



South Carolina Department of Transportation

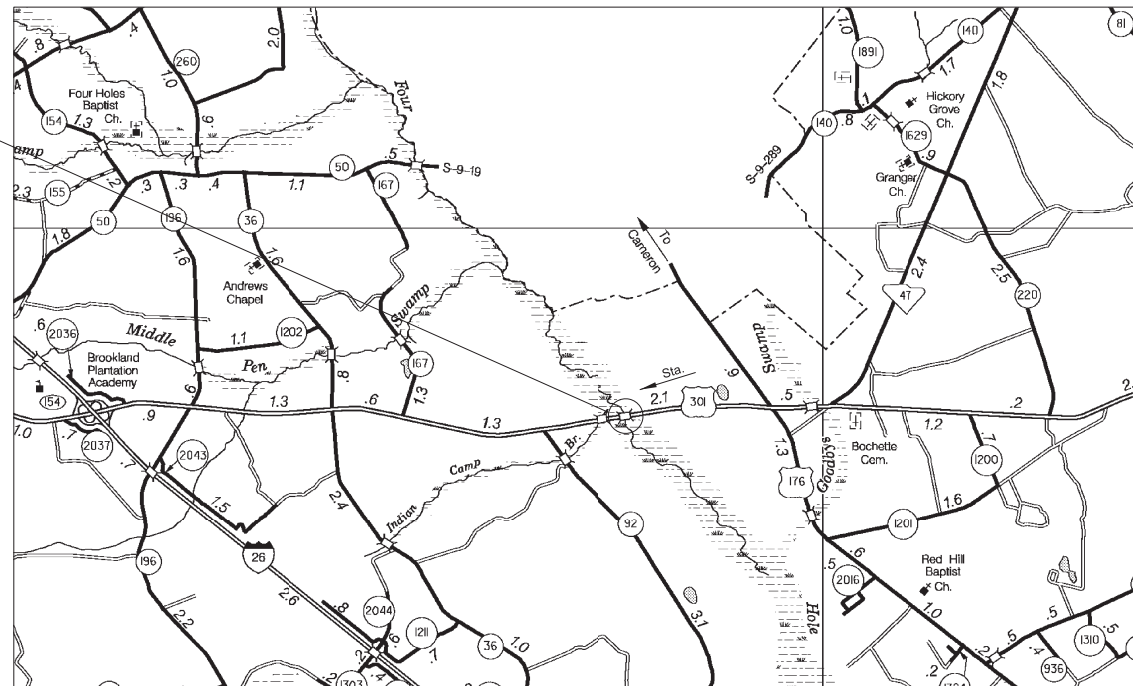
PROPOSED PLANS FOR

ORANGEBURG COUNTY PROJECT ID: 0040308 US ROUTE 301 SOUTHBOUND (FIVE CHOP ROAD) REPLACE BRIDGE OVER FOUR HOLE SWAMP

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SITE LOCATION



-N-

Submit Shop Plans to:
SCDOT
Preconstruction Support Engineer
Attn: Logistics Coordinator - Shop Plans
955 Park Street - Room 409
Columbia, SC 29201

Approximate Location of Bridge is
Latitude 33°-27'-27" N
Longitude 80°-38'-55" W

	FOR CONSTRUCTION	
	INITIAL	DATE
RPG - HYDROLOGY		
RPG - STRUCTURES		
RPG - GEOTECHNICAL		
PRECONSTRUCTION SUPPORT - STRUCTURES		
RPG - DESIGN MANAGER		
RPG - PROGRAM MANAGER		

LAYOUT

NET LENGTH OF ROADWAY	0.000 MILES
NET LENGTH OF BRIDGES	0.055 MILES
NET LENGTH OF PROJECT	0.055 MILES
LENGTH OF EXCEPTIONS	0.000 MILES
GROSS LENGTH OF PROJECT	0.055 MILES

NOTE: EXCEPT AS MAY OTHERWISE BE SPECIFIED ON THE PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIALS AND WORKMANSHIP ON THIS PROJECT SHALL CONFORM TO THE SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION (2007 EDITION) AND THE STANDARD DRAWINGS FOR ROAD CONSTRUCTION IN EFFECT AT THE TIME OF LETTING.

3 DAYS BEFORE DIGGING IN
SOUTH CAROLINA
CALL 811
SOUTH CAROLINA 811 (SC811)
WWW.SC811.COM
ALL UTILITIES MAY NOT BE A MEMBER OF SC811

ASSET ID 1753

TRAFFIC DATA			
2013	ADT	11500	V.P.D.
2033	ADT	17500	V.P.D.
	TRUCKS	17	%

ENGINEER OF RECORD

**NOT FOR
CONSTRUCTION**

FOR CONSTRUCTION DATE

REVIEWED	DR.	MFB	GFD	8-14	DATE

DebaughtGF, Thursday, December 29, 2016 1:58:10 PM
 Printed: Thursday, December 29, 2016 1:58:10 PM

