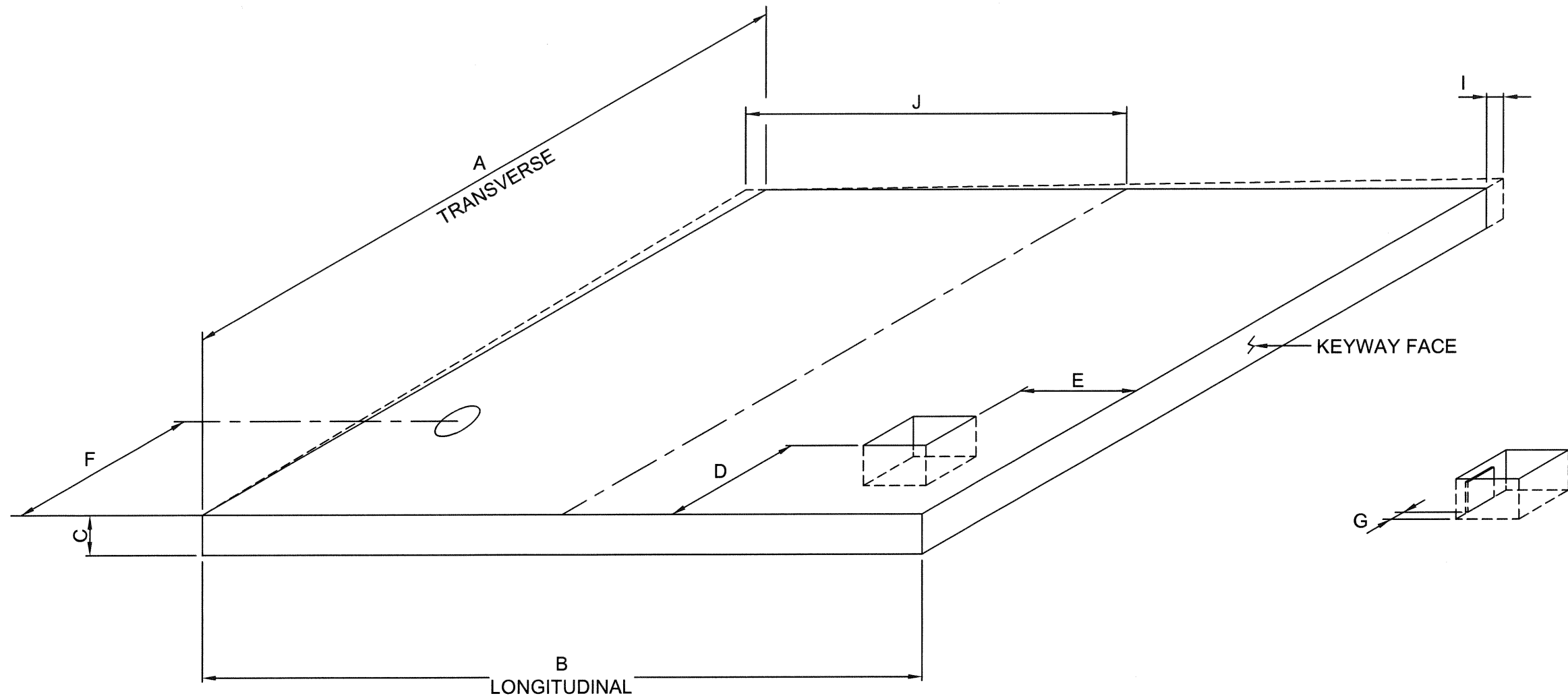
WSP USA



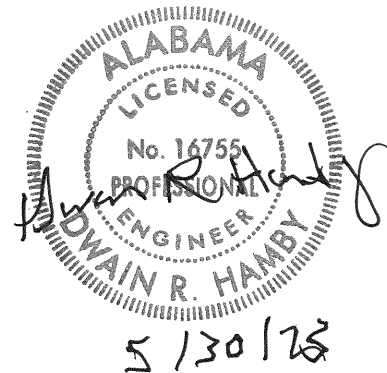
SPECIAL NOTES

1. CONCRETE STRENGTH SHALL BE 3,500 PSI MIN. (STRIPPING).
2. CONCRETE STRENGTH SHALL BE 6,000 PSI MIN. @ 28 DAYS.

REVISION	QUALITY CONTROL	CONTECH ENGINEERED SOLUTIONS LLC www.ContechES.com 400 Industrial Park Drive, Pelham, Alabama 35124 Main Office: 205-663-4681	OLIN CHEMICAL PLANT WRIGHT BROTHERS CONST. DECK UNIT DETAILS		P.I. No.: 752 279	DATE: 05/30/23
	POUR #		DESIGNED: D.R.H.	DRAWN: J.A.E.		
	MARK #		CHECKED: DRH	SHEET NO.: 6 OF 15		
	GIRDER #		APPROVED: <i>[Signature]</i>			
	DATE:		CKD:			



REVIEW	
REVIEWED BY: A. O'Connor	<input checked="" type="checkbox"/> NO EXCEPTIONS TAKEN
CHECKED BY: A. Saha & P. Austin	<input type="checkbox"/> MAKE CORRECTIONS NOTED
DATE: 06-01-2023	<input type="checkbox"/> AMEND AND RESUBMIT
	<input type="checkbox"/> REJECTED - SEE REMARKS
<p>The Engineer of Record's review of the shop drawings is for conformity of the requirements of the BD Documents and to the intent of the design. The Engineer of Record's review of shop drawings, which includes means, methods, techniques, sequences and construction procedures, is limited to the effects on the permanent works. The Engineer of Record's review of submittal which includes means, methods, techniques, sequences and construction procedures, does not include an in-depth check for the ability to perform the Work in a safe or efficient manner.</p>	
<p>WSP USA 3340 Peachtree Road, NE Suite 2400, Tower Place 100 Atlanta, GA 30326 (404) 237-2115</p>	<p>DATE: 06-01-2023</p> <p>WSP USA</p>



PRECAST CONCRETE DECK PANEL TOLERANCES

- A. LENGTH (TRANSVERSE): $\pm \frac{1}{2}$ "
- B. WIDTH (LONGITUDINAL): $\pm \frac{1}{4}$ "
- C. DEPTH (OVERALL): $\pm \frac{1}{4}$ "
- D. POSITION OF BLOCKOUTS (TRANSVERSE): $\pm \frac{1}{4}$ "
- E. POSITION OF BLOCKOUTS (LONGITUDINAL): $\pm \frac{1}{4}$ "
- F. POSITION OF HANDLING DEVICES: ± 3 "
- G. POSITION OF WELD PLATES: $\pm \frac{1}{4}$ "
- H. DIFFERENTIAL VERTICAL OFFSET BETWEEN ADJACENT MEMBERS: $\frac{1}{4}$ "
- I. SQUARENESS OF ENDS: $\pm \frac{1}{4}$ "
- J. ALIGNMENT (DEVIATION FROM STRAIGHT LINE PARALLEL TO CENTERLINE OF MEMBER): $\pm \frac{1}{4}$ "

REVISION	QUALITY CONTROL
	POUR #
	MARK #
	GIRDER #
DATE:	CKD:



OLIN CHEMICAL PLANT
WRIGHT BROTHERS CONST.
DECK UNIT TOLERANCES

P.I. No.:	CONTECH No.:	DATE:
	752 279	05/30/23
DESIGNED:	D.R.H.	DRAWN:
		J.A.E.
CHECKED:	DRH	SHEET NO.:
		7 OF 15
APPROVED:		

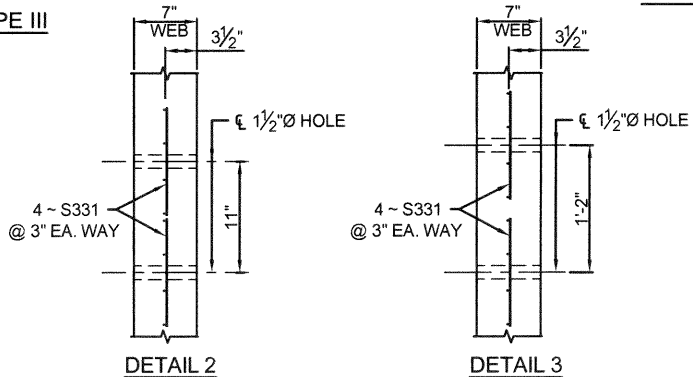
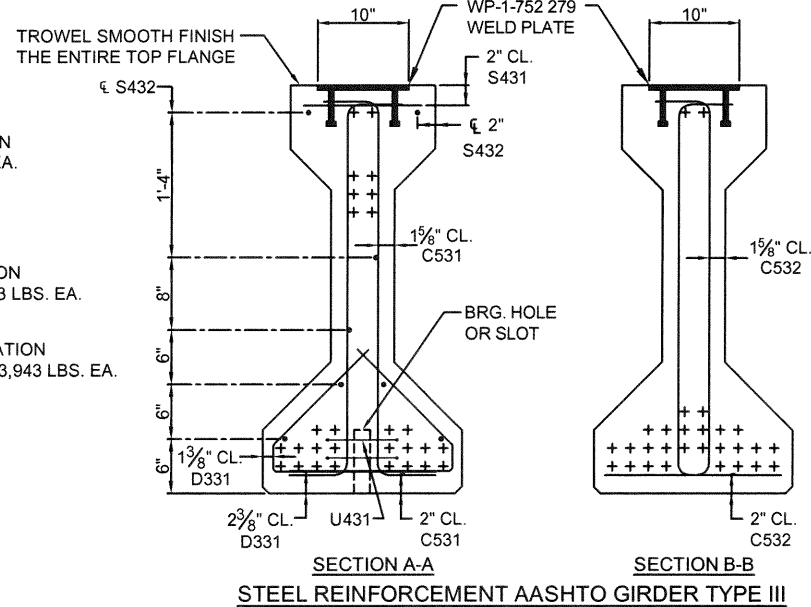
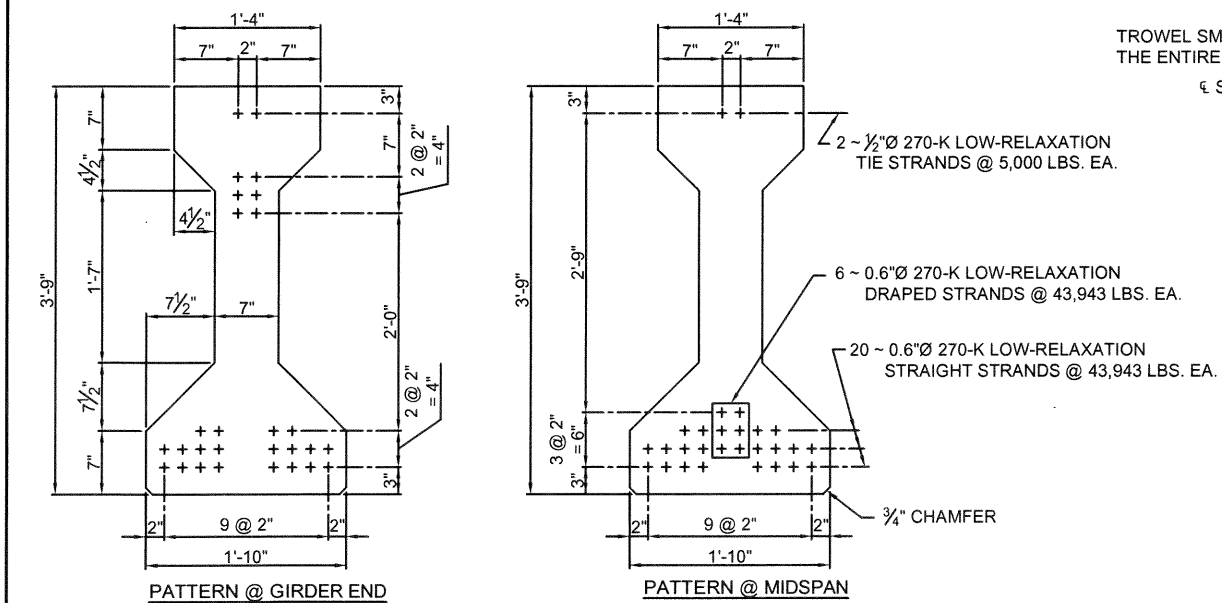
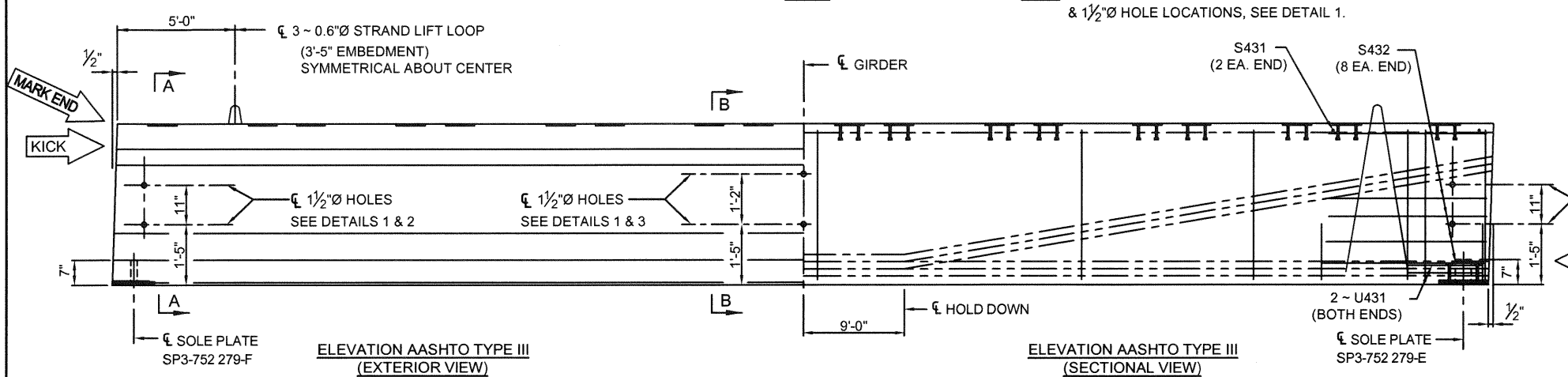
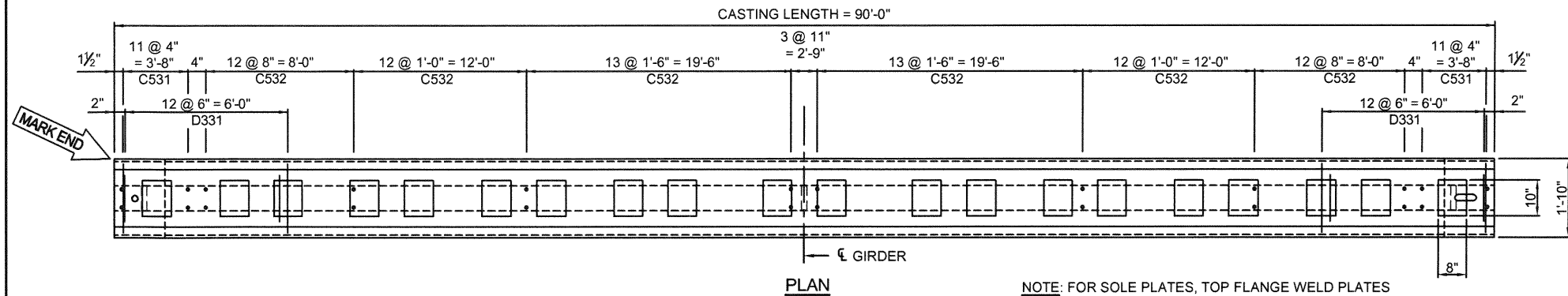
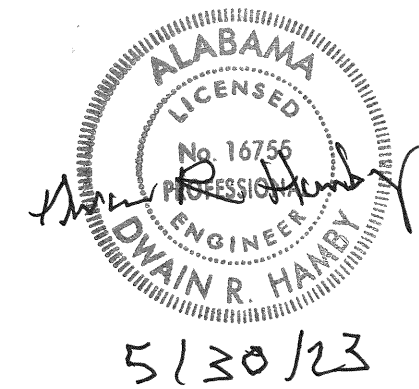
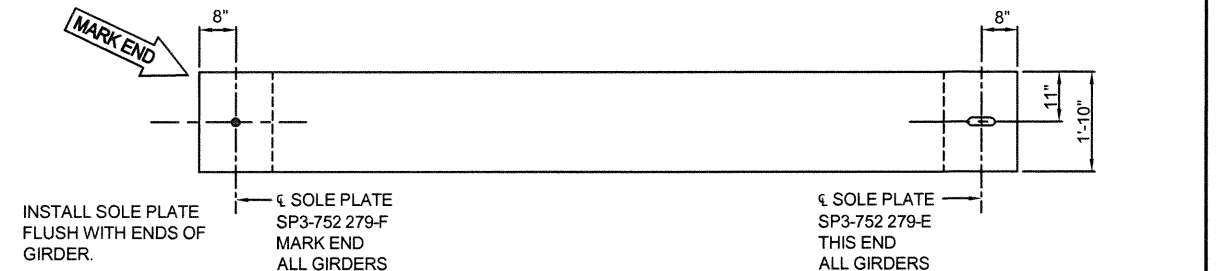
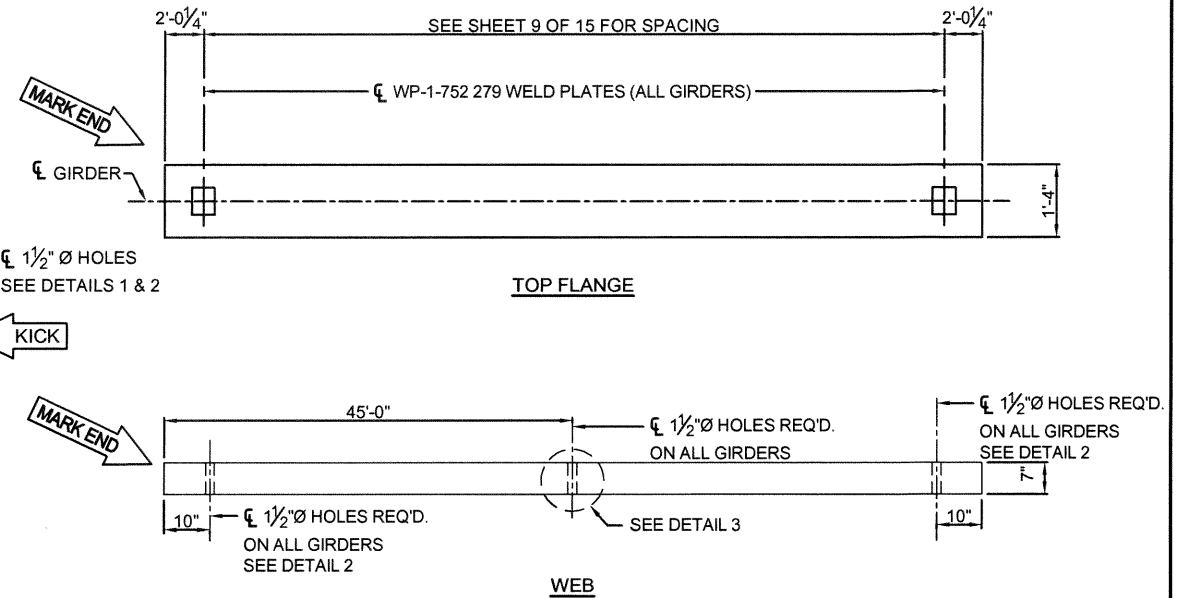


TABLE OF DIMENSIONS							
QTY.	MARK #	HORIZONTAL IN PLACE PLAN DIMENSION	SLOPE ADJUST in. (+)	BEAM SHORTENING SHRINKAGE & END ROTATION in. (+)	"L" CASTING LENGTH	BEAM SHORTENING SHRINKAGE & END ROTATION in. (-)	IN PLACE "L"
4	T3-752 279-1	89'-11 1/2"	1/16"	7/16"	90'-0"	7/16"	89'-11 9/16"



REVIEW		NO EXCEPTIONS TAKEN
REVIEWED BY: A. O'Connor	MAKE CORRECTIONS NOTED	
CHECKED BY: A. O'Connor	AMEND AND RESUBMIT	
DATE: 06-01-2023	REJECTED - SEE REMARKS	
The Engineer of Record's review of the shop drawings is for conformity of the requirements of the RD Documents and to the intent of the design. The Engineer of Record's review of shop drawings, which includes means, methods, techniques, sequences and construction procedures is limited to the effects on the permanent works. The Engineer of Record's review of submittals which includes means, methods, techniques, sequences and construction procedures, does not include an in-depth check for the ability to perform the Work in a safe or efficient manner.		
ENGINEER OF RECORD: [Signature]	DATE: 06-01-2023	
WSP USA 3540 Peachtree Road, NE Suite 2400, Tower Place 100 Atlanta, GA 30326 (404) 231-2115		

WSP USA

SPECIAL NOTES

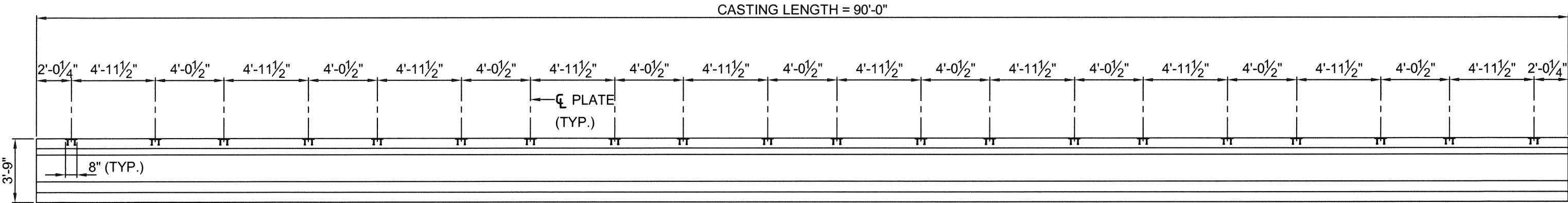
1. CONCRETE STRENGTH SHALL BE 7,500 PSI MIN. @ RELEASE.
 2. CONCRETE STRENGTH SHALL BE 8,500 PSI MIN. @ 28 DAYS.
 3. CUT STRANDS FLUSH WITH END OF GIRDER AND COAT EACH END WITH AN APPROVED EPOXY MORTAR.
 4. ESTIMATED BEAM CAMBER AT ERECTION: 2 15/16"
- ESTIMATED BEAM CAMBER AFTER APPLIED DEAD LOADS: 1 1/2"

REVISION	QUALITY CONTROL
	POUR #
	MARK #
	GIRDER #
DATE:	CKD:

CONTECH
ENGINEERED SOLUTIONS LLC
www.ContechES.com
400 Industrial Park Drive, Pelham, Alabama 35124
Main Office: 205-663-4681

OLIN CHEMICAL PLANT
WRIGHT BROTHERS CONST.
TYPE III GIRDER DETAILS

P.I. No.: 752 279	DATE: 05/30/23
DESIGNED: D.R.H.	DRAWN: J.A.E.
CHECKED: DRH	SHEET NO.: 8 OF 15
APPROVED: [Signature]	



ELEVATION VIEW TYPE III GIRDER WP-1-752 279 WELD PLATE LOCATIONS

REVIEW

REVIEWED BY: A. O'Connor

CHECKED BY: A. Saha & P. Austin

DATE: 06-01-2023

☒ NO EXCEPTIONS TAKEN

☐ MAKE CORRECTIONS NOTED

☐ AMEND AND RESUBMIT

☐ REJECTED - SEE REMARKS

The Engineer of Record's review of the shop drawings is for conformity of the requirements of the BD Documents and to the intent of the design. The Engineer of Record's review of shop drawings, which includes means, methods, techniques, sequences and construction procedures, is limited to the effects on the permanent works. The Engineer of Record's review of substantial, which includes means, methods, techniques, sequences and construction procedures, does not include an in-depth check for the ability to perform the Work in a safe or efficient manner.

06-01-2023

ENGINEER OF RECORDS

WSP USA

3340 Peachtree Road, NE

Suite 2400, Tower Place 100

Atlanta, GA 30326 (404) 237-2115

WSP USA

ALABAMA

LICENSED

No. 16755

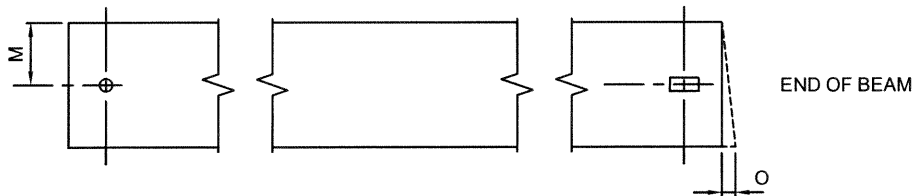
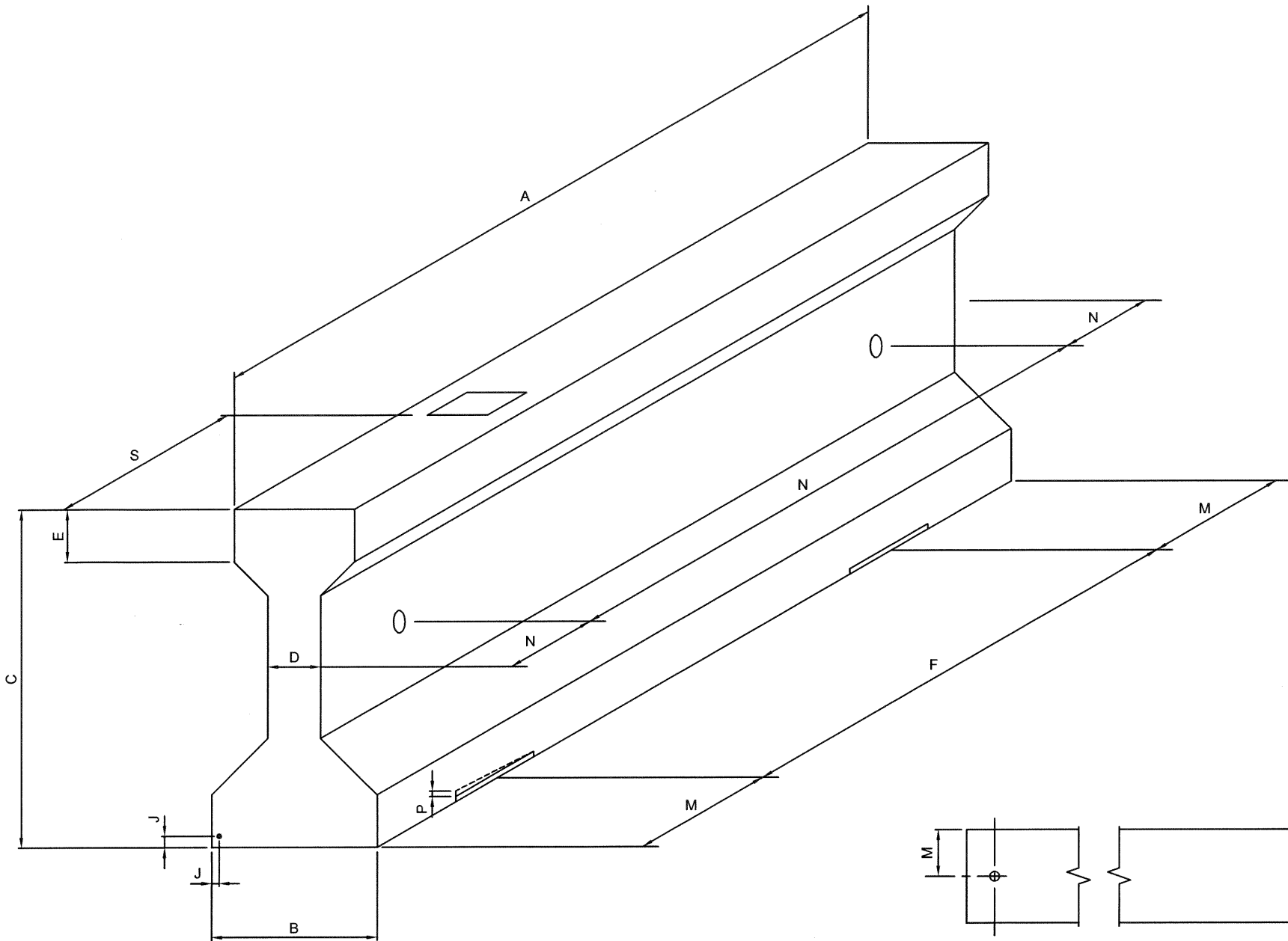
PROFESSIONAL

ENGINEER

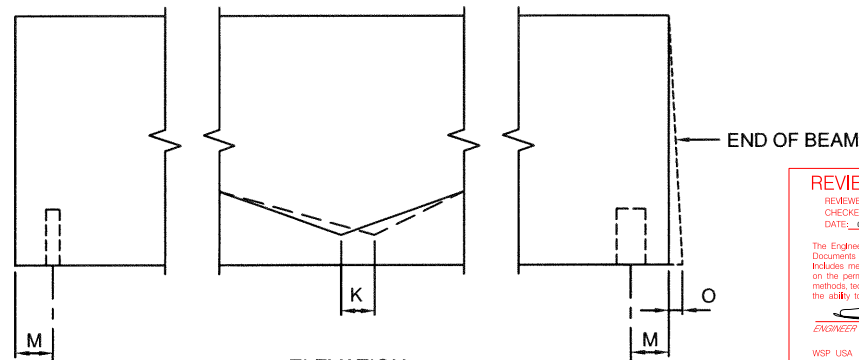
DWAIN R. HAMBY

5/30/23

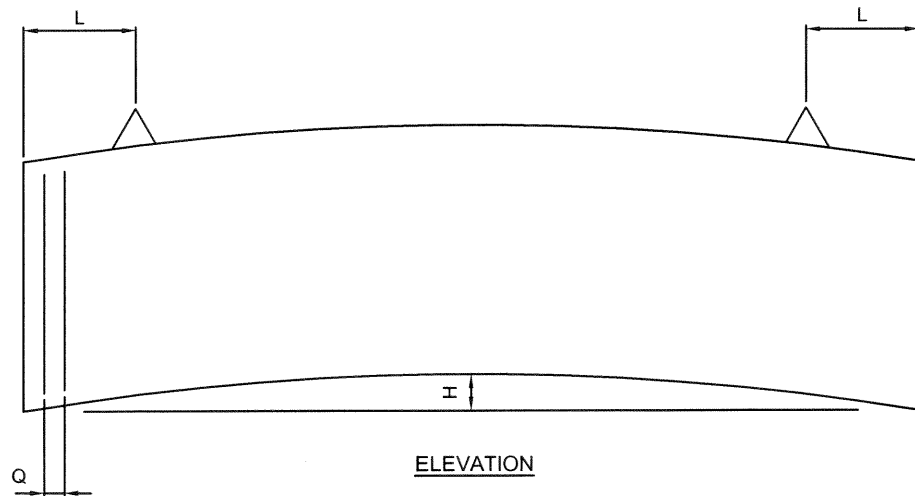
REVISION		QUALITY CONTROL		<div>CONTECH[®]</div> <div>ENGINEERED SOLUTIONS LLC</div> <div>www.ContechES.com</div> <div>400 Industrial Park Drive, Pelham, Alabama 35124</div> <div>Main Office: 205-663-4681</div>	OLIN CHEMICAL PLANT		P.I. No.:	CONTECH No.:	DATE:	
		POUR #			WRIGHT BROTHERS CONST.		DESIGNED:	752 279	05/30/23	
		MARK #			TYPE III GIRDER		D.R.H.		J.A.E.	
		GIRDER #			8"X10" WELD PLATE LOCATIONS		CHECKED:	DRH	SHEET NO.:	
		DATE:	CKD:				APPROVED:		9 OF 15	



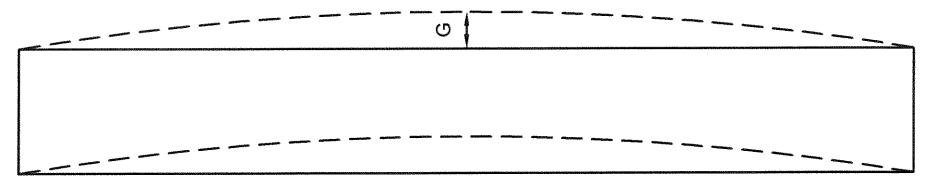
PLAN



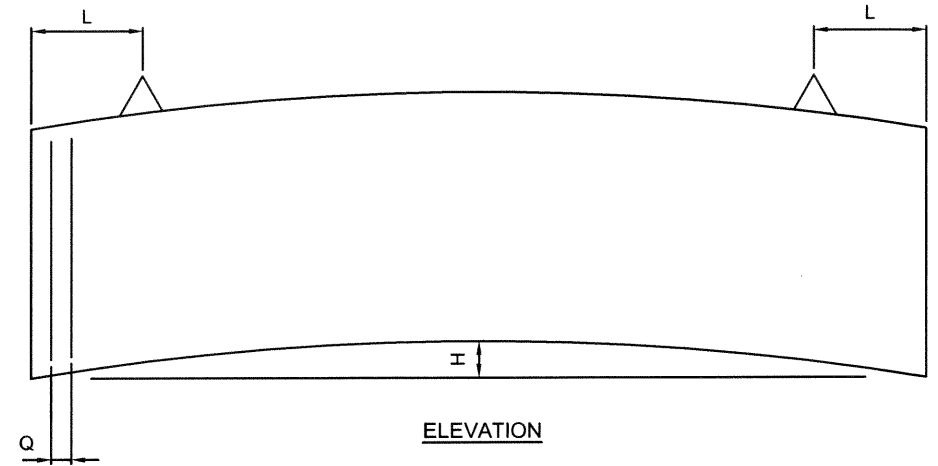
ELEVATION



ELEVATION



PLAN



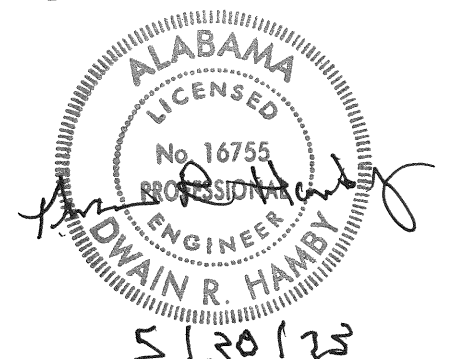
ELEVATION

PRESTRESSED BEAM TOLERANCES

- A. LENGTH: $\pm \frac{1}{4}$ " PER 25 FT. 1" MAX.
- B. WIDTH FLANGES AND FILLETS: $+\frac{3}{8}$ ", $-\frac{1}{4}$ "
- C. DEPTH OVERALL: $+\frac{1}{2}$ ", $-\frac{1}{4}$ "
- D. WIDTH OF WEB: $+\frac{3}{8}$ ", $-\frac{1}{4}$ "
- E. DEPTH FLANGE AND FILLETS: $\pm \frac{1}{4}$ "
- F. BEARING PLATES (CENTER TO CENTER): $\pm \frac{1}{4}$ " PER 25 FT., 1" MAX.
- G. HORIZONTAL ALIGNMENT
(DEVIATION FROM STRAIGHT LINE PARALLEL TO CENTERLINE OF MEMBER)
1" FOR 60' - 100' LENGTHS
- H. CAMBER DEVIATION FROM DESIGN CAMBER: $\pm \frac{1}{8}$ "
- J. TENDON POSITION: $\pm \frac{1}{4}$ " C.G. OF STRND GROUP & INDIVIDUAL TENDONS.
- K. POSITION OF DEFLECTION PTS. FOR DEFLECTED STRAND: ± 6 "
- L. POSITION OF HANDLING DEVICES: ± 6 "
- M. BEARING PLATES, BEARING HOLES AND BEARING SLOTS (CENTER TO END OF BEAM AND CENTER TO EDGE OF BEAM): $\pm \frac{1}{4}$ "
- N. $1\frac{1}{2}$ " Ø DIAPHRAGM BOLT-UP HOLES (CENTER TO CENTER & CENTER TO END): ± 1 "
- O. EXPOSED BEAM ENDS (DEVIATION FROM SQUARE OR DESIGNATED SKEW)
HORIZONTAL: $\pm \frac{1}{4}$ " PER FT. OF BEAM WIDTH
VERTICAL: $\pm \frac{1}{8}$ " PER FT. OF BEAM DEPTH
- P. BEARING AREA DEVIATION FROM PLANE: $\pm \frac{1}{8}$ "
- Q. STIRRUP BARS (LONGITUDINAL SPACING): ± 1 "
- S. POSITION OF WELD PLATES: $\pm \frac{1}{2}$ "

REVIEW		<input checked="" type="checkbox"/> NO EXCEPTIONS TAKEN
REVIEWED BY: A. O'Connor	CHECKED BY: A. Saba & P. Austin	<input type="checkbox"/> MAKE CORRECTIONS NOTED
DATE: 06-01-2023		<input type="checkbox"/> AMEND AND RESUBMIT
		<input type="checkbox"/> REJECTED - SEE REMARKS
<p>The Engineer of Record's review of the shop drawings is for conformity of the requirements of the BD Documents and to the intent of the design. The Engineer of Record's review of shop drawings, which includes means, methods, techniques, sequences and construction procedures is limited to the effects on the permanent works. The Engineer of Record's review of submittal which includes means, methods, techniques, sequences and construction procedures, does not include an in-depth check for the ability to perform the Work in a safe or efficient manner.</p>		
<p>WSP USA 5340 Peachtree Road, NE Suite 2400, Tower Place 100 Atlanta, Ga 30326 (404) 231-2115</p>		<p>DATE: 06-01-2023</p>

WSP USA

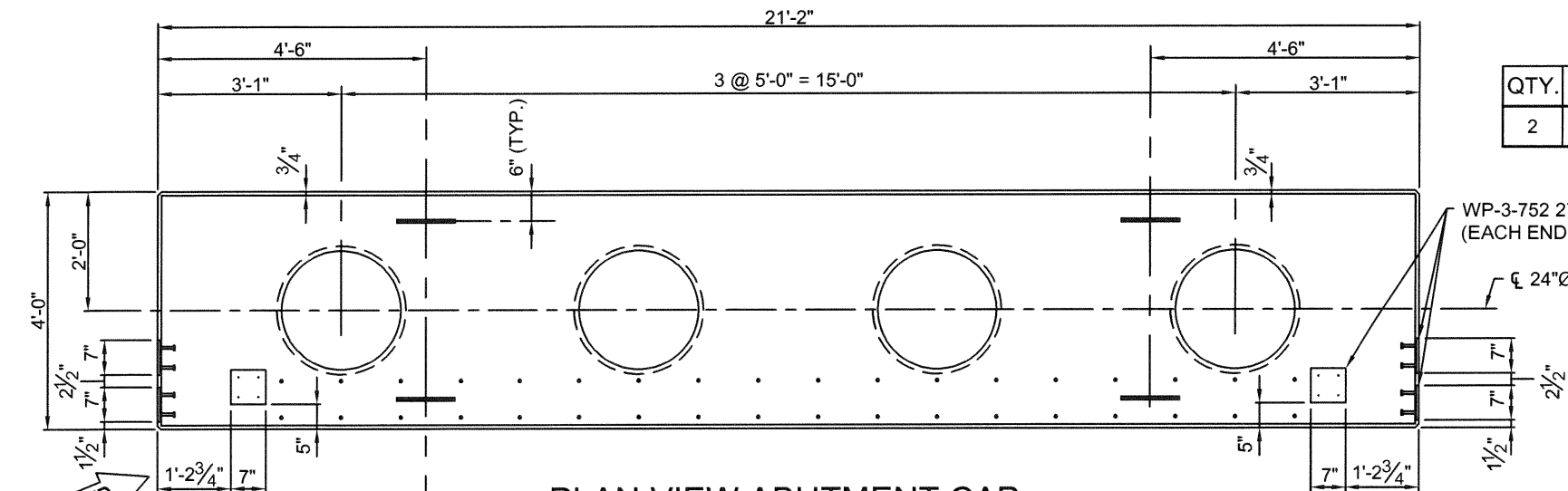


REVISION	QUALITY CONTROL
	POUR #
	MARK #
	GIRDER #
DATE:	CKD:

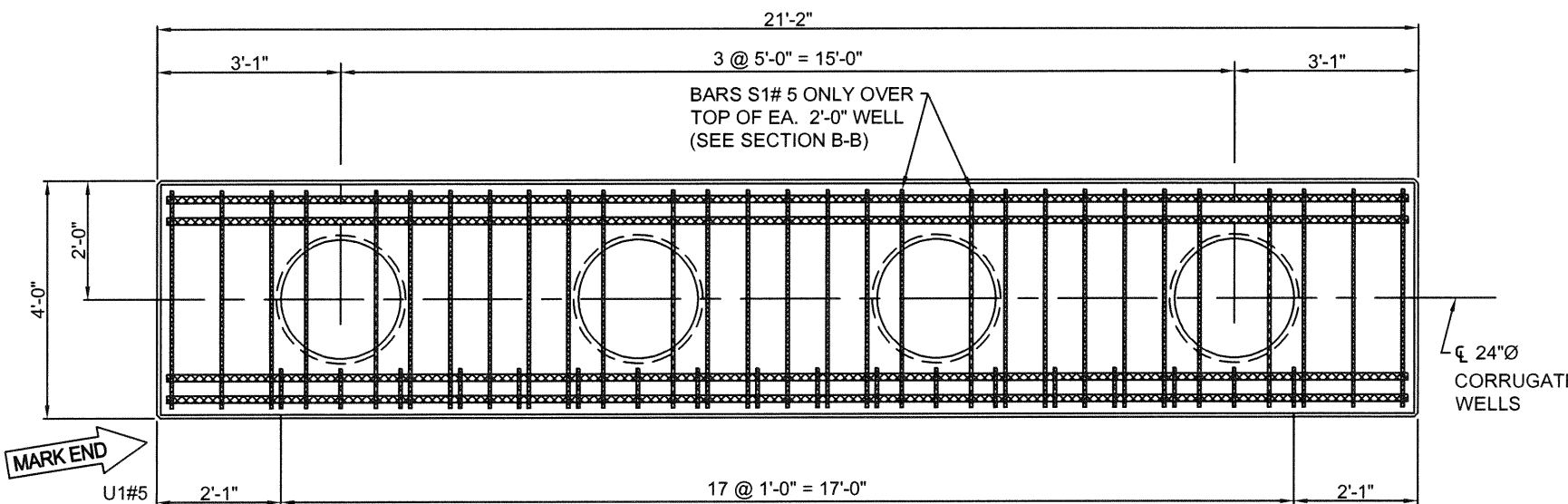
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OLIN CHEMICAL PLANT
WRIGHT BROTHERS CONST.
TYPE III GIRDER TOLERANCES