SUMMARY OF ESTIMATED QUANTITIES			
ITEM NO.	B I D I T E M	UNIT	QUANTITY
1075001	MONITORING OF CONSTRUCTION-RELATED EARTHBORNE VIBRATIONS	LS	NEC.
2028100	REMOVAL & DISPOSAL OF EXISTING BRIDGE	LS	NEC.
2033025	BORROW EXCAVATION - (AASHTO TYPE A-1 SAND) ●	TON	1110.000
2043000	WET EXCAVATION FOR BRIDGES*	CY	3150.000
2045040	COFFERDAM - TYPE 4 (30,001 - 40,000 C.F.)	EA	6.000
2103000	FLOWABLE FILL	CY	1682.000
6750278	FURNISH & INSTALL 2.0" SCHEDULE 80 PVC CONDUIT	LF	1340.000
7011400	CONC. FOR STRUCTURES - CLASS 4000	CY	1015.100
7011600	CONC. FOR STRUCTURES - CLASS 5000	CY	316.300
7020300	COMPRESSION SEAL JOINT	LF	94.500
7023200	GROOVED SURFACE FINISH	SY	1368.000
7031200	REINF. STEEL FOR STRUCTURES (BRIDGE)	LB	281511.000
7031220	HOOP REINFORCING STEEL FOR STRUCTURES (BRIDGE)	LB	18408.000
7051000	CONCRETE BRIDGE BARRIER PARAPET	LF	619.300
7051910	CONCRETE BRIDGE BARRIER PARAPET TRANSITION	EA	3.000
7110001	DYNAMIC PILE ANAL. TEST SET-UP	EA	16.000
7110010	PILE DRIVING SET-UP	EA	42.000
7112220	STEEL H BEARING PILING (HP 14 X 73)*	LF	375.000
7112222	STEEL H BEARING INDEX PILING (HP 14 X 73)*	LF	79.000
7113480	STEEL PIPE PILING (48" DIAMETER) ⊗	LF	2520.000
7113482	STEEL PIPE INDEX PILING (48" DIAMETER) ⊗	LF	642.000
7243150	ELASTOMERIC BEARING ASSEMBLY (FLAT SLAB)	EA	10.000
8041010	RIP-RAP (CLASS-A)	TON	630.000
8048105	GEOTEXTILE FOR EROSION CONTROL UNDER RIP RAP (CLASS 1) TYPE B	SY	822.000
8990566	CLASS 5000 CONCRETE WITH FIBER (HIGH SLUMP) *	CY	238.200

Notes:

- For use as Class A-1-a loose sand backfill inside Steel Pipe Piles. See Interior Bent Geotechnical Notes, Sh. 22.
- * Provide HP14x73 Steel Piling that conforms to the latest AASHTO Specifications for M270 Steel with a minimum yield strength of 50 ksi.
- ⊗ Provide 48" Dia. Steel Pipe Piling that conforms to the latest ASTM Specifications for A252 Grade 3 Modified Steel with a minimum yield strength of 50 ksi.
- * Wet Excavation to include cofferdam excavation (See Cofferdam Backfill detail, Sh. 22) and soil extracted from inside of steel pipe piles to facilitate driving of pile through very dense layers.
- * See Special Provisions.

TABULATION OF ESTIMATED BRIDGE QUANTITIES

ITEM	NO.	CONC. FOR STRUCTURES CLASS 4000	CONC. FOR STRUCTURES CLASS 5000	REINF. STEEL FOR STRUCTURES (BRIDGE)	HOOP REINF. STEEL FOR STRUCTURES (BRIDGE)	CONC. BRIDGE BARRIER PARAPET	CONC. BRIDGE BARRIER PARAPET TRANSITION	DYNAMIC PILE ANAL. TEST SET-UP	PILE DRIVING SET-UP	STEEL PILING (HP14X73)	STEEL INDEX PILING (HP14X73)	STEEL PIPE PILING (48" DIA.)	STEEL INDEX PIPE PILING (48" DIA.)	ELASTOMERIC BEARING ASSEMBLY (FLAT SLAB)	CONC. CLASS 5000 WITH FIBER (HIGH SLUMP)
		CY	CY	LB	LB	LF	EA	EA	EA	LF	LF	LF	LF	EA	CY
End Bents 1 & 8	2	—	37.4	8,093	—	—	—	4	12	375	79	—	—	—	—
Interior Bents 2 thru 7	6	—	278.9	77,240	18,408	—	—	12	30	—	—	2,520	642	—	238.2
132' Span Superstructure	2	852.7	—	161,966	—	527.5	—	—	—	—	—	—	—	8	—
30' Span Superstructure	1	84.2	—	15,964	—	59.8	—	—	—	—	—	—	—	2	—
Approach Slabs	2	78.2	—	18,248	—	32.0	3	—	—	—	—	—	—	—	—
TOTALS		1015.1	316.3	281,511	18,408	619.3	3	16	42	375	79	2,520	642	10	238.2

NOT FOR CONSTRUCTION

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

SUMMARY
OF ESTIMATED
QUANTITIES

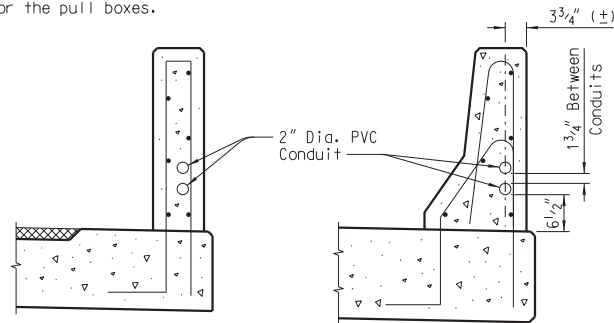
COUNTY	ORANGEBURG	ROUTE	US 301
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GENERAL CONDUIT NOTES

Furnish and install approved conduits and fittings in accordance with the National Electric Code (NEC) and as directed by the RCE.