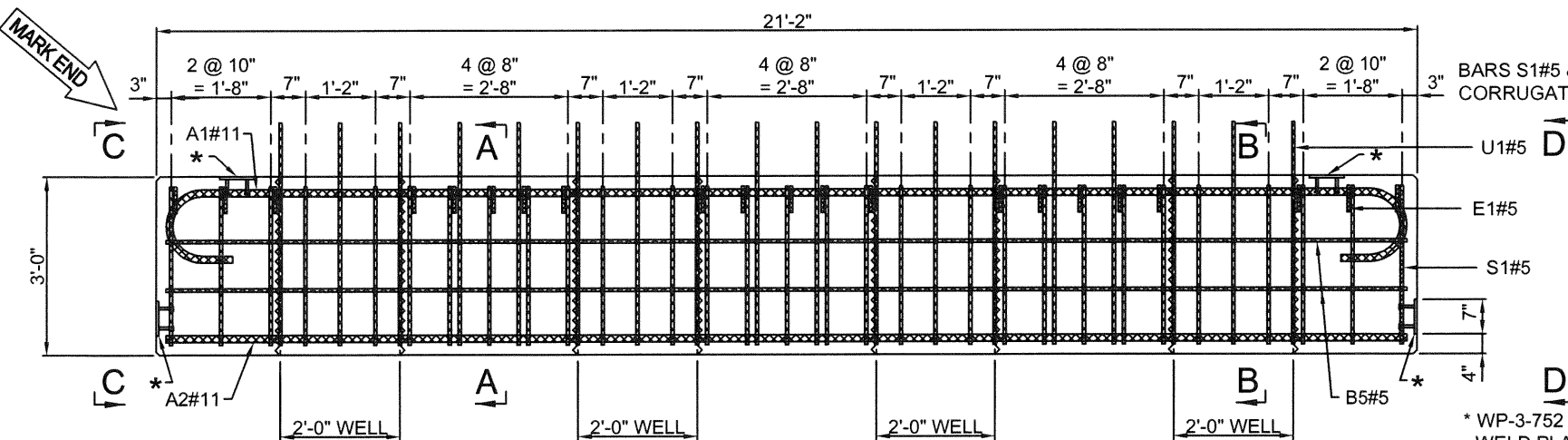
P.I. No.:	CONTECH No.:	DATE:
	752 279	05/30/23
DESIGNED:	D.R.H.	DRAWN:
		J.A.E.
CHECKED:	DRH	SHEET NO.:
		10 OF 15
APPROVED:		



PLAN VIEW ABUTMENT CAP

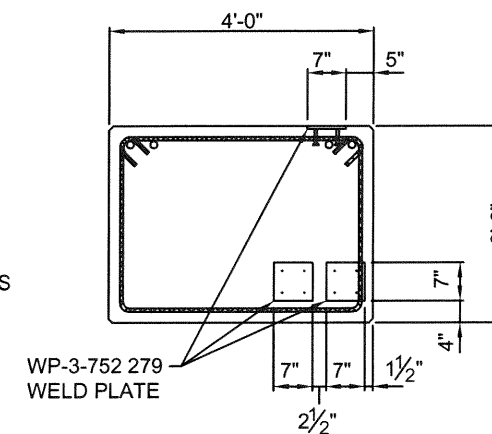


PLAN VIEW ABUTMENT CAP (REINFORCEMENT)

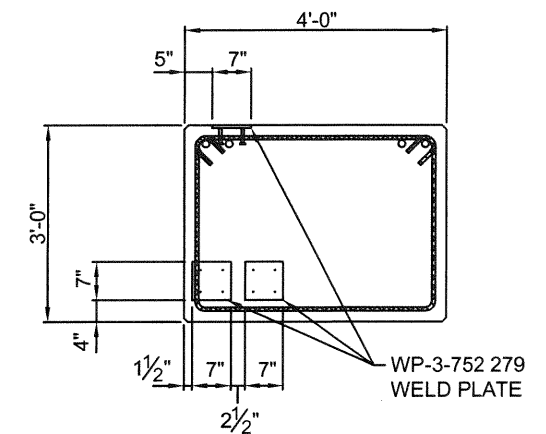


ELEVATION VIEW ABUTMENT CAP (REINFORCEMENT)

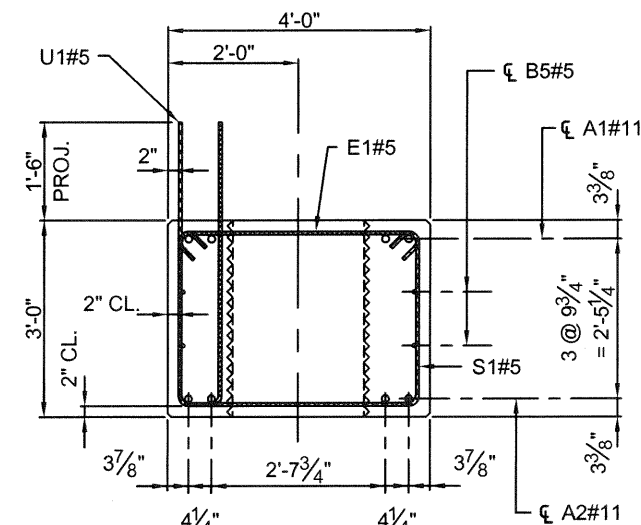
QTY.	MARK #
2	AC-752 279-1



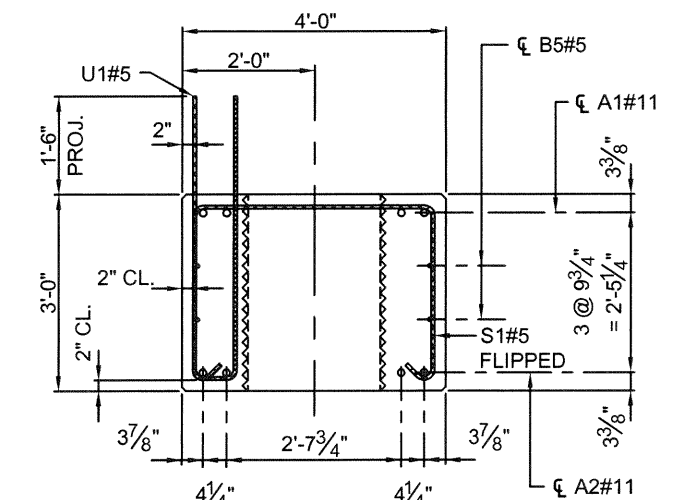
END VIEW C-C



END VIEW D-D

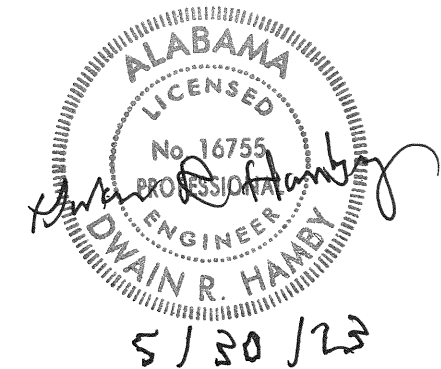


SECTION A-A



SECTION B-B

REVIEW	
REVIEWED BY: A. O'Connor	<input checked="" type="checkbox"/> NO EXCEPTIONS TAKEN
CHECKED BY: A. Saha & P. Austin	<input checked="" type="checkbox"/> MAKE CORRECTIONS NOTED
DATE: 06-01-2023	<input checked="" type="checkbox"/> AMEND AND RESUBMIT
	<input checked="" type="checkbox"/> REJECTED - SEE REMARKS
<small>The Engineer of Record's review of the shop drawings is for conformity of the requirements of the BD Documents and to the intent of the design. The Engineer of Record's review of shop drawings, which includes means, methods, techniques, sequences and construction procedures is limited to the effects on the permanent works. The Engineer of Record's review of submittals which includes means, methods, techniques, sequences and construction procedures, does not include an in-depth check for the ability to perform the work in a safe or efficient manner.</small>	
ENGINEER OF RECORD	DATE: 06-01-2023
WSP USA 3340 Peachtree Road, NE Suite 2400, Tower Place 100 Atlanta, Ga. 30326 (404) 233-2115	
WSP USA	



SPECIAL NOTES

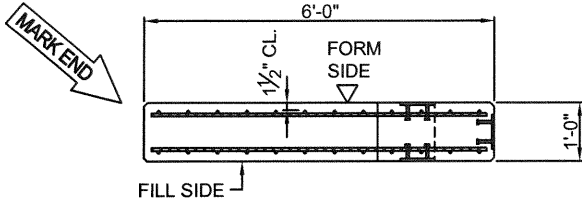
1. CONCRETE STRENGTH SHALL BE 3,500 PSI MIN. (STRIPPING).
2. CONCRETE STRENGTH SHALL BE 6,000 PSI MIN. @ 28 DAYS.

REVISION	QUALITY CONTROL
	POUR #
	MARK #
	GIRDER #
DATE:	CKD:

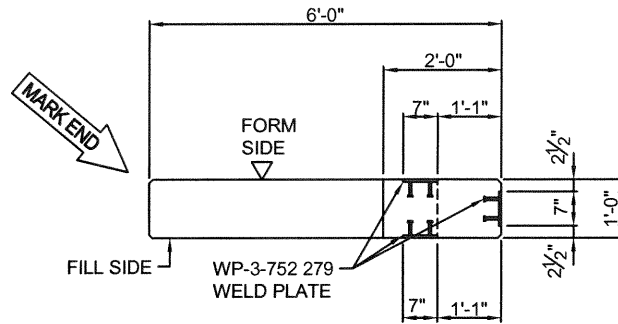
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400 Industrial Park Drive, Pelham, Alabama 35124
Main Office: 205-663-4681

OLIN CHEMICAL PLANT
WRIGHT BROTHERS CONST.
ABUTMENT CAP DETAILS

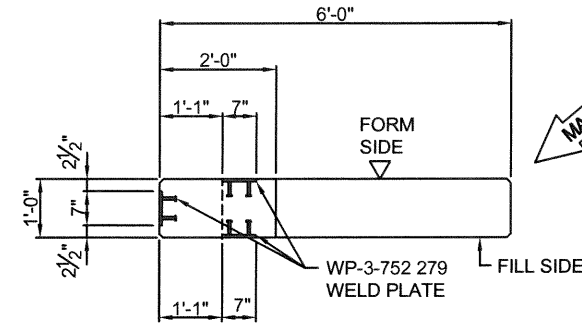
P.I. No.:	CONTECH No.:	DATE:
	752 279	05/30/23
DESIGNED:	DRAWN:	
D.R.H.	J.A.E.	
CHECKED:	SHEET NO.:	
DRH	11 OF 15	
APPROVED:		



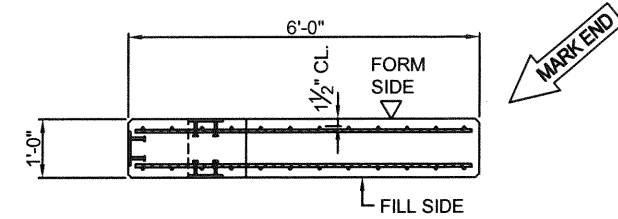
PLAN VIEW ABUTMENT WALL
(REINFORCEMENT)
AW-752 279-1L



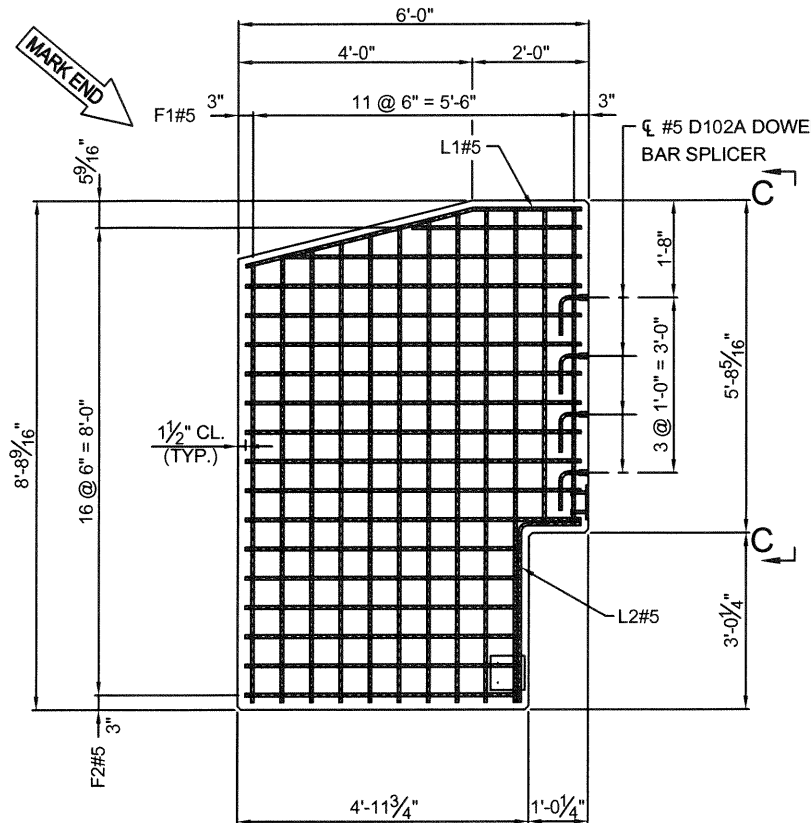
PLAN VIEW ABUTMENT WALL
AW-752 279-1L



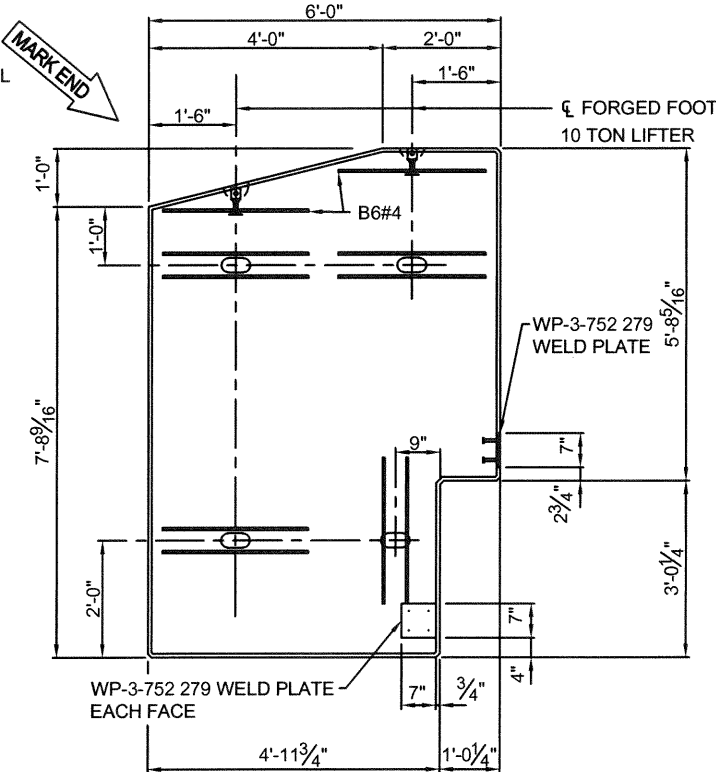
PLAN VIEW ABUTMENT WALL
AW-752 279-1R



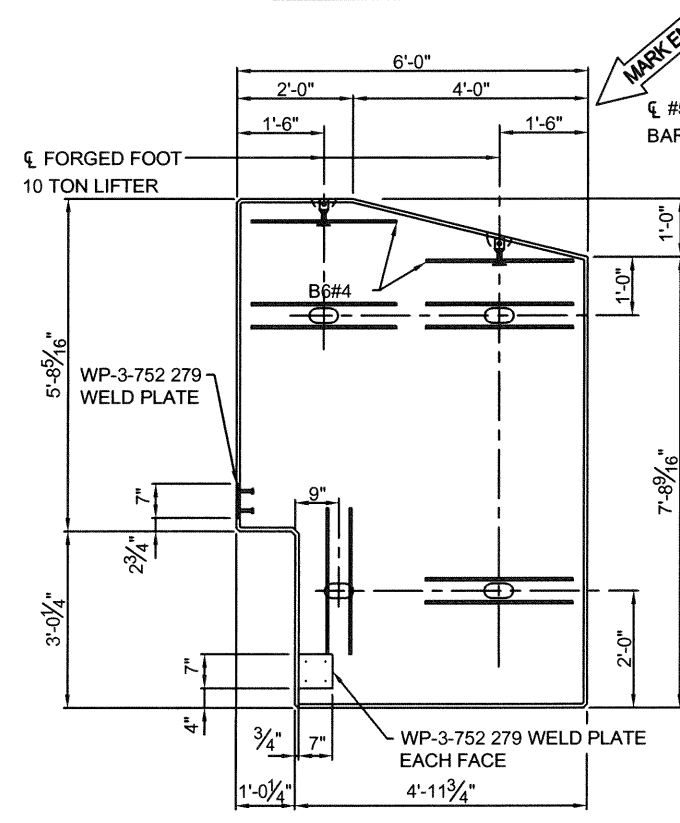
PLAN VIEW ABUTMENT WALL
(REINFORCEMENT)
AW-752 279-1R



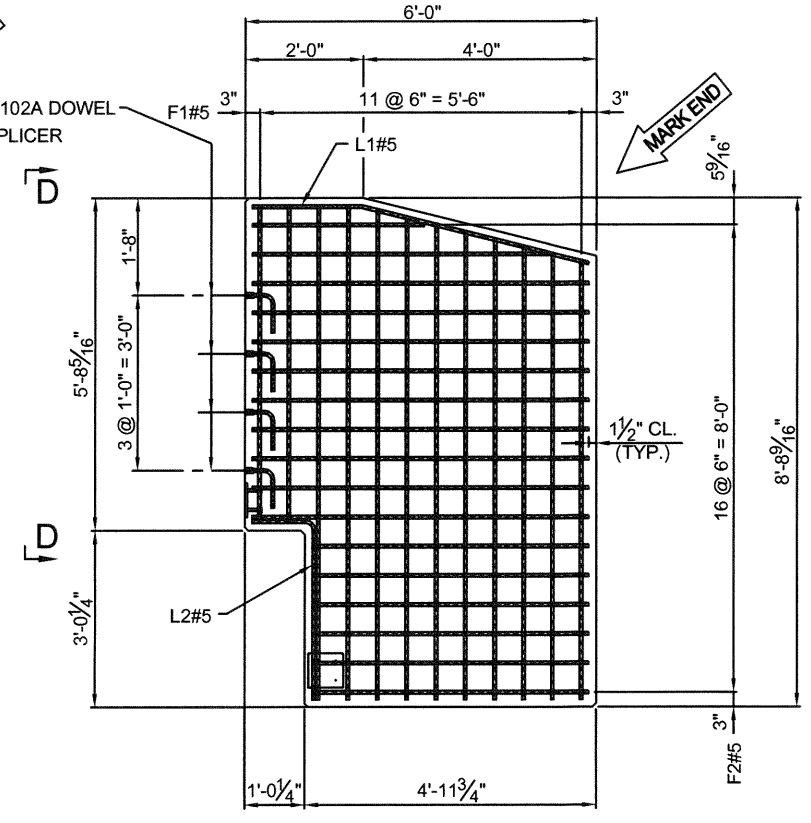
ELEVATION VIEW ABUTMENT WALL
(REINFORCEMENT)
AW-752 279-1L



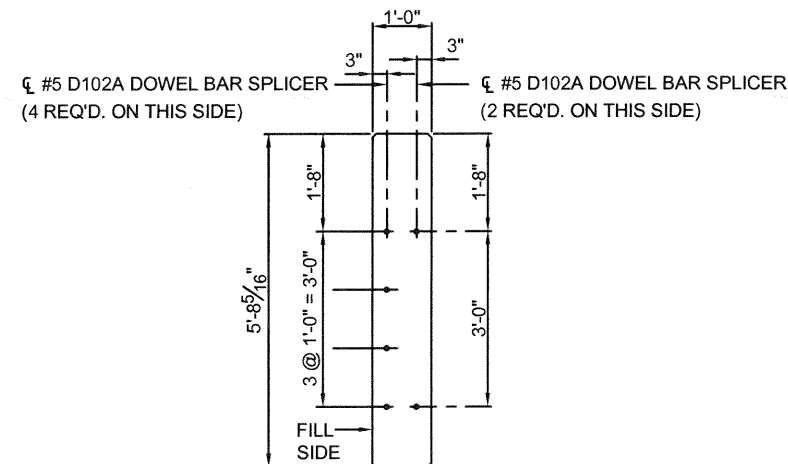
ELEVATION VIEW ABUTMENT WALL
AW-752 279-1L



ELEVATION VIEW ABUTMENT WALL
AW-752 279-1R



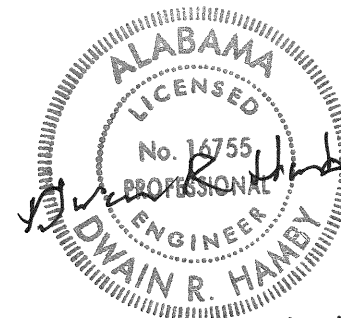
ELEVATION VIEW ABUTMENT WALL
(REINFORCEMENT)
AW-752 279-1R



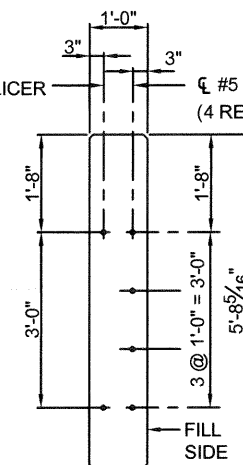
VIEW C-C

#5 D102A DOWEL BAR SPLICER
(2 REQ'D. ON THIS SIDE)

#5 D102A DOWEL BAR SPLICER
(4 REQ'D. ON THIS SIDE)



5130123



VIEW D-D

REVIEW	
REVIEWED BY: A. O'Connor	<input type="checkbox"/> NO EXCEPTIONS TAKEN
CHECKED BY: A. Saha & P. Austin	<input type="checkbox"/> MAKE CORRECTIONS NOTED
DATE: 06-01-2023	<input type="checkbox"/> AMEND AND RESUBMIT
	<input type="checkbox"/> REJECTED - SEE REMARKS

The Engineer of Record's review of the shop drawings is for conformity of the requirements of the BD Documents and to the intent of the design. The Engineer of Record's review of shop drawings, which includes means, methods, techniques, sequences, and construction procedures, is limited to the effects on the permanent works. The Engineer of Record's review of submittal, which includes means, methods, techniques, sequences, and construction procedures, does not include an in-depth check for the ability to perform the Work in a safe or efficient manner.

WSP USA
3340 Peachtree Road, NE
Suite 2400, Tower Place 100
Atlanta, Ga 30326 (404) 251-0115

WSP USA

SPECIAL NOTES

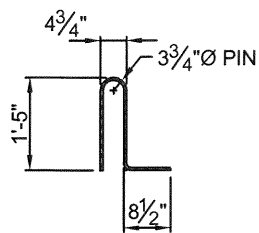
1. CONCRETE STRENGTH SHALL BE 3,500 PSI MIN. (STRIPPING).
2. CONCRETE STRENGTH SHALL BE 6,000 PSI MIN. @ 28 DAYS.
3. USE 4 EACH 10 TON LIFTERS PER PANEL TO STRIP PANEL FROM FORM.

REVISION	QUALITY CONTROL
	POUR #
	MARK #
	GIRDER #
DATE:	CKD:

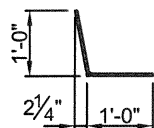
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ENGINEERED SOLUTIONS LLC
www.ContechES.com
400 Industrial Park Drive, Pelham, Alabama 35124
Main Office: 205-663-4681

OLIN CHEMICAL PLANT
WRIGHT BROTHERS CONST.
ABUTMENT WING WALLS

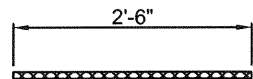
P.I. No.:	CONTECH No.:	DATE:
DESIGNED:	752 279	05/30/23
D.R.H.		
CHECKED:	DRAWN:	
DRH	J.A.E.	
APPROVED:	SHEET NO.:	
	12 OF 15	



B2#4
(352 REQ'D.)



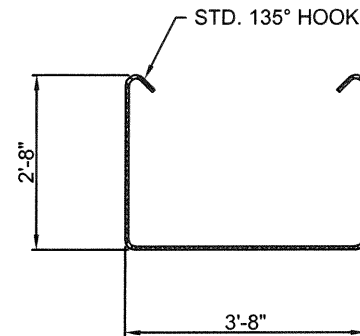
B3#3
(160 REQ'D.)



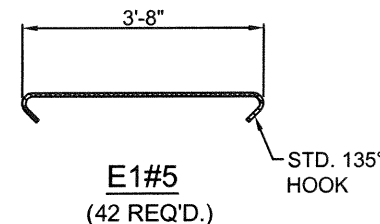
B6#4
2-SHEAR BARS
PER LIFTING INSERT
(128 REQ'D.)



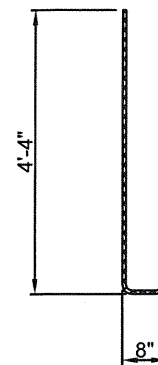
FORGE FOOT ANCHOR
10 TON 5 1/2" LONG
(DECK UNITS & WINGWALLS)
(64 REQ'D.)



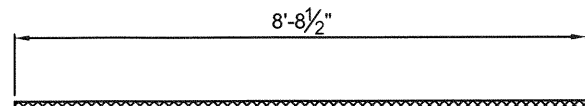
S1#5
(58 REQ'D.)



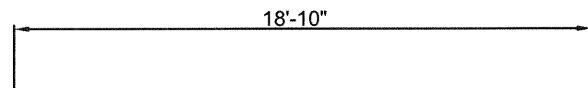
E1#5
(42 REQ'D.)



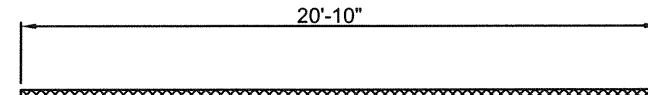
U1#5
(36 REQ'D.)



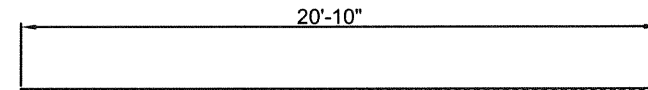
B4#5
(760 REQ'D.)



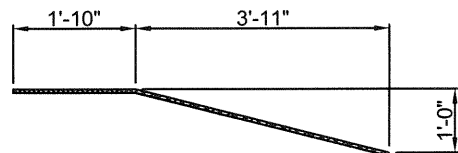
B1#5
(360 REQ'D.)



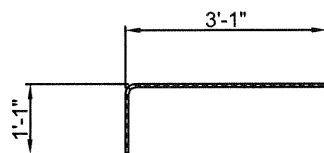
B5#5
(8 REQ'D.)



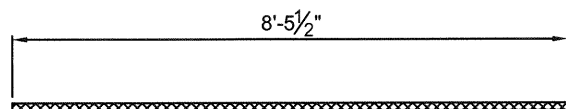
A2#11
(8 REQ'D.)



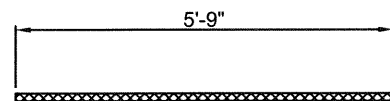
L1#5
(8 REQ'D.)



L2#5
(8 REQ'D.)

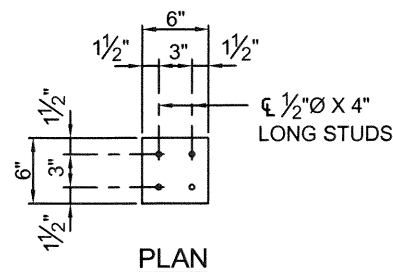


F1#5
(96 REQ'D.)

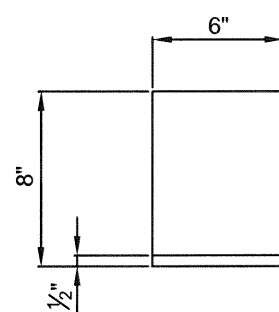


F2#5
(136 REQ'D.)

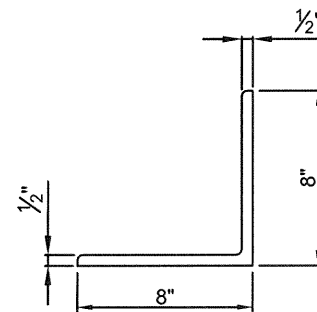
NOTE: LENGTH OF BARS F1#5 & F2#5 ARE MAXIMUM LENGTHS. BARS SHALL BE CUT TO FIT PANELS.



PLAN



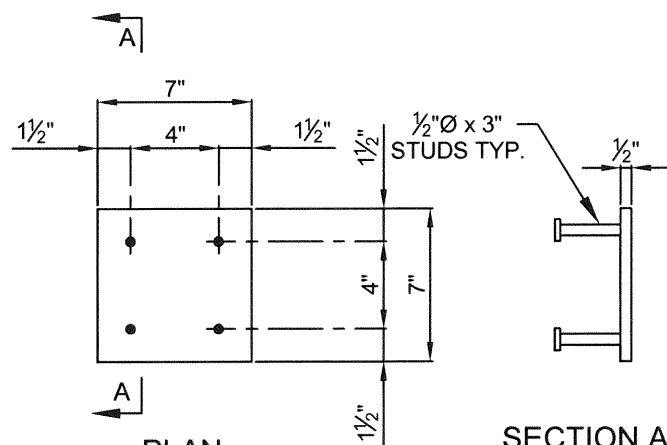
ELEVATION



END VIEW

ANGLE A1
(4 REQ'D.)

ANGLE FINISH: PRIMED AND PAINTED CONCRETE GRAY.



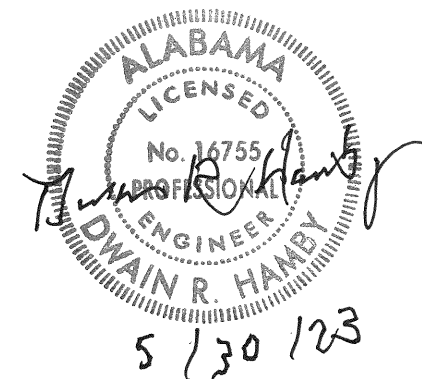
PLAN

PLATE WP-3-752 279
(24 REQ'D.)

PLATE FINISH: PRIMED AND PAINTED CONCRETE GRAY ON EXPOSED SIDE.

SECTION A-A

ELEVATION WP-2-752 279
6" X 6" X 1 1/2" WELD PLATE
(160 REQ'D.)
ASTM A36 GRADE 36
FINISH BLACK



5 / 30 / 23

REVIEW	
REVIEWED BY: A. O'Connor	<input checked="" type="checkbox"/> NO EXCEPTIONS TAKEN
CHECKED BY: A. Saha & P. Austin	<input type="checkbox"/> MAKE CORRECTIONS NOTED
DATE: 06-01-2023	<input type="checkbox"/> AMEND AND RESUBMIT
	<input type="checkbox"/> REJECTED - SEE REMARKS
The Engineer of Record's review of the shop drawings is for conformity of the requirements of the BD Documents and to the intent of the design. The Engineer of Record's review of shop drawings which includes means, methods, techniques, sequences, and construction procedures is limited to the effects on the permanent works. The Engineer of Record's review of substantial which includes means, methods, techniques, sequences, and construction procedures, does not include an in-depth check for the ability to perform the work in a safe or efficient manner.	
ENGINEER OF RECORDS	DATE: 06-01-2023
WSP USA	

SPECIAL NOTES

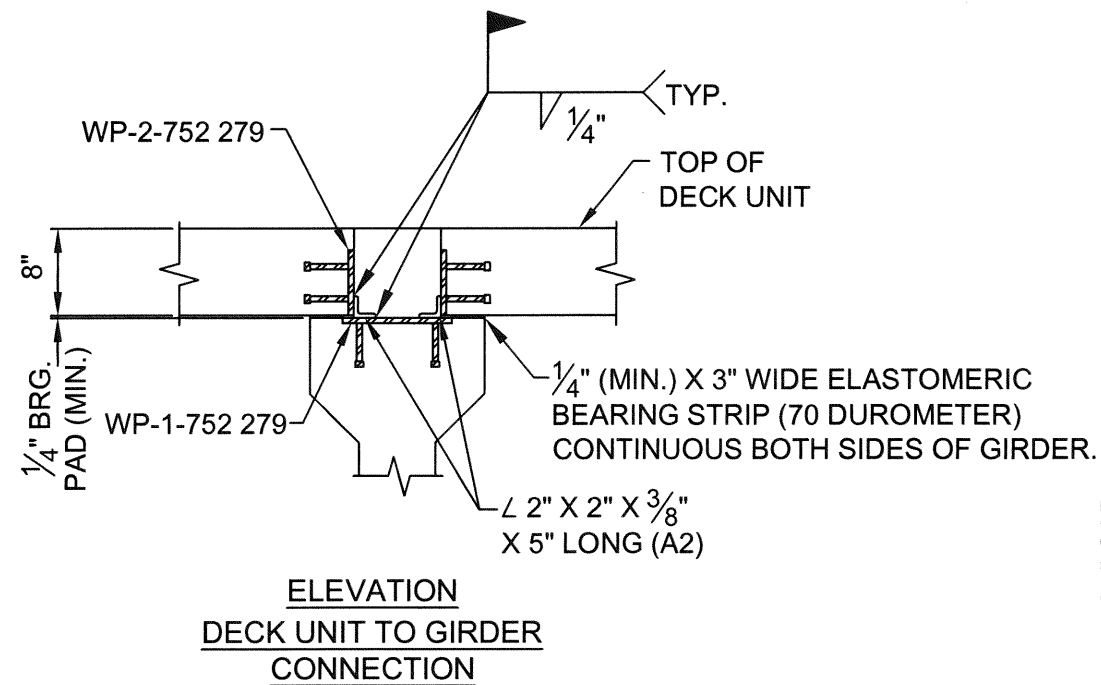
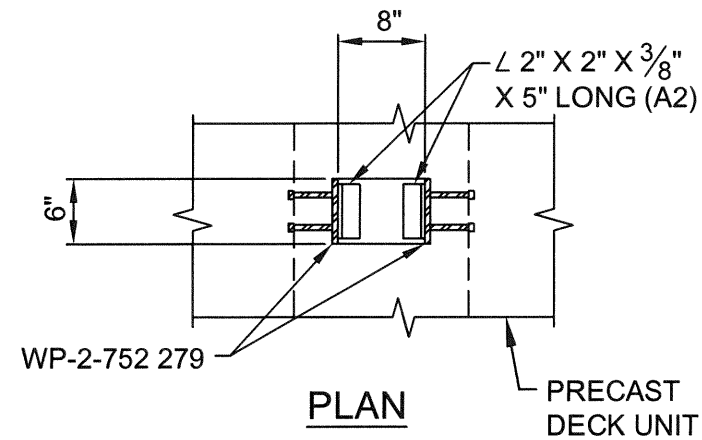
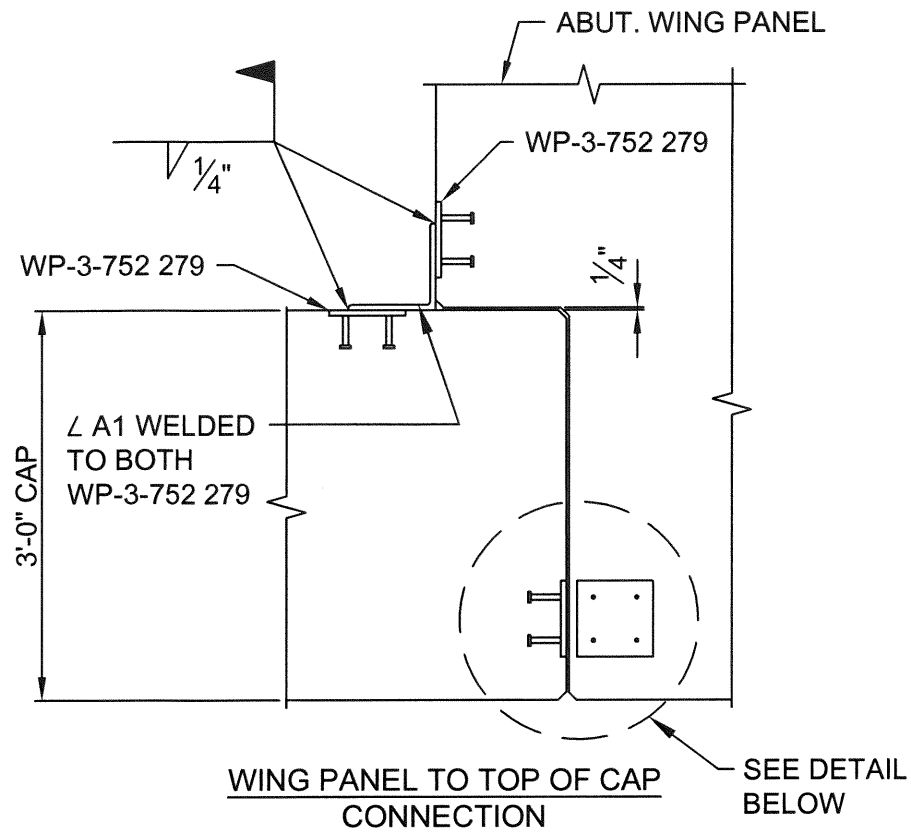
1. ALL REINFORCING STEEL TO BE ASTM A615-GRADE 60.
2. ALL STEEL PLATE TO CONFORM TO AASHTO M270 OR ASTM A709 GRADE 36.

REVISION		QUALITY CONTROL	
		POUR #	
		MARK #	
		GIRDER #	
DATE:		CKD:	