Furnish Schedule 80 PVC rigid nonmetallic conduits in accordance with NEMA TC-2 and UL Standard 651 and furnish fittings in accordance with NEMA TC-3 and UL Standard 514B. Furnish conduit and fittings with UL labels; conduit - on each 10 foot length; fittings - stamped or molded on each fitting. Connect conduit and fittings using solvent cement in accordance with manufacturer's recommendations.

Furnish and install NEMA Type 4X non-metallic or galvanized steel pull boxes sized in accordance with NEC requirements and the maximum limits shown. Provide gasketed weatherproof covers for the pull boxes.



SECTION THRU BARRIER TRANSITION **SECTION THRU BARRIER PARAPET**

DETAILS OF CONDUIT IN BARRIER PARAPET

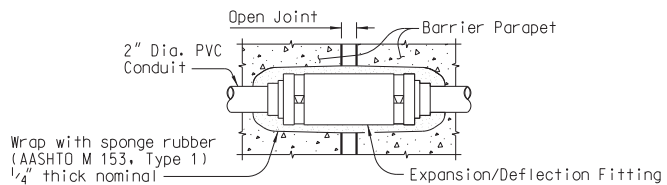
(Typ. ea. side of bridge)

Use Schedule 80 PVC nonmetallic pipe for conduit.

Extend conduits 6 inches beyond each end of the barrier parapet transition and cap with watertight covers.

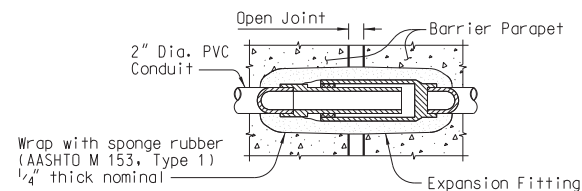
Provide expansion fittings and/or expansion/deflection fittings at all open joints in the barrier parapet.

Include all costs for furnishing and installing conduit, expansion/deflection and/or expansion fittings, and any incidentals required in the unit price bid for 2.0" Schedule 80 PVC Conduit.



EXPANSION / DEFLECTION FITTING DETAIL

(For open joints located at End Bents 1 & 8)



EXPANSION FITTING DETAIL

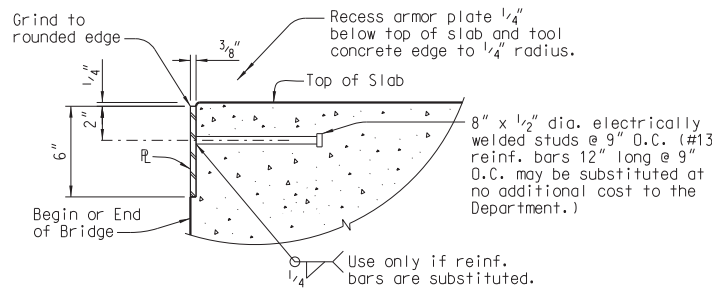
(For open joints located at Interior Bents 4 & 7)

WATER ELEVATIONS

The water elevations shown in the plans are for information only and the actual water elevation during construction may vary depending on weather conditions and seasonal fluctuations.

ORIENTATION IN RELATION TO STATIONING

Left and right sides, where referred to in these plans, are in relation to direction of stationing.



ARMOR PLATE DETAIL AT END BENTS

Install 3/8" thick plates, as detailed above, at the beginning and end of the bridge.

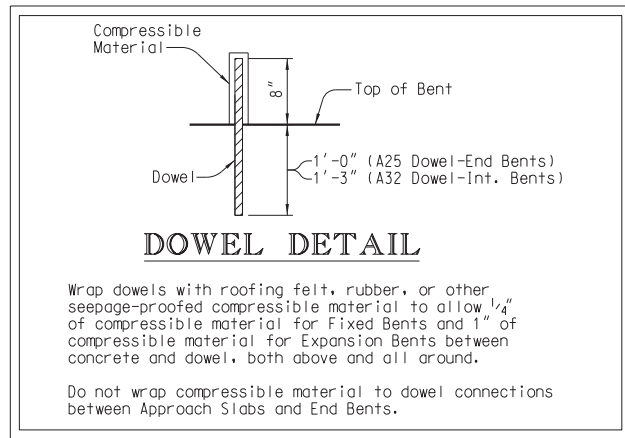
Provide steel for the armor plates that conforms to the latest AASHTO M 270 Grade 50W (ASTM A 709 Gr. 50W) steel and neither the plates nor the anchor studs need to be painted.

Provide fabricated plates that conform to the crown and grade of the roadway and extend from gutter line to gutter line. The plates may be fabricated in reasonable lengths and connected at the job site with full penetration butt welds ground flush along the top face of connected plates.

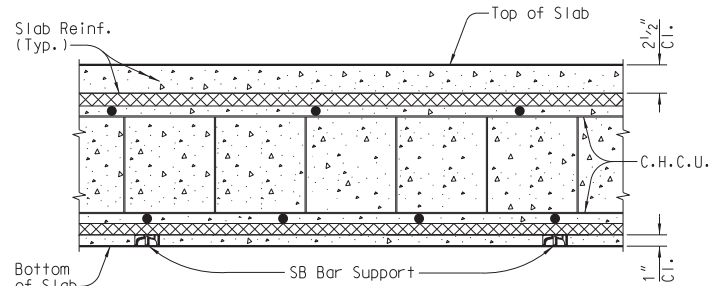
If necessary, longitudinal reinforcing bars of the slab may be shifted laterally to clear anchor studs.

Holes, 3/16" dia., spaced approximately 2'-0" on center may be provided in the lower portion of the plates to bolt the plates to the forms.

Include all costs of material and workmanship to fabricate, furnish, and install the armor plates and anchor studs complete and in place, in the unit price bid for Class 4000 concrete.



DOWEL DETAIL



BAR SUPPORT DETAIL

Section Parallel to C Roadway

For bar supports that contact forms or floor surfaces, use plastic bar supports that conform to the requirements of the Standard Specifications. Protect the plastic bar supports from exposure to sunlight until placed in the form. Where removable forms are used, do not use continuous legs or rails that are in contact with the forms.

For supports that do not contact forms or floor surfaces, use wire bar supports that conform to the requirements of the Standard Specifications. In applications where galvanized bars are used, use galvanized wire supports.

MATERIAL AND WORKMANSHIP

Provide all material and workmanship in accordance with the South Carolina Department of Transportation 2007 Standard Specifications for Highway Construction, unless otherwise specified on the Plans or in the Special Provisions.

COMPLETION DATES

On inside face of right side barrier parapet/railing at beginning of bridge and on left side barrier parapet/railing at end of bridge, place year of completion adjacent to guardrail attachment. Place this completion date so that it will not be covered by the guardrail connector when it is installed. Recess numbers in the concrete using numbers fabricated from reusable/durable material that is approved by the RCE. Provide numbers in accordance with SCDOT Standard Drawing No. 702-305-00.

REINFORCING STEEL

Fabricate reinforcing bars in accordance with the current C.R.S.I. Manual of Standard Practice except for ties, stirrups, and welded hoops.

Provide all ties and stirrups with 135° hooks that have extensions no less than the larger of ten bar diameters or six inches. This 135° hook requirement does not apply to stirrups extending from prestressed concrete beams. The fabrication tolerance for out-to-out dimension of welded hoop diameter is ± 1/2 inch.

Do not use lap splices in column and shaft reinforcing steel.

CONCRETE

Provide the class of concrete as noted in the contract documents. For cast-in-place structural elements, use Class 4000 concrete where the class of concrete is not specified in the contract documents.

Payment for concrete in slab is based on theoretical plan quantity. No adjustment is made for variation in camber.

Chamfer all exposed edges 3/4" unless otherwise noted.

The minimum acceptable concrete cover for reinforcing steel is 1/2" less than the plan dimensions when required by reinforcing bar fabrication tolerances.

Cast shear keys on bent caps monolithic with the cap unless indicated otherwise in these plans. Construct the top of each shear key level.

GRINDING & TEXTURING CONCRETE DECKS

For bridge stage construction projects, grind and texture the bridge decks as necessary near the stage longitudinal construction joints in order to meet the longitudinal and transverse rideability and rolling straightedge requirements of the Contract.

Prior to casting any closure pour, grinding, or texturing, make profile line surveys (2 to 6 as determined by the RCE) of each stage of the bridge decks. Make one of these profile line surveys for each stage along the edge of the deck adjacent to the closure pour. Compare the surveys within each stage and compare the surveys of each stage to surveys of the adjacent stage to aid in determining the amount of grinding and texturing needed to meet the rideability and rolling straightedge requirements. Submit all grinding and texturing procedures, plotted survey profiles, and proposed grinding depths to the RCE for approval. Maintain a final cover of 2" minimum over the bridge deck reinforcing steel.

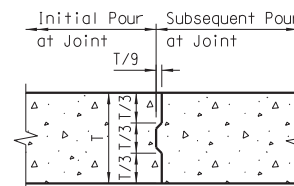
Follow the above procedures for all stages of the work. For all surveys performed on the same bridge, use identical stations for survey shots in order to facilitate survey comparisons. All costs for performing, evaluating, and submitting the surveys are considered incidental to the Contract and no additional compensation is allowed for the performance of this work.

Payment for grinding and texturing concrete bridge decks at the junction of new and existing bridge deck slabs is determined in accordance with Subsection 702.6 of the Standard Specifications. No payment is made for grinding and texturing of new bridge decks to correct irregularities and excessive deviations.

ALLOWANCE FOR DEAD LOAD DEFLECTION AND SETTLEMENT

In setting falsework for reinforced concrete spans, make an allowance for the deflection of the falsework, for any settlement of the falsework, for the instantaneous dead load deflection of the span, and for the long-time dead load deflection of the span such that on removal of the falsework the top of the structure shall conform to theoretical finished grade plus the allowance for long-time deflection.