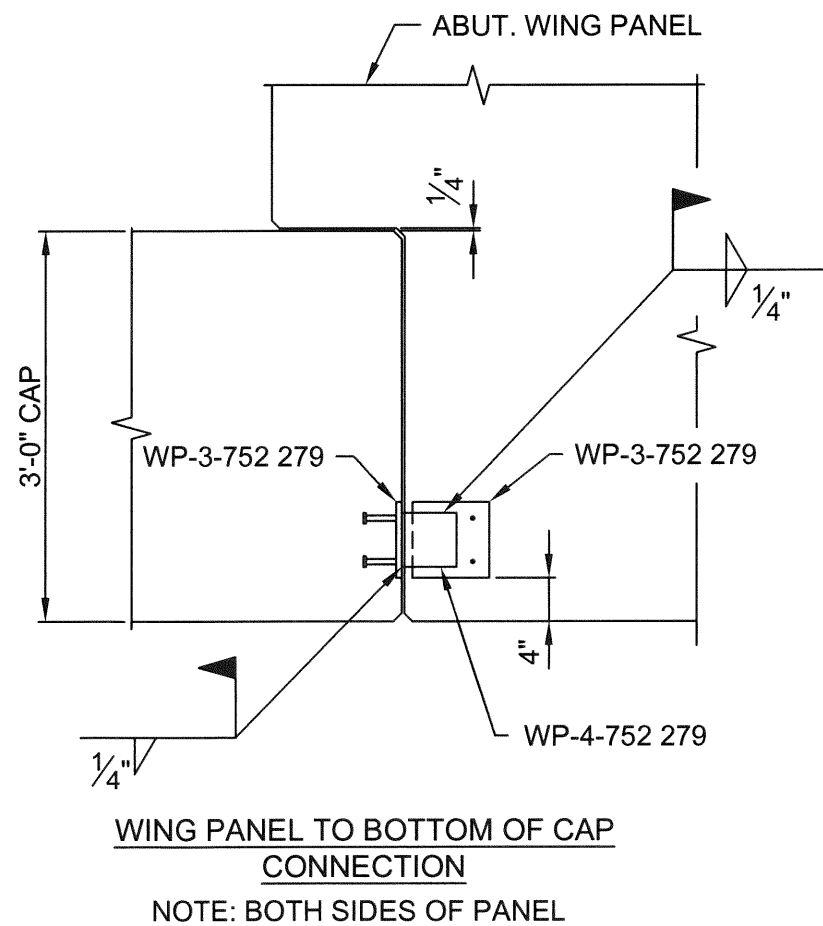
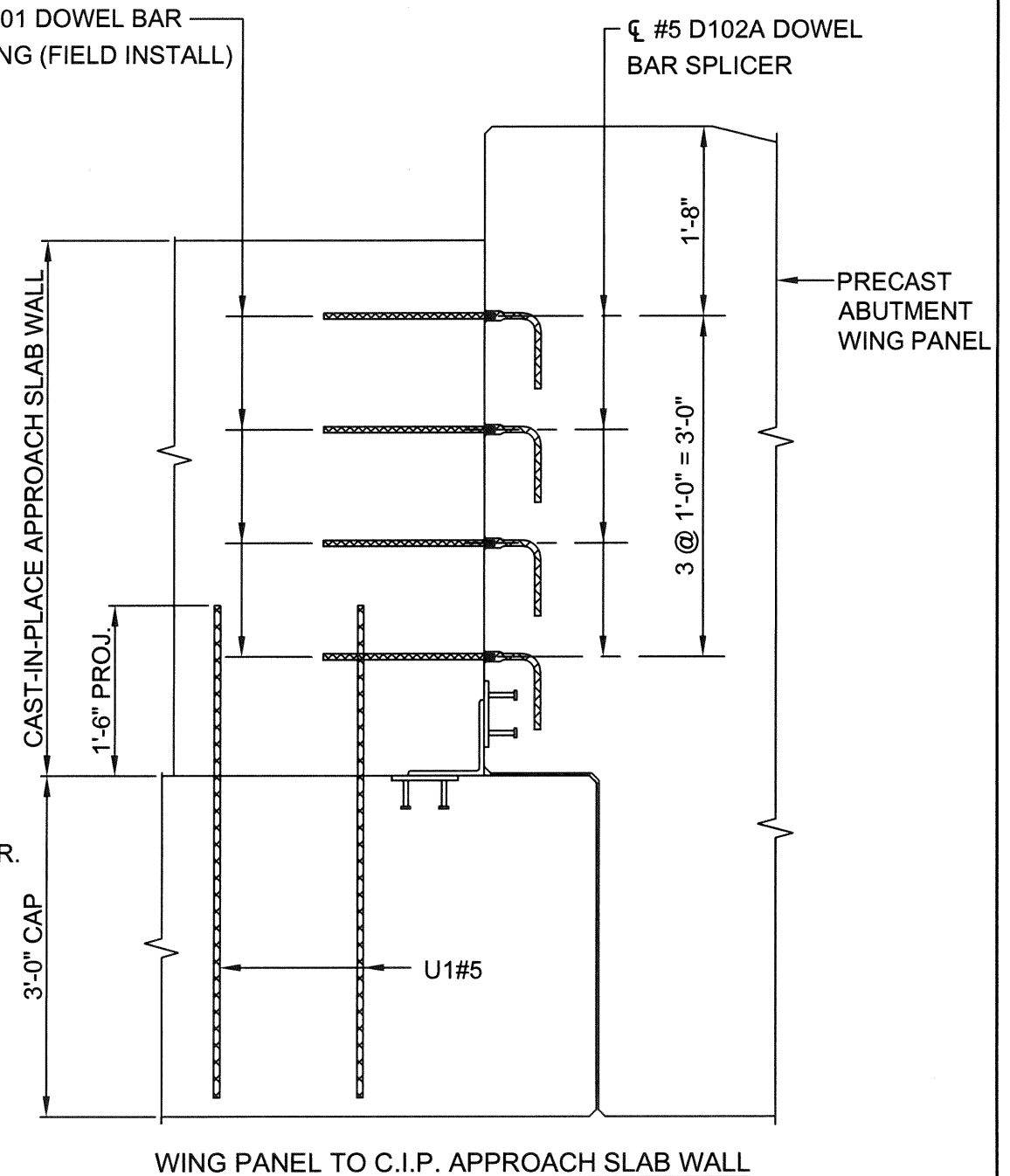
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Main Office: 205-663-4681

OLIN CHEMICAL PLANT
WRIGHT BROTHERS CONST.
MATERIALS FOR DECK UNITS,
ABUT. CAPS & WINGWALLS

P.I. No.:	CONTECH No.:	DATE:
	752 279	05/30/23
DESIGNED:	D.R.H.	DRAWN:
		J.A.E.
CHECKED:	DRH	SHEET NO.:
		13 OF 15
APPROVED:	Dwain R. Hamby	



CL #5 D101 DOWEL BAR
1'-6" LONG (FIELD INSTALL)



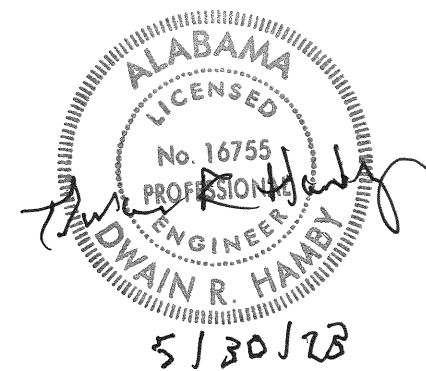
REVIEW		<input checked="" type="checkbox"/> NO EXCEPTIONS TAKEN	
REVIEWED BY: A. O'Connor	MADE CORRECTIONS NOTED		
CHECKED BY: A. Salas & P. Austin	AMEND AND RESUBMIT		
DATE: 06-01-2023	REJECTED - SEE REMARKS		

The Engineer of Record's review of the shop drawings is for conformity of the requirements of the RD Documents and to the intent of the design. The Engineer of Record's review of shop drawings, which includes means, methods, techniques, sequences, and construction procedures, is limited to the effects on the permanent works. The Engineer of Record's review of submittals, which includes means, methods, techniques, sequences, and construction procedures, does not include an in-depth check for the ability to perform the Work in a safe or efficient manner.

ENGINEER OF RECORD: *[Signature]* DATE: 06-01-2023

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3340 Peachtree Road, NE
Suite 2400, Tower Place 100
Atlanta, Ga 30326 (404) 237-2115

WSP USA



REVISION		QUALITY CONTROL	
		POUR #	
		MARK #	
		GIRDER #	
DATE:		CKD:	

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400 Industrial Park Drive, Pelham, Alabama 35124
Main Office: 205-663-4681

OLIN CHEMICAL PLANT
WRIGHT BROTHERS CONST.
CONNECTION DETAILS

P.I. No.:	CONTECH No.:	DATE:
	752 279	05/30/23
DESIGNED:	DRAWN:	
D.R.H.	J.A.E.	
CHECKED:	SHEET NO.:	
DRH	15 OF 15	
APPROVED:		
<i>[Signature]</i>		

Formal Alternative Technical Concepts Submittal Form

Project: SCDOT S-31 (Cannons Campground Rd.) over Peters Creek

Project ID: 041165

ATC No.: 2

Priority: High

Team: Wright Brothers - Neel-Schaffer

Date: 4/10/25

Description (required):

The proximity of the Duke Distribution and Transmission lines to the slope adjacent to tracts 16 and 17 make installation of a sheet pile wall infeasible at this location, not to mention potential difficulties in driveability with shallow rock indicated in the geotechnical report. The alternative of a reinforced soil slope here presents a phasing concern, as this area would need to be excavated either prior to or after bridge construction and could not be occupied by critical bridge equipment, and this may not be sufficient to maintain slopes within the ROW if utilized in conjunction with ATC #1.

This ATC proposes alternative wall types to be constructed here, and at other locations on the project to include Soldier Pile walls with precast concrete panels inserted between the flange, and Cast-in-Place Gravity Walls. Example details for soldier pile and panel walls and a standard detail used extensively for GDOT Gravity Walls are included in the Attachments. The DB Team understands that all permanent retaining wall types are required to be designed specifically for use on this project in accordance with the SCDOT GDM by a licensed SC PE.

This ATC also proposes the use of temporary wire basket walls, such that fill can be placed without potential delays in wall construction and permanent wall facing may be completed on an independent schedule. All temporary walls shall comply with SCDOT Supplemental Technical Specification SC-M-204-2 and will also require design and approval by SCDOT prior to construction.

Usage:

Soldier Pile Walls with Precast Panels are proposed in the Southeast Quadrant adjacent to tract 16 and in the Northwest Quadrant adjacent to tract 6.

Cast-in-Place Gravity Walls are proposed in the Southwest Quadrant adjacent to parcel 5, and the Northeast Quadrant adjacent to tract 6.

Temporary Wire Basket walls may be used along the Soldier Pile Wall locations if necessary to maintain schedule progress.

Deviations (required):

- This ATC would propose utilizing alternative wall types to those specified in Exhibit 4b section 2.2. The proposed wall types include soldier pile walls and gravity walls in lieu of the sheet pile wall or reinforced slope stabilization indicated in the RFP and at other locations as necessary.

- This ATC would also propose the use of temporary walls, such that permanent wall facing can be completed on an independent schedule from bridge construction and grading operations.

Justification:

Soldier Pile walls may be constructed with low-overhead drilling equipment, which provide many benefits including accessibility to construct the wall required adjacent to tracts 16 and 17 near the Duke Distribution line, and reduced vibrations associated with pile driving near other adjacent properties. They also reduce the risk of driveability concerns with sheet piles at the proposed locations that would require additional anchor installation.

Gravity walls are an ideal solution for low-height retaining wall applications at the toe of slope. After geotechnical investigation, their design is straightforward and they can be constructed in accordance with readily available materials.

Formal Alternative Technical Concepts Submittal Form

Project: SCDOT S-31 (Cannons Campground Rd.) over Peters Creek

Project ID: 041165

ATC No.: 2

Priority: High

Team: Wright Brothers - Neel-Schaffer

Date: 4/10/25

Soldier Pile walls, like sheet pile walls, require additional time for detailed design of shop drawings and fabrication of materials. Should this duration exceed the available time to achieve substantial completion, the DB Team would be prepared with SCDOT approved designs to install temporary fill walls to place embankment for the new roadway profile. When soldier pile or sheet pile walls are fully constructed, the DB Team proposes to fill any gap between the wall facing and the wire basket walls with No. 57 stone.

Schedule:

There are no impacts to the overall project schedule as a result of this ATC.

Impacts:

There are no negative impacts associated with this ATC.

History:

Both Wright Brothers and Neel-Schaffer have extensive experience in the design and construction of all proposed wall types.

Risks:

Implementation of this ATC reduces substantial risk in the phasing of wall construction, especially through the proposed use of temporary fill walls, to remove wall construction from the critical path of the project. This ATC will allow bridge construction to proceed unimpeded, allowing the maximum duration for completion of retaining walls on an independent schedule path.

This ATC can also reduce geotechnical risk that may delay the installation of sheet pile walls due to shallow rock that is indicated in the preliminary geotechnical reports. Availability of these additional wall types will allow the DB Team to proceed with an agreeable design without a further change request to address unknowable conditions.

Costs (required):

This ATC is not expected to impact the cost of the solution located at the slope adjacent to tracts 16 and 17, or for additional walls that would be required in conjunction with ATC #1.

Quality:

There will be no impact to quality or performance of the bridge or roadway with the implementation of this ATC.

Operations & Maintenance:

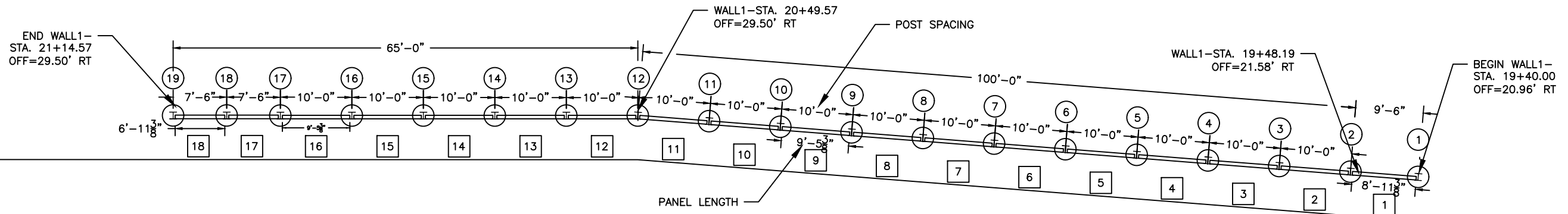
Operations and Maintenance of the proposed retaining walls is anticipated to be equivalent to the wall types that are currently allowed in the RFP.

FATC #2 - Attachments

Wright Brothers Construction Company, Inc. – Neel-Schaffer, Inc.

Proposed Wall Details

- Soldier Pile Wall with Precast Panels and Coping
- Cast-in-Place Gravity Wall
- Temporary Wire Basket Wall



NW1 PLAN VIEW

LEGEND:
POST NUMBER-----①
PANEL WALL NUMBER---①



TRICOR CONSTRUCTION INC.
1983 CHESNEE HIGHWAY
SPARTANBURG, SC 29303
PH: (864)582-2570
FAX: (864)582-2571



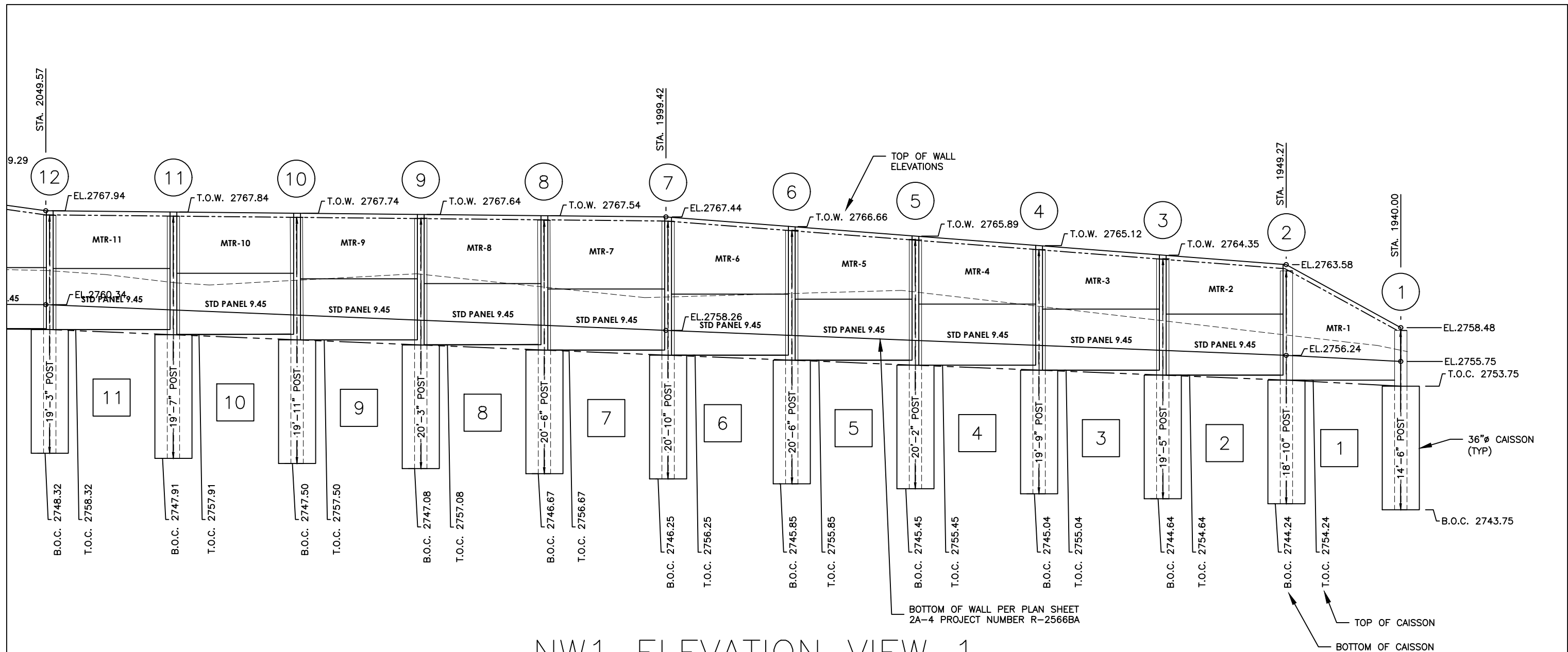
REV. NO.	DATE	REVISION

PREPARED BY:

FISHER ASSOCIATES

180 CHARLOTTE STREET, ROCHESTER, NY 14607
TEL (585)-334-1310
WWW.FISHERASSOC.COM

DATE: 2/21/25	SHEET TITLE: PLAN VIEW	DRWN BY: FFIII
SCALE: N/A		CKD BY: XXX
PROJECT: PRECAST SOLDIER PILE LAGGING WALL NC 105 BRIDGE OVER WATAUGA RIVER WATAUGA COUNTY		
PRECAST PROJECT: 37512.3.3	DWG. LD. WALL#1	
FISHER ASSOC PROJ. NO.: 250021.01	SHT. NO. 2	OF 7



NW1 ELEVATION VIEW 1
(VIEW FROM ROADWAY SIDE OF WALL)

PREPARED FOR:



TRICOR CONSTRUCTION INC.
1983 CHESNEE HIGHWAY
SPARTANBURG, SC 29303
PH: (864)582-2570
FAX: (864)582-2571



3/20/25

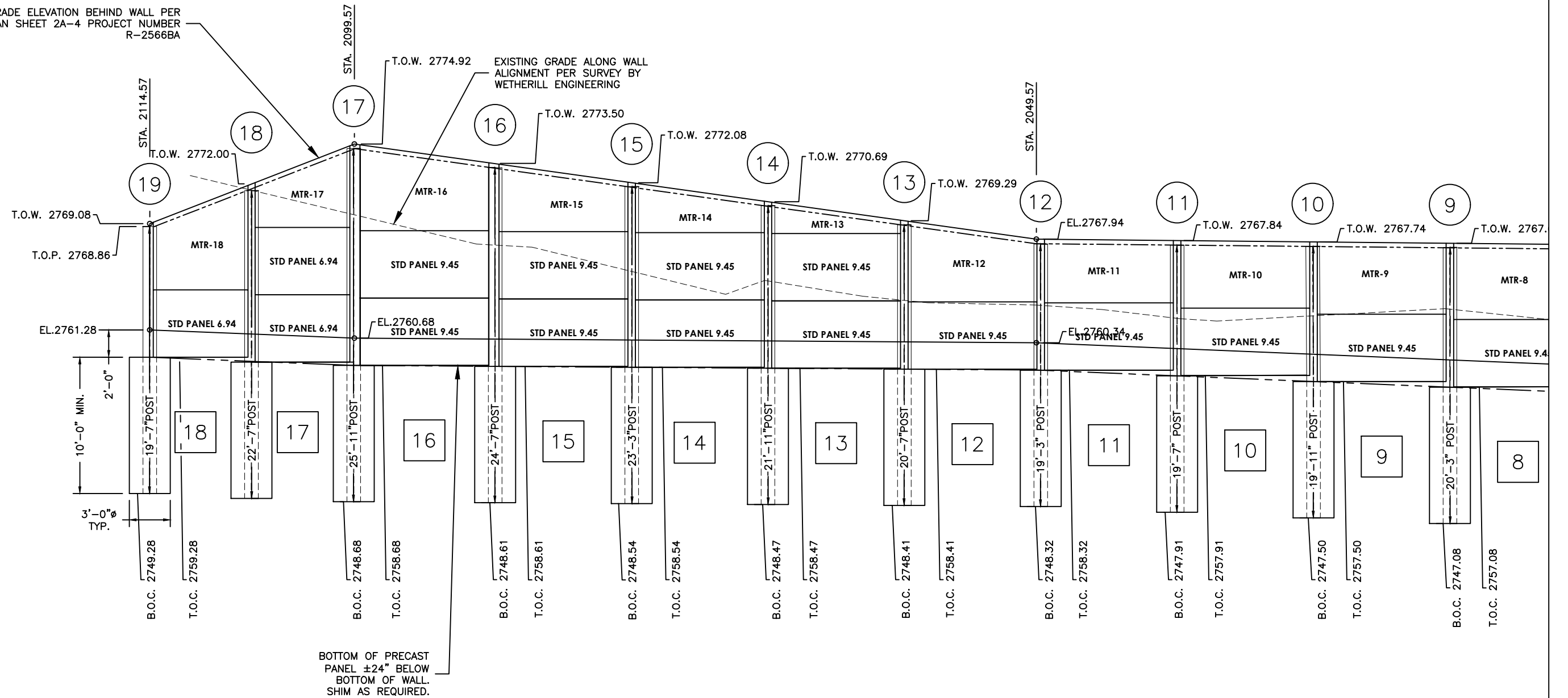
REV. NO.	DATE	REVISION

PREPARED BY:



DATE: 2/21/25	SHEET TITLE: ELEVATION VIEW 1	DRWN BY: FFIII
SCALE: N/A		CKD BY: XXX
PROJECT: PRECAST SOLDIER PILE LAGGING WALL NC 105 BRIDGE OVER WATAUGA RIVER WATAUGA COUNTY		
PRECAST PROJECT: 37512.3.3	DWG. LD. WALL #1	
FISHER ASSOC PROJ. NO.: 250021.01	SHT. NO. 3 OF 7	

GRADE ELEVATION BEHIND WALL PER
PLAN SHEET 2A-4 PROJECT NUMBER
R-2566BA



NW1 ELEVATION VIEW 2

(VIEW FROM ROADWAY SIDE OF WALL)

PREPARED FOR:



TRICOR CONSTRUCTION INC.
1983 CHESNEE HIGHWAY
SPARTANBURG, SC 29303
PH: (864)582-2570
FAX: (864)582-2571



3/20/25

REV. NO.	DATE	REVISION

PREPARED BY:

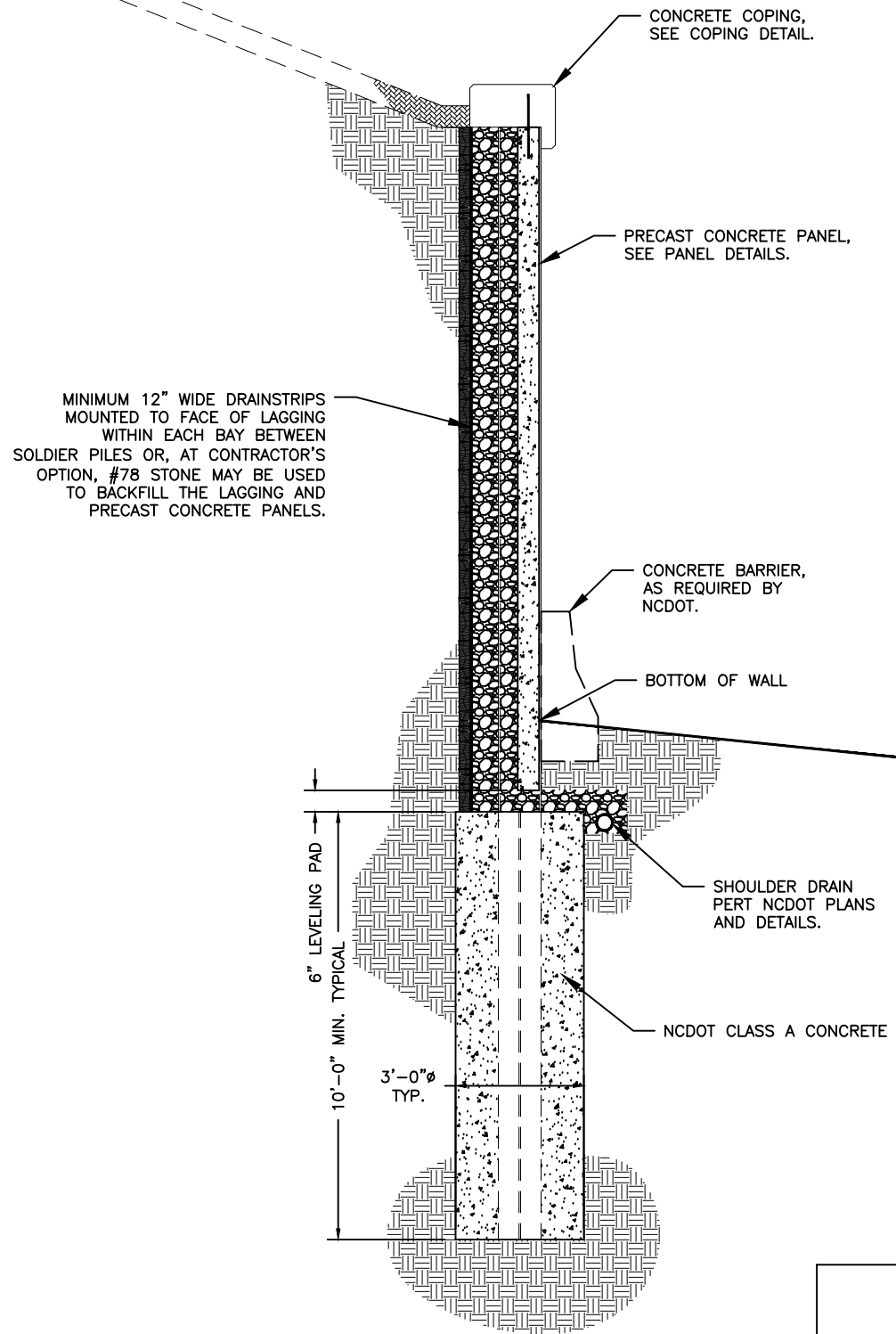
FISHER ASSOCIATES
180 CHARLOTTE STREET, ROCHESTER, NY 14607
TEL (585)-334-1310
WWW.FISHERASSOC.COM

LEGEND:

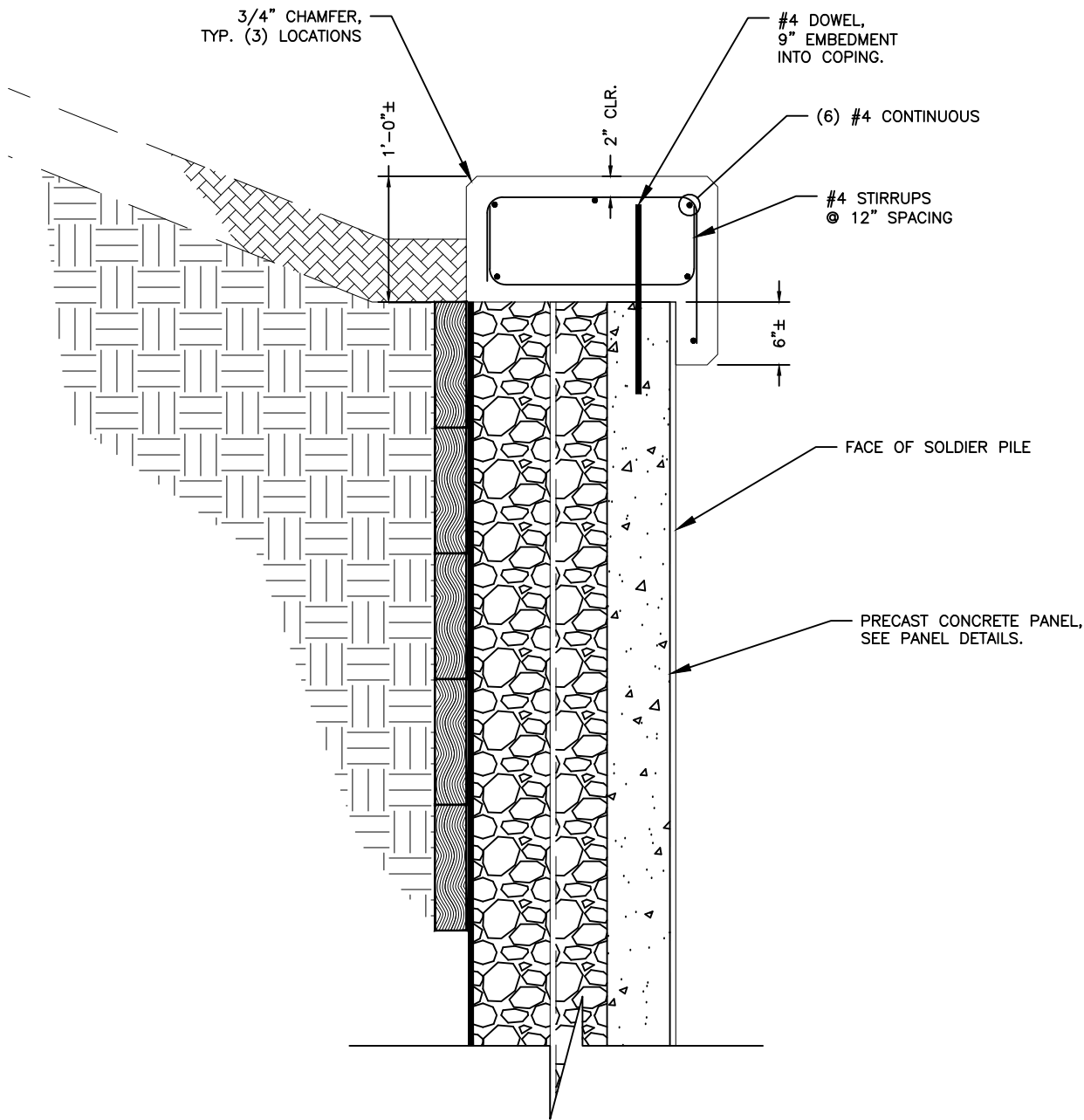
POST NUMBER-----①
PANEL WALL NUMBER---①

DATE: 2/21/25	SHEET TITLE: ELEVATION VIEW 2	DRWN BY: FFIII
SCALE: N/A		CKD BY: XXX
PROJECT: PRECAST SOLDIER PILE LAGGING WALL NC 105 BRIDGE OVER WATAUGA RIVER WATAUGA COUNTY		
PRECAST PROJECT: 37512.3.3	DWG. LD. WALL#1	
FISHER ASSOC PROJ. NO.: 250021.01	SHT. NO. 4 OF 7	

NOTE:
INSTALL 1/2" EXPANSION JOINTS
IN COPING AT 30'-0"± SPACING.



SECTION VIEW



SECTION VIEW

PREPARED FOR:



TRICOR CONSTRUCTION INC.
1983 CHESNEE HIGHWAY
SPARTANBURG, SC 29303
PH: (864)582-2570
FAX: (864)582-2571



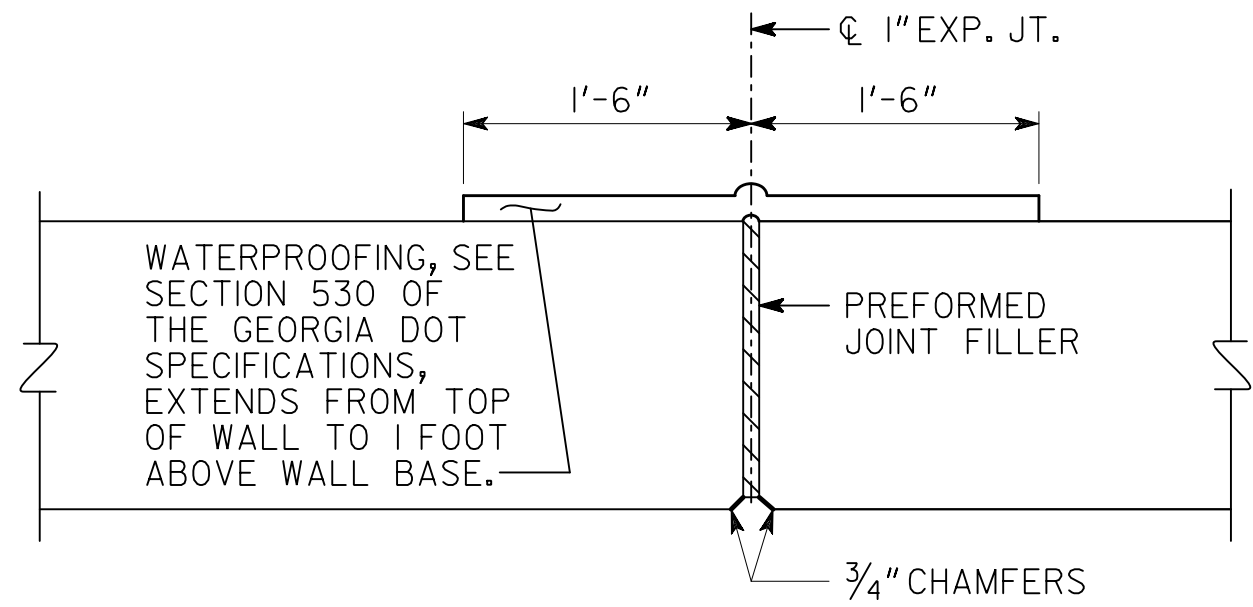
3/20/25

REV. NO.	DATE	REVISION

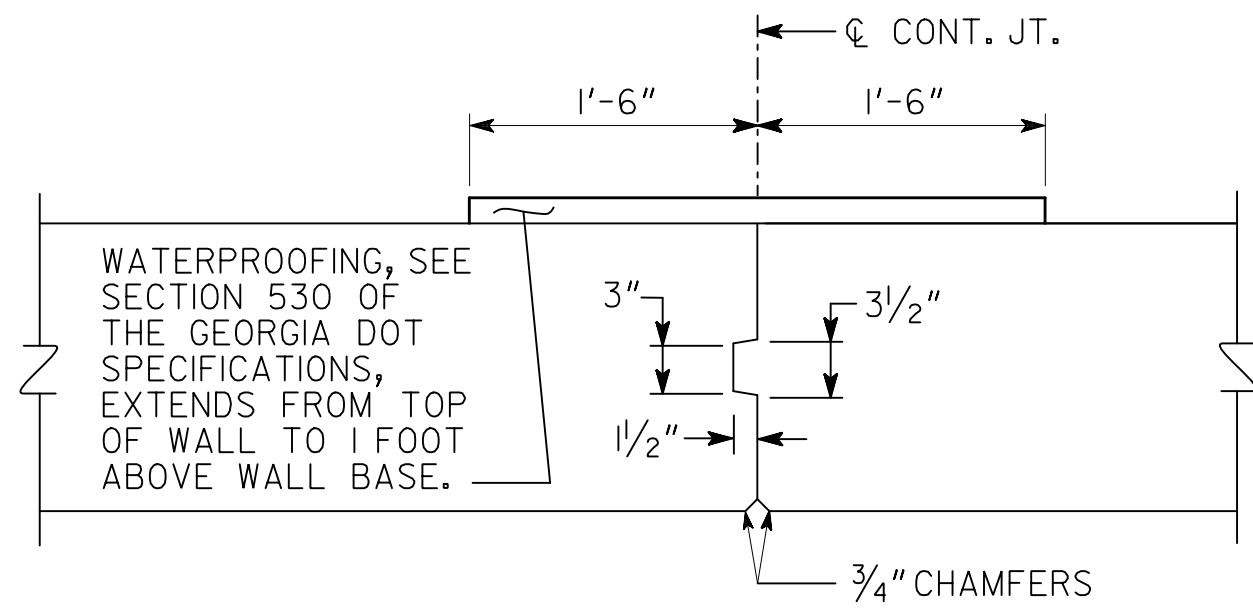
PREPARED BY:

FISHER ASSOCIATES
180 CHARLOTTE STREET, ROCHESTER, NY 14607
TEL (585)-334-1310
WWW.FISHERASSOC.COM

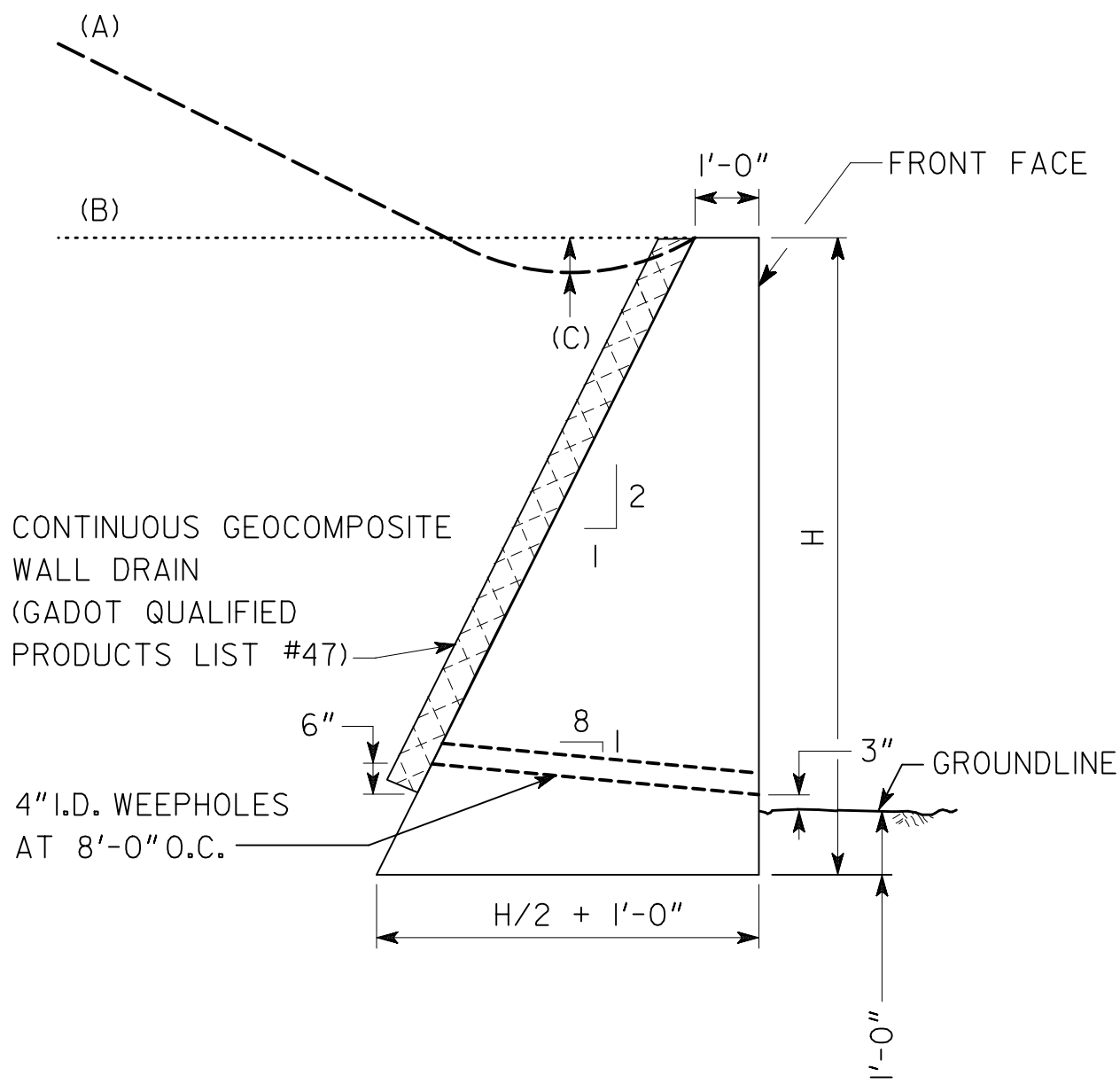
DATE: 2/21/25	SHEET TITLE: TYPICAL DETAILS	DRWN BY: FFIII
SCALE: N/A	CKD BY: XXX	
PROJECT: PRECAST SOLDIER PILE LAGGING WALL NC 105 BRIDGE OVER WATAUGA RIVER WATAUGA COUNTY		
PRECAST PROJECT: 37512.3.3	DWG. LD. WALL#1	
FISHER ASSOC PROJ. NO.: 250021.01	SHT. NO. 5 OF 7	