For instantaneous and long-time dead load deflection, use a camber of 1/8" for concrete flat slab spans 22 feet in length, 3/16" for concrete flat slab spans 30 feet in length, and 3/8" for concrete flat slab spans 40 feet and 44 feet in length, unless otherwise directed by the RCE. Adjust these cambers as necessary to allow for falsework deflection, falsework settlement and vertical curve ordinates.



CONST. JT. DETAIL

Before making subsequent pour, wait either a minimum of 96 hours after placement of the initial pour or until the initial pour concrete has attained a minimum of 75% of the specified 28-day compressive strength as verified by testing extra cylinders.

COORDINATION OF PLANS, SPECIFICATIONS, AND SPECIAL PROVISIONS

Generally, in case of discrepancy, this General Notes and Details for Flat Slabs sheet governs over the Standard Specifications but the remainder of the plans govern over notes on this sheet and Special Provisions govern over all. See Subsection 105.4 of the Standard Specifications.

DRIVEN PILE FOUNDATIONS

Where piles occur in fill, place fill before driving piles.

Where prestressed concrete piles are to be driven through fill, install piles in pre-bored holes extending to the original ground. For square prestressed concrete piles bore holes having a minimum diameter of 1.25 times the nominal pile size. Include all cost of pre-boring fills for pile installation in the unit price bid for the piles.

EXCAVATION FOR END BENTS

Include all cost of excavation necessary to construct end bents and to remove material under superstructure to an elevation twelve inches below tops of end bent caps, in the unit price bid for class of concrete specified in the Plans.

If a concrete footing is used for the end bent, the excavation below that included for the cap and berm in the above paragraph is paid for at the unit price bid for excavation. Include excavation above this in the unit price bid for class of concrete specified in the Plans.

BEARINGS

Provide a suitable trowel finish to the top surface of concrete caps where concrete slabs bear. See Subsection 702.4.13 of the Standard Specifications.

SPECIFICATIONS

AASHTO 2012 LRFD Bridge Design Specifications, 6th Edition, with Interim Revisions through 2013.

ANSI/AASHTO/AWS D1.5 Bridge Welding Code (latest edition), with additions and revisions as stated in the Standard Specifications.

DESIGN DATA

Load and Resistance Factor Design (LRFD) method

Live Load: AASHTO HL-93 loading

The top 1/4" of all concrete slabs is considered as a wearing surface and is not included in the slab depth used for the calculation of section properties.

An extra dead load of 0.015 KSF is incorporated into the design of this structure as an allowance for a future wearing surface.

Seismic design is in accordance with the 2008 SCDOT "Seismic Design Specifications for Highway Bridges", Version 2.0, with the following parameters:

Seismic Design Category: C

Analysis Method: Multimode Spectral with Pushover

Operational Classification: II

Site Class: D

Design Acceleration Coefficients:

PGA (FEE):	0.20 g	PGA (SEE):	0.43 g
S _s (FEE):	0.39 g	S _s (SEE):	0.87 g
S ₀₁ (FEE):	0.18 g	S ₀₁ (SEE):	0.49 g

Values determined from Three Point Method

FINAL FINISH OF EXPOSED CONCRETE SURFACES

Apply the final surface finish on the bridge(s) only to the following checked and designated bridge areas:

- A) Entire surface of all barrier rails, parapet walls, approach slab curbs, concrete utility supports, and wing walls; outside vertical edge of bridge deck slabs and sidewalks.
 - B) Outside face of exterior prestressed girders.
 - C) Entire surface of designated substructure units, except top of bent caps and piers.
 - D) No final surface required.
- All Units Designated Units:

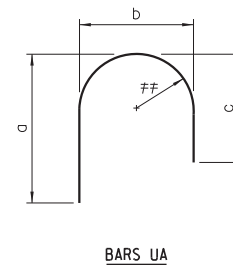
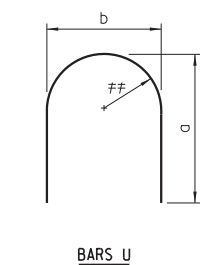
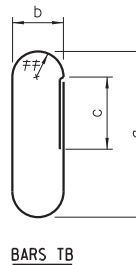
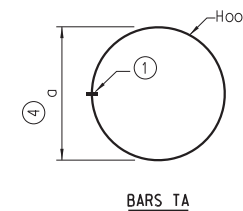
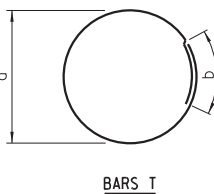
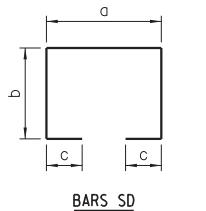
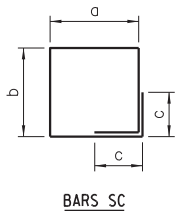
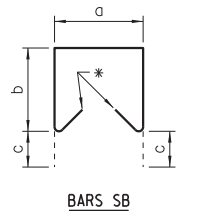
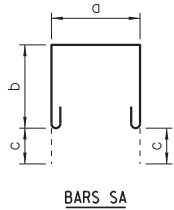
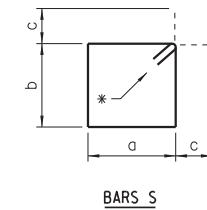
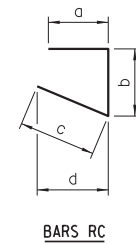
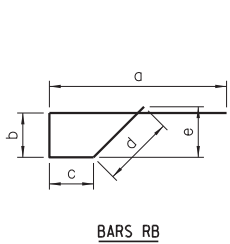
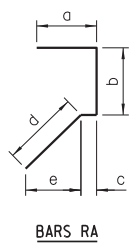
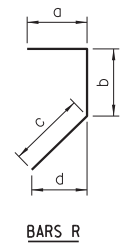
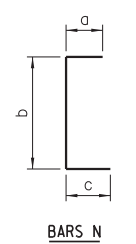
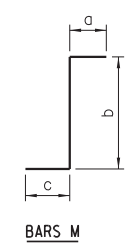
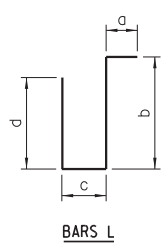
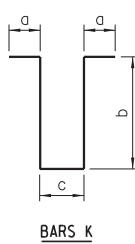
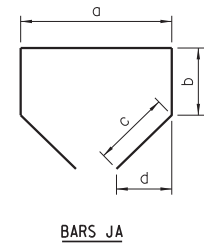
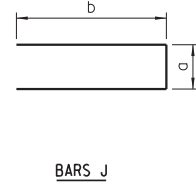
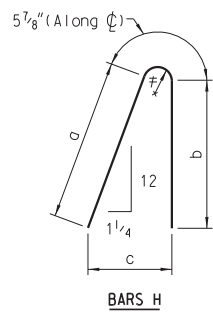
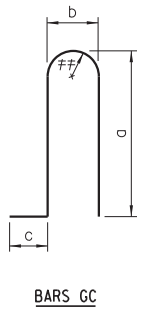
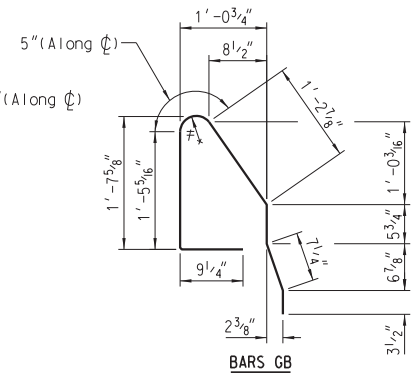
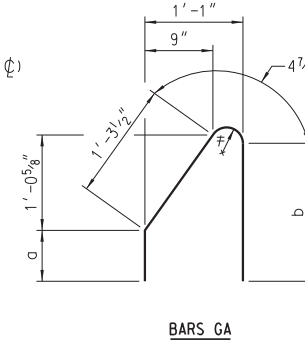
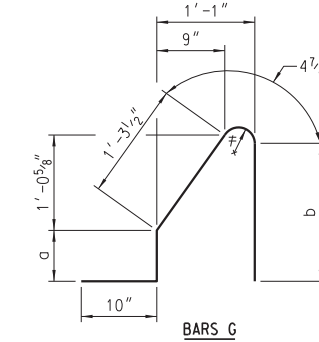
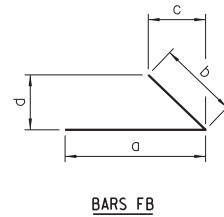
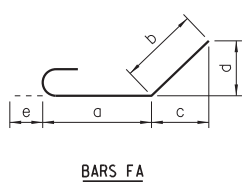
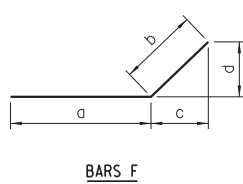
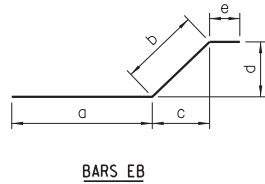
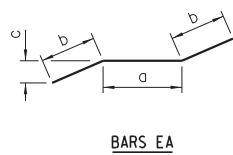
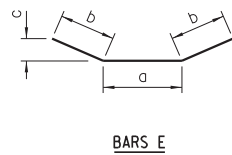
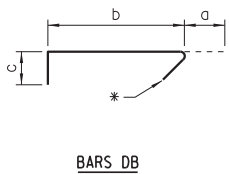
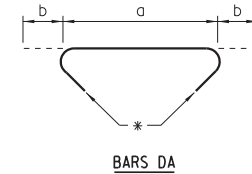
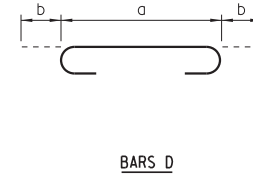
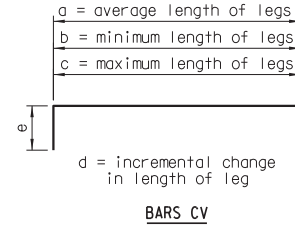
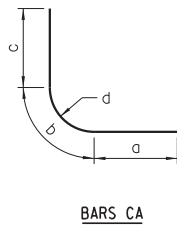
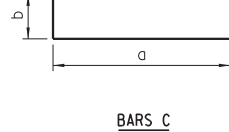
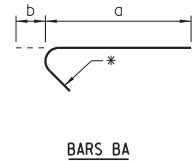
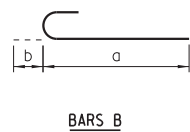
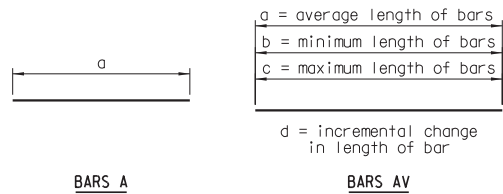
NOT FOR CONSTRUCTION

**SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION**

**GENERAL NOTES
AND DETAILS
FOR FLAT SLABS**

COUNTY
ORANGEBURG

ROUTE
US 301

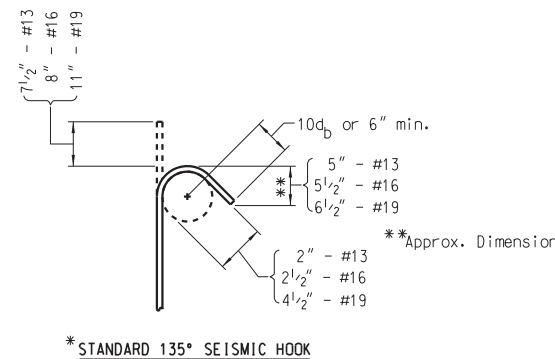
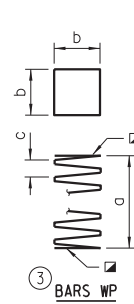
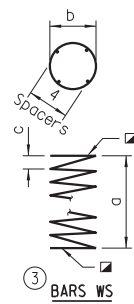
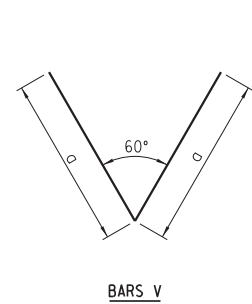


Notes:
Dimensions shown are out-to-out and Standard C.R.S.I. bending details shall apply, except as noted.
- 1 5/8" Inside Radius
- Outside Radius = b/2
☑ - 1 1/2 turns @ a closed pitch secured by an ultimate welded lap splice.

REINFORCING STEEL CODE

TYPE	SIZE	SERIES	COUPLER
A	16	01	(2)

- Ultimate Butt-Welded Splice - Use complete joint penetration butt weld conforming to the requirements of AWS D1.4/D1.4M Structural Welding Code - Reinforcing Steel (Latest Edition) and the Standard Specifications.
- If a mechanical coupler is required, the reinforcing steel code includes a designation of "S" for a standard coupler and a designation of "U" for an Ultimate Coupler. Unless noted otherwise, bar lengths shown in the Reinforcing Steel Schedules are to the center of the coupler. If necessary, adjust the length of the bars to maintain the required concrete cover.
- Splice WS and WP bars with either ultimate welded lap splices or ultimate mechanical couplers. Use over and under lap splices, not side by side, to maintain bar clearances.
- The fabrication tolerance for welded hoop diameter is ± 1/2 inch.



NOT FOR CONSTRUCTION

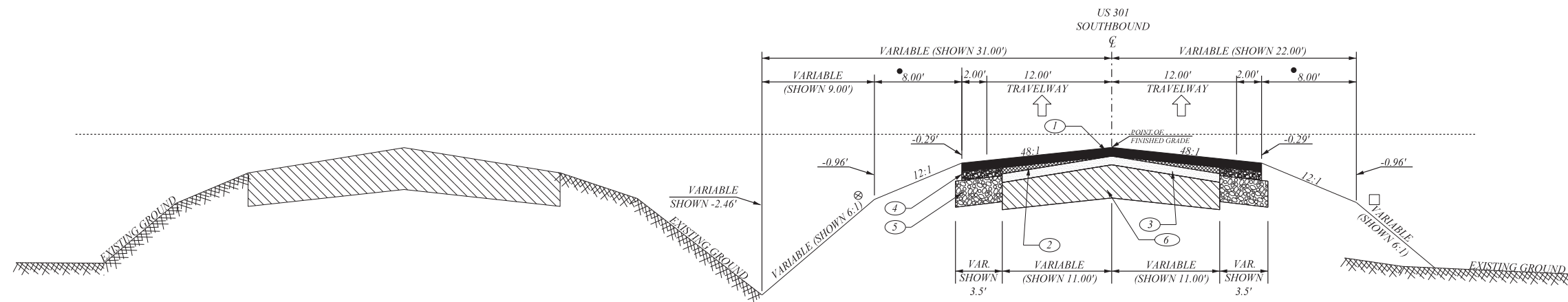
SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

REINFORCING BENDING
DETAILS

COUNTY ORANGEBURG ROUTE US 301

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROUTE	SHEET NO.
3	SC	ORANGEBURG	0040308	US 301	5

TYPICAL SECTION OF IMPROVEMENT SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION COLUMBIA, S.C.