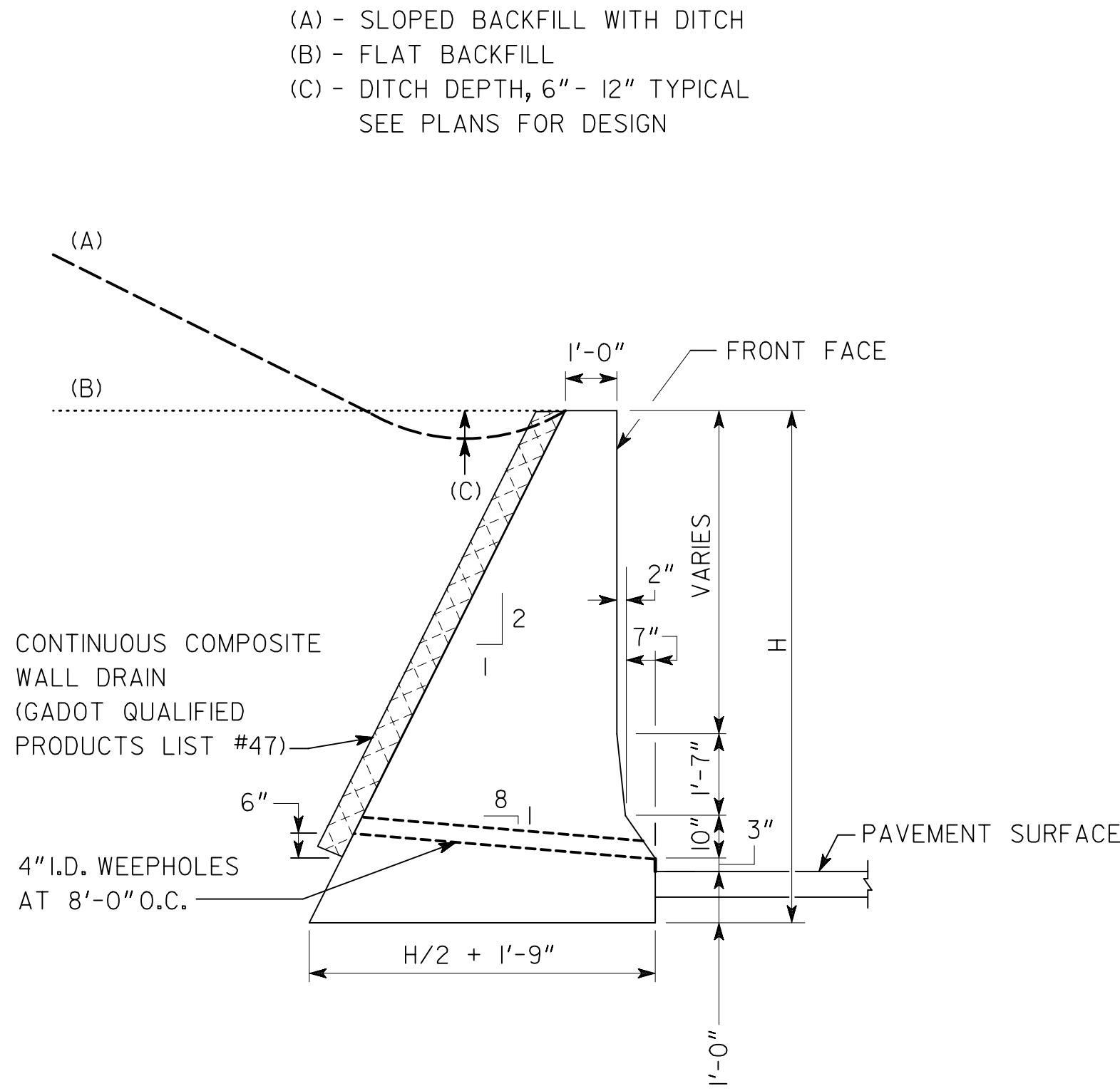
DETAIL OF EXPANSION JOINT
SEE GENERAL NOTE #3



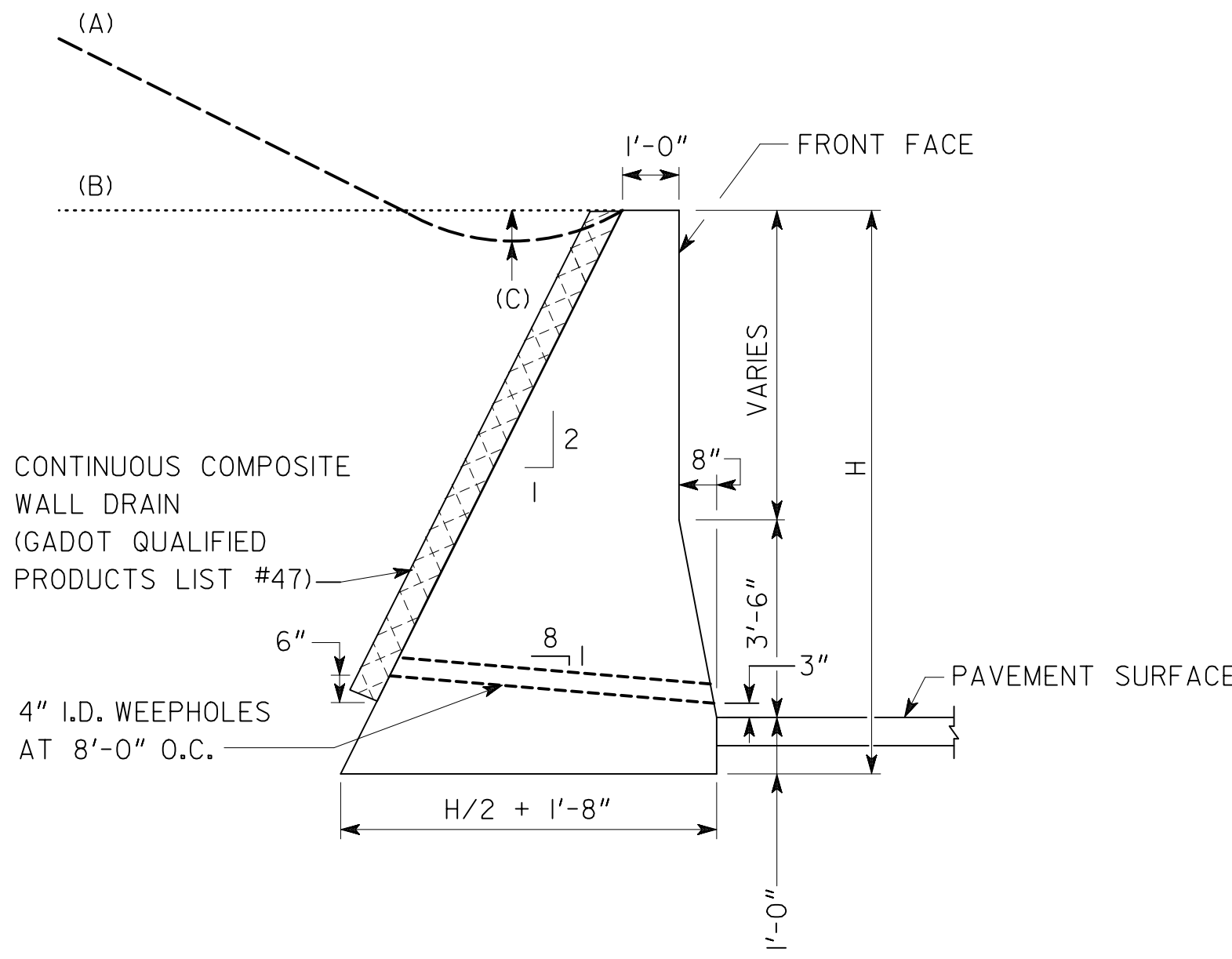
DETAIL OF CONTRACTION JOINT
SEE GENERAL NOTE #3



TYPICAL SECTION A



TYPICAL SECTION B
(NEW JERSEY BARRIER FACE)



TYPICAL SECTION C
(SINGLE SLOPE BARRIER FACE)

MAXIMUM "H"*			
BACKSLOPE	TYP. SECTION A	TYP. SECTION B **	TYP. SECTION C **
FLAT	8'-6"	10'-0"	10'-0"
SLOPE TO 4:1	6'-3"	7'-0"	7'-0"
SLOPE TO 2:1	4'-6"	4'-9"	4'-9"

* GREATER "H" PERMITTED IF APPROVED BY BRIDGE DESIGN.

** TYPICAL SECTION B SHALL HAVE A MINIMUM H OF 3'-8"
TYPICAL SECTION C SHALL HAVE A MINIMUM H OF 4'-6"

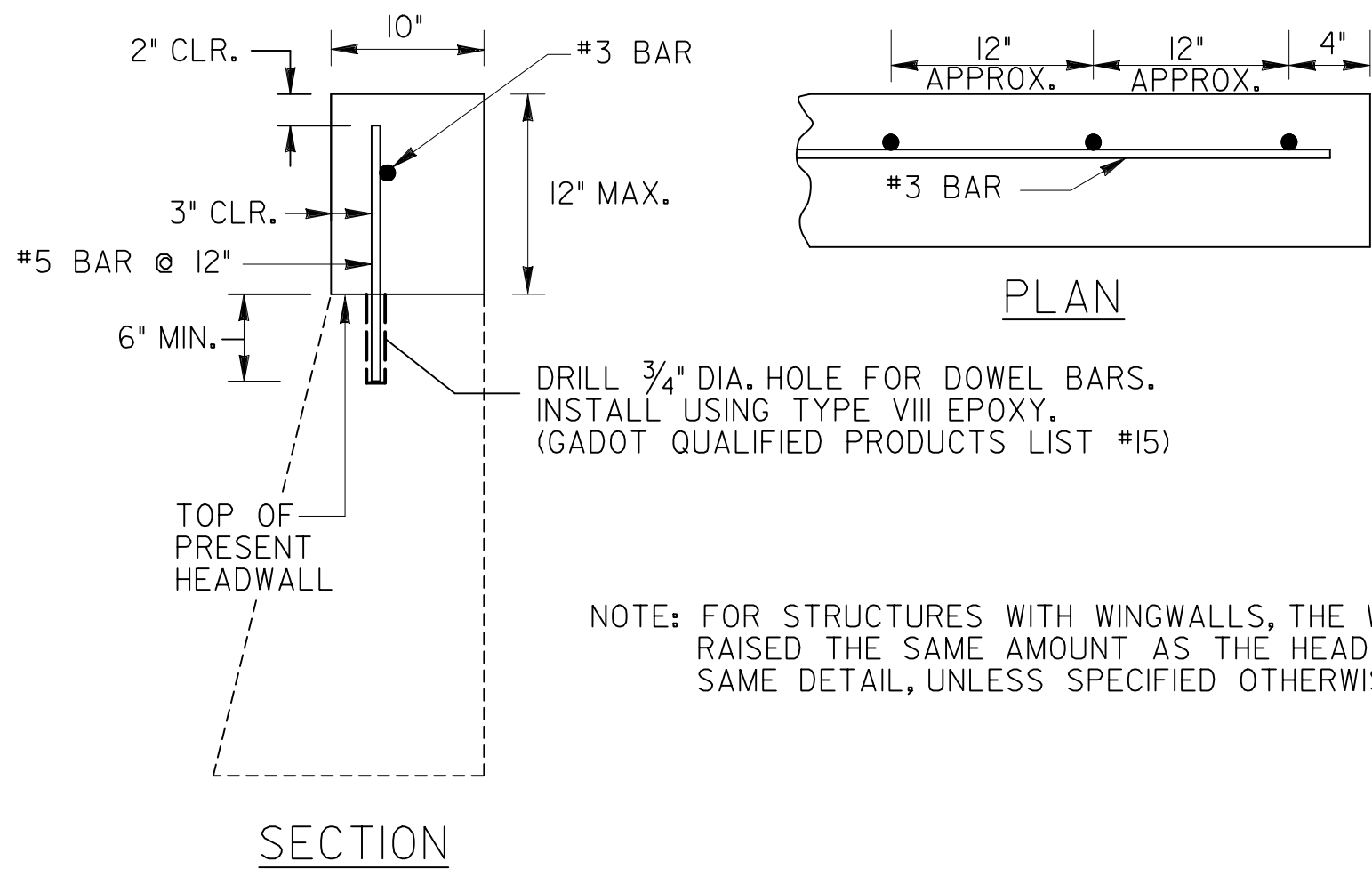
GENERAL NOTES:

- GRAVITY WALLS SHALL NOT BE USED WHEN HORIZONTAL DISTANCE FROM EDGE OF TRAVEL WAY TO FRONT FACE OF WALL IS LESS THAN $(H + 1'-0")$.
- GRAVITY WALLS DESIGNED FOR THE FOLLOWING SOIL PROPERTIES:

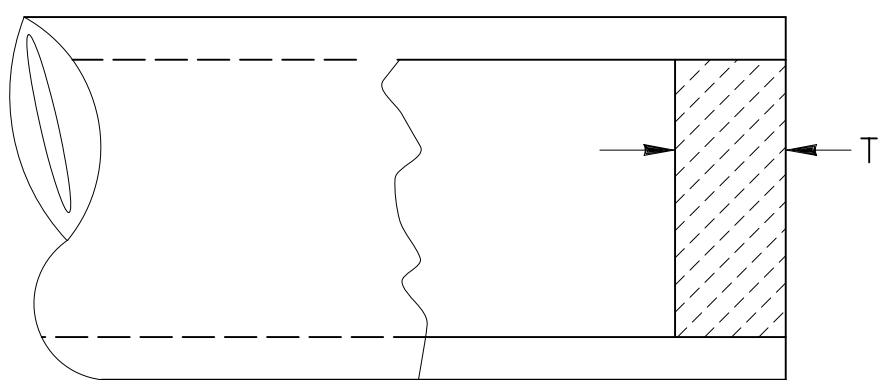
	FOUNDATION	BACKFILL
COHESION =	0 PSF	0 PSF
ϕ =	28°	28°
UNIT WEIGHT =	120 PCF	120 PCF
- EXPANSION JOINTS SHALL BE LOCATED AT A MAXIMUM SPACING OF 90'-0" AND EXTEND THROUGH THE WALL. CONTRACTION JOINTS SHALL BE LOCATED AT A MAXIMUM SPACING OF 30'-0".
- GRAVITY WALLS WITH A VERTICAL FRONT FACE SHALL BE PAID FOR AS "CLASS B CONCRETE OR MORTAR RUBBLE MASONRY, RETAINING WALL". GRAVITY WALLS WITH A BARRIER FRONT FACE SHALL BE PAID FOR AS "CLASS A CONCRETE, RETAINING WALL". WATERPROOFING, JOINT FILLER, WALL DRAIN, AND OTHER INCIDENTAL ITEMS SHALL BE INCLUDED IN OVERALL BID SUBMITTED.

- A CONCRETE DITCH DETAIL FOR THE TOP OF THE WALL SHOULD BE INCLUDED IN THE ROADWAY PLANS WHEN WATER IS FLOWING TOWARDS THE BACK OF THE WALL. SEE CONSTRUCTION DETAIL D-49.
- FINISH EXPOSED SURFACES OF THE WALL WITH A TYPE III FINISH.
- APPLY GRAFFITI PROOF COATING AS PER SECTIONS 500 AND 838 OF THE GEORGIA DOT SPECIFICATIONS.
- ALL NECESSARY FENCE AND HANDRAIL SHOULD BE INCLUDED IN THE ROADWAY PLANS WHEN APPROPRIATE.
- GRAVITY WALL TYPICAL SECTIONS A, B, AND C HAVE BEEN DESIGNED PER THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 7TH EDITION, 2014.

DETAIL FOR RAISING HEADWALL



TYPICAL PIPE PLUG



SECTION

NOTE: PLAN PAY QUANTITIES ARE TO REFLECT PIPE PLUGS AS CU. YDS. OF CL. B CONCRETE. ON CONSTRUCTION PLUGS MAY BE BUILT WITH BRICK MASONRY, MORTAR RUBBLE MASONRY, CL. A CONC., OR CL. B CONC. WITH NO ADJUSTMENT IN PAYMENT MADE FOR ALTERNATES.

D	T (MIN)	PIPE PLUG (CU. YDS.)
12"	8"	0.0194
15"	8"	0.0303
18"	8"	0.0436
24"	8"	0.0776
30"	8"	0.1212
36"	8"	0.1745
42"	8"	0.2376
48"	8"	0.3103
54"	12"	0.5890
60"	12"	0.7272
66"	12"	0.8799
72"	12"	1.0472

	DATE	DEPARTMENT OF TRANSPORTATION STATE OF GEORGIA	
	REVISION	STANDARD GRAVITY WALL TYPICAL SECTIONS, RAISING HEADWALL, AND TYPICAL PIPE PLUG	
		NO SCALE:	REV. & REDR. SEPT, 2016
	BY	REV. & C.E.W. (SUBMITTED) REDR. (APPROVED)	STATE ROAD & AIRPORT DESIGN ENGR. STATE HIGHWAY ENGINEER
	CHK.	D.D.E.	NUMBER 9031L SHEET 1 OF 2

GEOTECHNICAL
ENGINEER

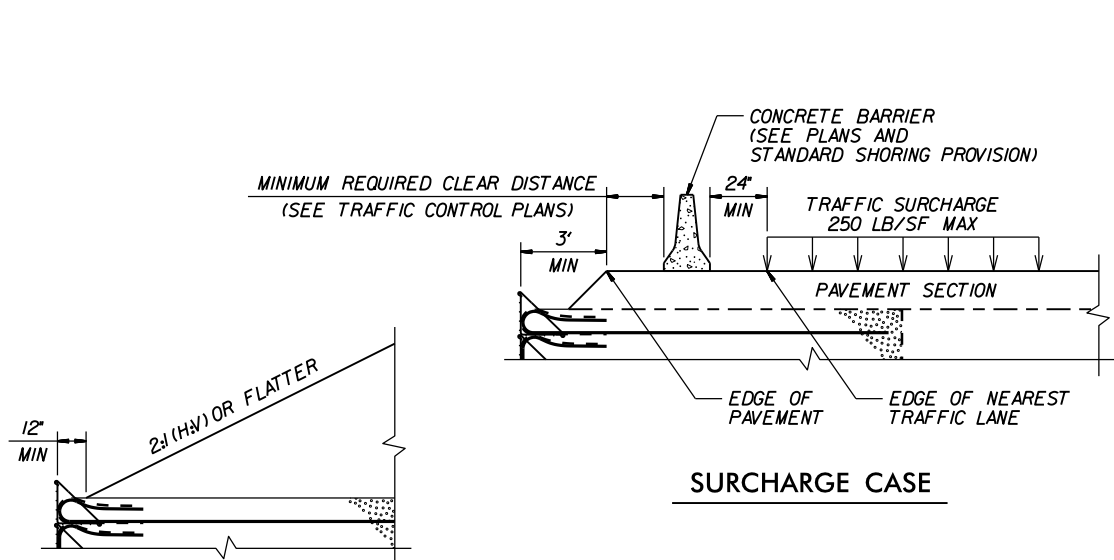


ENGINEER

SIGNATURE DATE

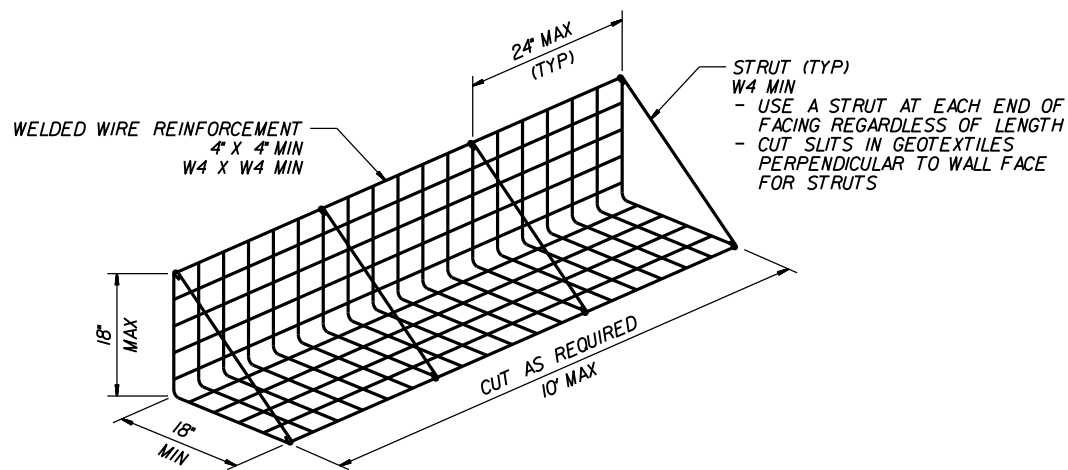
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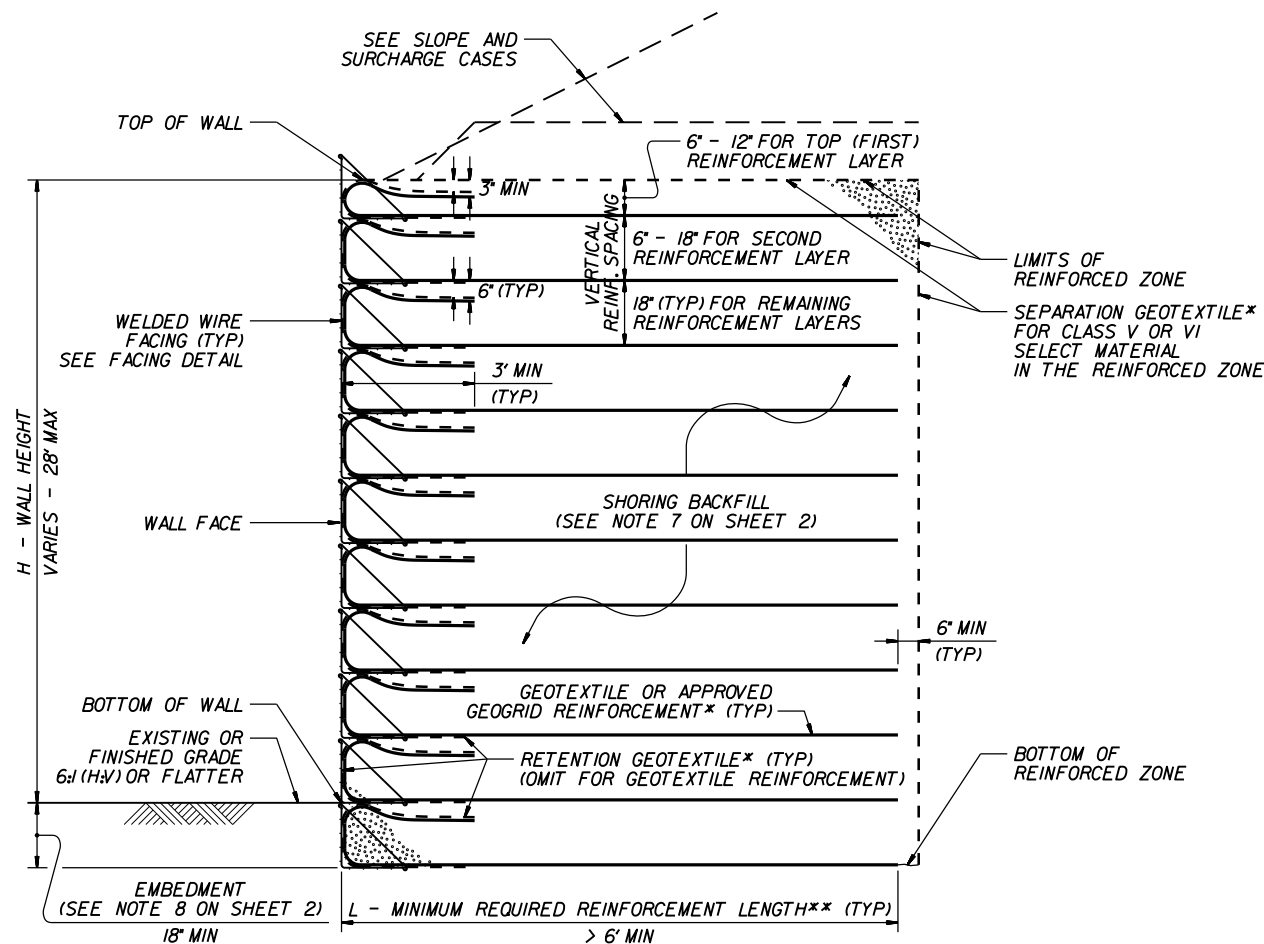


SURCHARGE CASE

SLOPE CASE

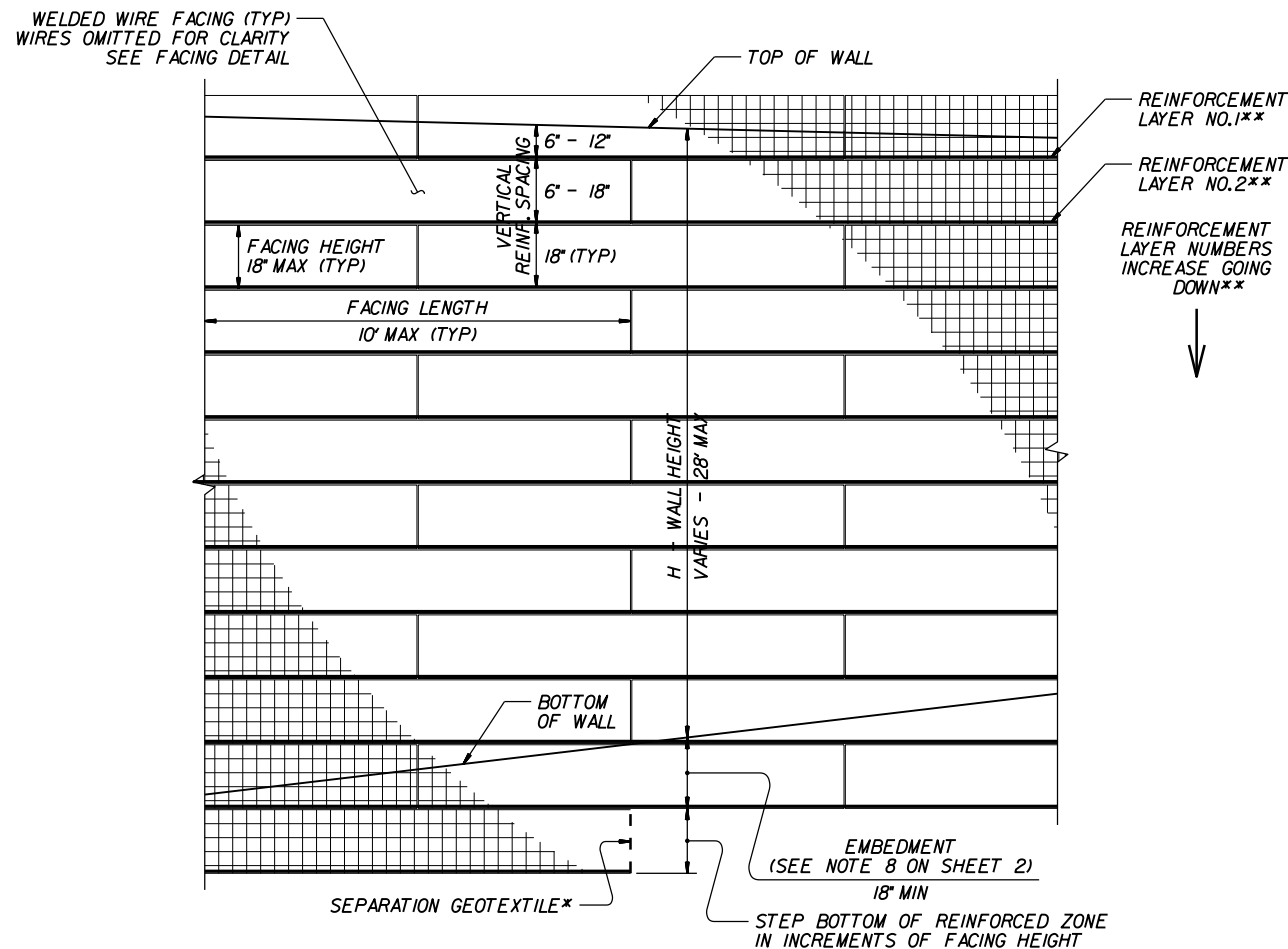


FACING DETAIL



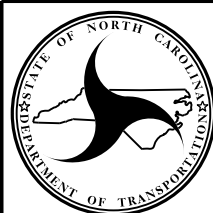
STANDARD TEMPORARY WALL

(FOR STANDARD TEMPORARY WALLS ON STRUCTURES,
SEE TEMPORARY WALL ON STRUCTURE DETAIL ON SHEET 2.)
*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.
**SEE REINFORCEMENT TABLES ON SHEET 3.



STANDARD TEMPORARY WALL - PARTIAL ELEVATION

*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.
**SEE REINFORCEMENT TABLES ON SHEET 3.



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

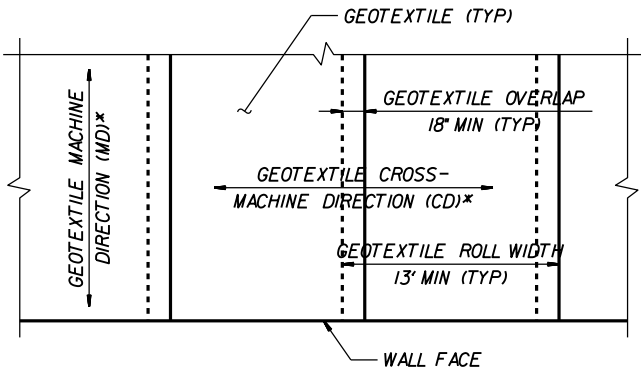
GEOTECHNICAL
ENGINEERING UNIT

STANDARD DETAIL NO. 1801.02

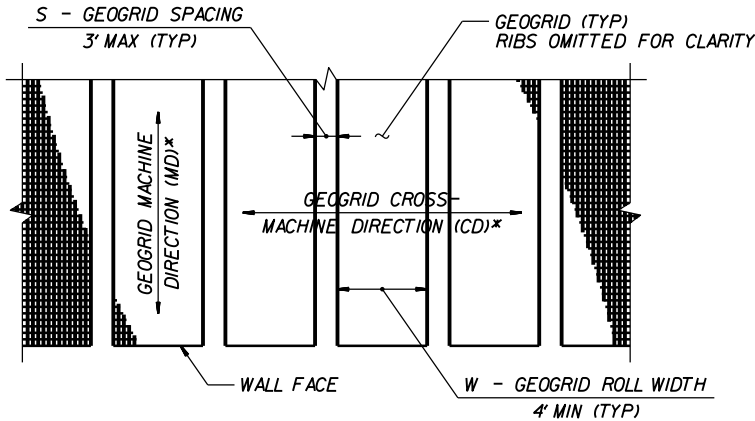
STANDARD
TEMPORARY WALL
SHEET 1 OF 3

GEOTECHNICAL ENGINEER	ENGINEER
SIGNATURE	DATE
SIGNATURE	DATE

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UNLESS ALL SIGNATURES COMPLETED



GEOTEXTILE PLACEMENT
(100% COVERAGE MIN FOR
GEOTEXTILE REINFORCEMENT)

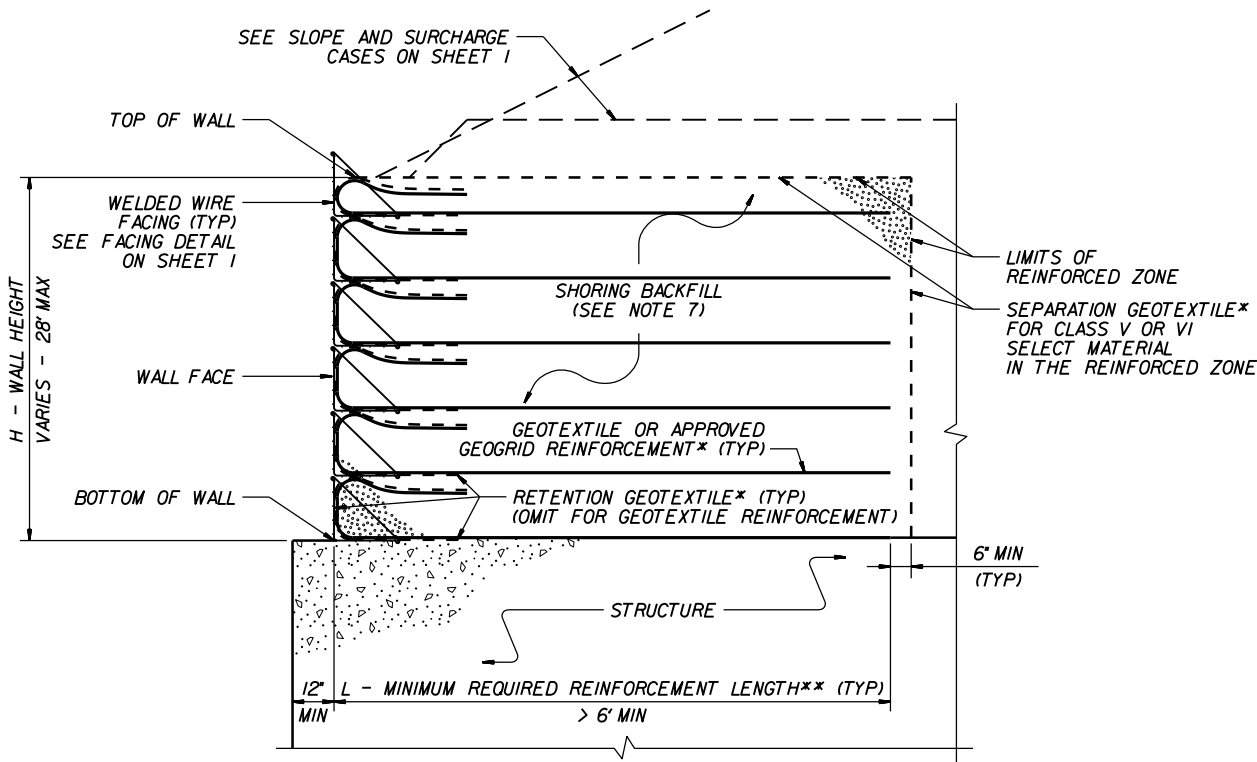


GEOGRID PLACEMENT
(80% COVERAGE MIN FOR
GEOGRID REINFORCEMENT -
 $\frac{W}{W+S} \times 100 \geq 80\%$,
SEE NOTE 11)

GEOSYNTHETIC PLACEMENT DETAILS

(PLAN VIEW)

*SEE NOTE 12.



TEMPORARY WALL ON STRUCTURE DETAIL

*SEE GEOSYNTHETIC PLACEMENT DETAILS.

**SEE REINFORCEMENT TABLES ON SHEET 3.

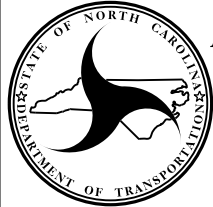
NOTES:

1. AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY WALLS AS NOTED IN THE PLANS.
2. FOR STANDARD TEMPORARY WALLS, SEE STANDARD SHORING PROVISION.
3. STANDARD TEMPORARY WALLS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
UNIT WEIGHT, γ = 120 LB/CF
FRICTION ANGLE, ϕ = 30 DEGREES
COHESION, c = 0 LB/SF
4. DO NOT USE STANDARD TEMPORARY WALLS IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
5. DO NOT USE STANDARD TEMPORARY WALLS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW TEMPORARY WALLS.
6. USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, ASSUME GROUNDWATER DEPTH IS LESS THAN 7' BELOW BOTTOM OF REINFORCED ZONE. DO NOT USE STANDARD TEMPORARY WALLS IF GROUNDWATER IS ABOVE BOTTOM OF REINFORCED ZONE.
7. DO NOT USE A-2-4 SOIL FOR STANDARD TEMPORARY WALLS AROUND CULVERTS OR IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS FOR SLOPE CASES. DO NOT USE CLASS VI SELECT MATERIAL IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS WITH GEOTEXTILE REINFORCEMENT.
8. EMBEDMENT IS NOT REQUIRED FOR STANDARD TEMPORARY WALLS ON STRUCTURES OR ROCK AS DETERMINED BY THE ENGINEER.
9. DO NOT USE MORE THAN 4 DIFFERENT REINFORCEMENT STRENGTHS FOR EACH STANDARD TEMPORARY WALL.
10. GEOGRIDS ARE TYPICALLY APPROVED FOR ULTIMATE TENSILE STRENGTHS IN THE MACHINE DIRECTION (MD) AND CROSS-MACHINE DIRECTION (CD) OR SHORT-TERM DESIGN STRENGTHS FOR A 3-YEAR DESIGN LIFE IN THE MD BASED ON MATERIAL TYPE. THE LIST OF APPROVED GEOGRIDS WITH DESIGN STRENGTHS IS AVAILABLE FROM:
connect.ncdot.gov/resources/Materials/Pages/SoilsLaboratory.aspx
DEFINE MATERIAL TYPE FROM THE WEBSITE ABOVE FOR SHORING BACKFILL AS FOLLOWS:

MATERIAL TYPE	SHORING BACKFILL
BORROW	A-2-4 SOIL
FINE AGGREGATE	CLASS II, TYPE I OR CLASS III SELECT MATERIAL
COARSE AGGREGATE	CLASS V OR VI SELECT MATERIAL

IF THE WEBSITE DOES NOT LIST A SHORT-TERM DESIGN STRENGTH FOR AN APPROVED GEOGRID, USE A SHORT-TERM DESIGN STRENGTH EQUAL TO THE ULTIMATE TENSILE STRENGTH DIVIDED BY 3.5 FOR THE GEOGRID REINFORCEMENT.

11. FOR GEOGRID REINFORCEMENT WITH LESS THAN 100% COVERAGE, STAGGER REINFORCEMENT SO GEOGRIDS ARE CENTERED OVER GAPS IN THE REINFORCEMENT LAYER BELOW.
12. AT THE CONTRACTOR'S OPTION, REINFORCEMENT MAY BE INSTALLED WITH THE MD PARALLEL TO THE WALL FACE IF BOTH OF THE FOLLOWING CONDITIONS OCCUR:
- W (REINFORCEMENT ROLL WIDTH) \geq (MINIMUM REQUIRED REINFORCEMENT LENGTH) + 4.5' AND
- REINFORCEMENT STRENGTH IN CD \geq MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD.
13. SUBMIT A "STANDARD TEMPORARY WALL SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY WALL CONSTRUCTION. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM:
connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
14. DO NOT PLACE SHORING BACKFILL OR REINFORCEMENT UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.
15. FOR STANDARD TEMPORARY WALLS WITH PILE FOUNDATIONS IN THE REINFORCED ZONE, DRIVE PILES THROUGH REINFORCEMENT AFTER CONSTRUCTING TEMPORARY WALLS.
16. DO NOT SPLICE OR OVERLAP REINFORCEMENT SO SEAMS ARE PARALLEL TO THE WALL FACE.
17. CONTACT THE ENGINEER WHEN EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT.
18. FOR STANDARD TEMPORARY WALLS WITH INTERIOR ANGLES LESS THAN 90 DEGREES, WRAP GEOSYNTHETICS AT ACUTE CORNERS AS DIRECTED BY THE ENGINEER.
19. FOR STANDARD TEMPORARY WALLS WITH TOP OF WALL WITHIN 5' OF FINISHED GRADE, REMOVE TOP FACING AND INCORPORATE TOP REINFORCEMENT LAYER INTO FILL WHEN PLACING FILL IN FRONT OF WALL.



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

STANDARD DETAIL NO. 1801.02

STANDARD
TEMPORARY WALL
SHEET 2 OF 3

—

—

GEOTECHNICAL ENGINEER

SEAL

PE #

ENGINEER

SEAL NAME

SIGNATURE

DATE

ENGINEER

SIGNATURE

DATE

DOCUMENT NOT CONSIDERED FINAL

UNLESS ALL SIGNATURES COMPLETED

WALL HEIGHT (H) + EMBEDMENT (FT)	NUMBER OF REINFORCEMENT LAYERS*
2.5 - 4	3
4 - 5.5	4
5.5 - 7	5
7 - 8.5	6
8.5 - 10	7
10 - 11.5	8
11.5 - 13	9
13 - 14.5	10
14.5 - 16	11
16 - 17.5	12
17.5 - 19	13
19 - 20.5	14
20.5 - 22	15
22 - 23.5	16
23.5 - 25	17
25 - 26.5	18
26.5 - 28	19
28 - 29.5	20

*BASED ON VERTICAL REINFORCEMENT SPACING SHOWN ON SHEET 1.

SLOPE OR SURCHARGE CASE	GROUNDWATER DEPTH BELOW BOTTOM OF REINFORCED ZONE (SEE NOTE 6 ON SHEET 2) (FT)	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)	H - WALL HEIGHT (FT)																									
			< 4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
SLOPE CASE	> 0	CLASS II,TYPE I, CLASS III,CLASS V OR CLASS VI SELECT MATERIAL	6	6	7	8	9	11	12	13	13	14	15	16	17	18	19	20	21	22	23	24	24	25	26	27	27	
SURCHARGE CASE	> 0 TO 7 FOR H < 20' > 0 TO 10 FOR H ≥ 20'	ALL SHORING BACKFILL TYPES	6	7	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	17	17	18	19	19	20	21	22	
	> 7 FOR H < 20' > 10 FOR H ≥ 20'	A-2-4 SOIL	6	6	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	16	17	18	18	19	20	20	21	
		CLASS II,TYPE I OR CLASS III SELECT MATERIAL	6	6	7	7	8	8	9	10	10	11	11	12	12	13	14	15	15	16	16	17	17	18	18	19	20	
		CLASS V OR CLASS VI SELECT MATERIAL	6	6	7	7	7	8	8	9	9	10	10	11	12	13	13	14	14	15	15	16	17	17	18	19	19	

L – MINIMUM REQUIRED REINFORCEMENT LENGTH (FT)

(FOR ALL REINFORCEMENT TYPES)

REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II,TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL	A-2-4 SOIL	CLASS II,TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL
1	2400	2400	2400	2400	2400
2	2400	2400	2400	2400	2400
3	2400	2400	2400	2400	2400
4	2400	2400	2500	2400	2400
5	2500	2400	3000	2400	2400
6	3000	2400	3500	2800	2400
7	3500	2700	4000	3200	2600
8	4000	3100	4500	3600	2900
9	4500	3500	5000	4000	3200
10	5000	3900	5500	4400	3500
11	5500	4300	6000	4800	3800
12	6000	4700	6500	5200	4100
13	6500	5100	7000	5600	4400
14	7000	5400	7500	6000	4700
15	7500	5800	8000	6400	5000
16	8000	6200	8500	6800	5300
17	8500	6600	9000	7200	5600
18	9000	7000	9500	7600	5900
19	9500	7400	10000	8000	6200
20	10000	7800	10500	8400	6500

GEOTEXTILE REINFORCEMENT

ULTIMATE TENSILE STRENGTH (LB/FT)

REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II,TYPE I OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL	A-2-4 SOIL	CLASS II,TYPE I OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL
1	240	200	340	290	240
2	380	310	520	430	350
3	530	420	700	570	460
4	690	550	870	720	570
5	860	690	1050	860	680
6	1030	830	1220	1000	790
7	1200	970	1400	1150	900
8	1370	1110	1580	1290	1010
9	1550	1240	1750	1430	1120
10	1720	1380	1930	1580	1230
11	1890	1520	2100	1720	1340
12	2060	1660	2280	1860	1450
13	2240	1800	2450	2010	1560
14	2410	1940	2630	2150	1670
15	2580	2080	2800	2290	1780
16	2750	2220	2980	2440	1890
17	2930	2360	3160	2580	2000
18	3100	2500	3330	2720	2110
19	3270	2640	3510	2860	2220
20	3440	2780	3690	3000	2330

GEOGRID REINFORCEMENT

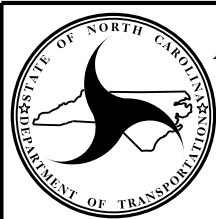
SHORT-TERM DESIGN STRENGTH (LB/FT)

(SEE NOTE 10 ON SHEET 2.)

MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD

(SEE NOTE 9 ON SHEET 2.)

*SEE PARTIAL ELEVATION ON SHEET 1 FOR REINFORCEMENT LAYER NUMBERING.



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

STANDARD DETAIL NO. 1801.02

STANDARD
TEMPORARY WALL
SHEET 3 OF 3



Technical Proposal
**S-31 (CANNONS CAMPGROUND RD.)
OVER PETERS CREEK
EMERGENCY BRIDGE REPLACEMENT**

Spartanburg County, SC

Contract ID Number
P041165