*USE THIS TYPICAL SECTION ON US ROUTE 301 SOUTHBOUND
FROM STATION 5941+ 40.00 TO 5960+ 00.00*

FOR INFORMATION ONLY

⊗ NOTES:

THIS SLOPE MAY BE VARIED WHEN A DEEPER DITCH IS NECESSARY FOR DRAINAGE PURPOSES, USING A MINIMUM SLOPE OF 12:1 AND A MAXIMUM SLOPE OF 4:1. WHERE A DEEPER DITCH THAN PROVIDED BY A 4:1 IS NECESSARY, THE DITCH SHALL BE PLACED FARTHER FROM THE \mathcal{C} CONTINUING THE 4:1 SLOPE TO PROVIDE FOR THE NECESSARY DEPTH. SEE PROFILE FOR THE SPECIAL DITCH GRADES.

□ FILL SLOPES

- 6:1-----0' TO 5' FILL
- 4:1-----5' TO 10' FILL
- 2:1-----OVER 10' FILL
- IF 2:1 SLOPE IS USED, WIDEN SHOULDER 3.5' FOR GUARDRAIL

PAVEMENT LEGEND

①		HOT MIX ASPHALT SURFACE COURSE TYPE B (200 LBS/SY)
②		HOT MIX ASPHALT INTERMEDIATE COURSE TYPE B FOR BUILDUP AND LEVELING
③		MILL EXISTING SURFACE 2" & REPLACE WITH HMA SURFACE TYPE B (200 LBS/SY)
④		HOT MIX ASPHALT INTERMEDIATE COURSE TYPE B (200 LBS/SY)
⑤		HOT MIX ASPHALT BASE COURSE TYPE A (600 LBS/SY)
⑥		EXISTING ASPHALT PAVEMENT - RETAIN

US ROUTE 301	RURAL PRINCIPAL ARTERIAL	DESIGN SPEED	
		MPH	FROM STA. TO STA.
		60	5941+ 40.00 TO 5960+ 00.00
EXCEPTIONS TO DESIGN SPEED			

**NOT FOR
CONSTRUCTION**

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
SIGN COLUMBIA, S.C.

TYPICAL SECTION

SCALE 1"=40' RTE./RD.

UTILITY OWNERS:		ABOVE GROUND	BURIED	BOTH
POWER:	DEPT. OF PUBLIC UTILITY	X		
TELEPHONE:	AT&T		X	
GAS:	DEPT. OF PUBLIC UTILITY		X	
SEWER:	N/A			
CABLE TV:	N/A			
WATER:	DEPT. OF PUBLIC UTILITY		X	

ALIGNMENT CONTROL CAN BE FOUND ON REFERENCE SHEET

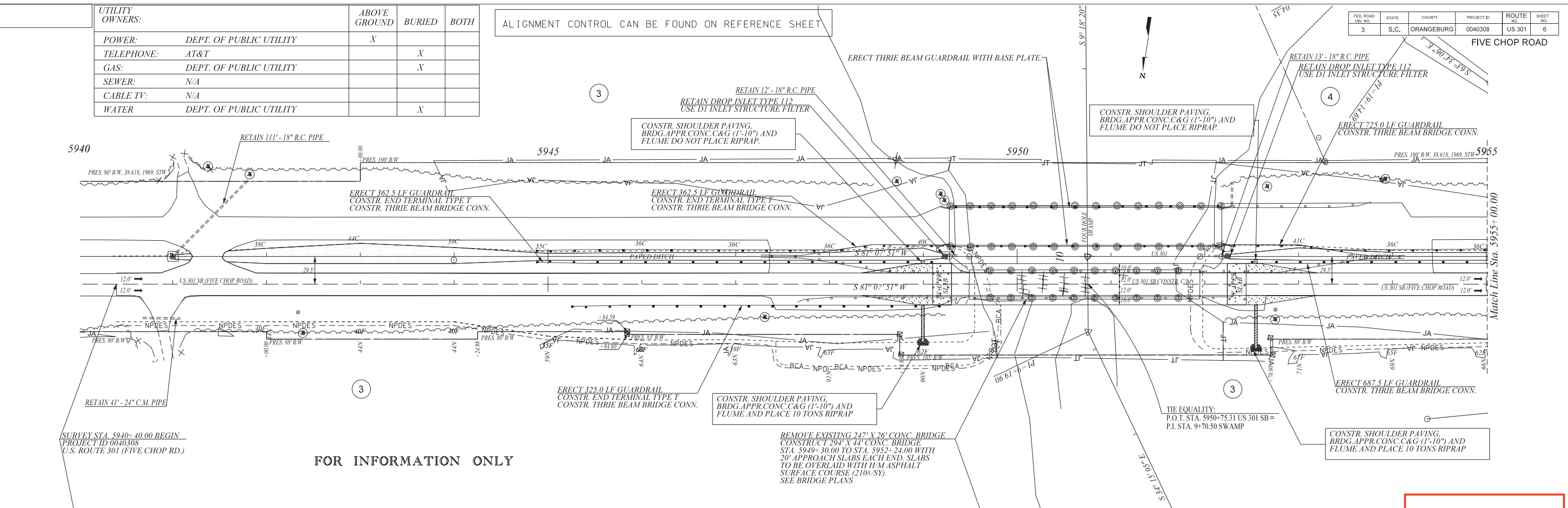
FED. ROAD DIST. NO.	STATE	COUNTY	PROJECT ID	ROUTE NO.	SHEET NO.
3	S.C.	ORANGEBURG	0040308	US 301	6

FIVE CHOP ROAD

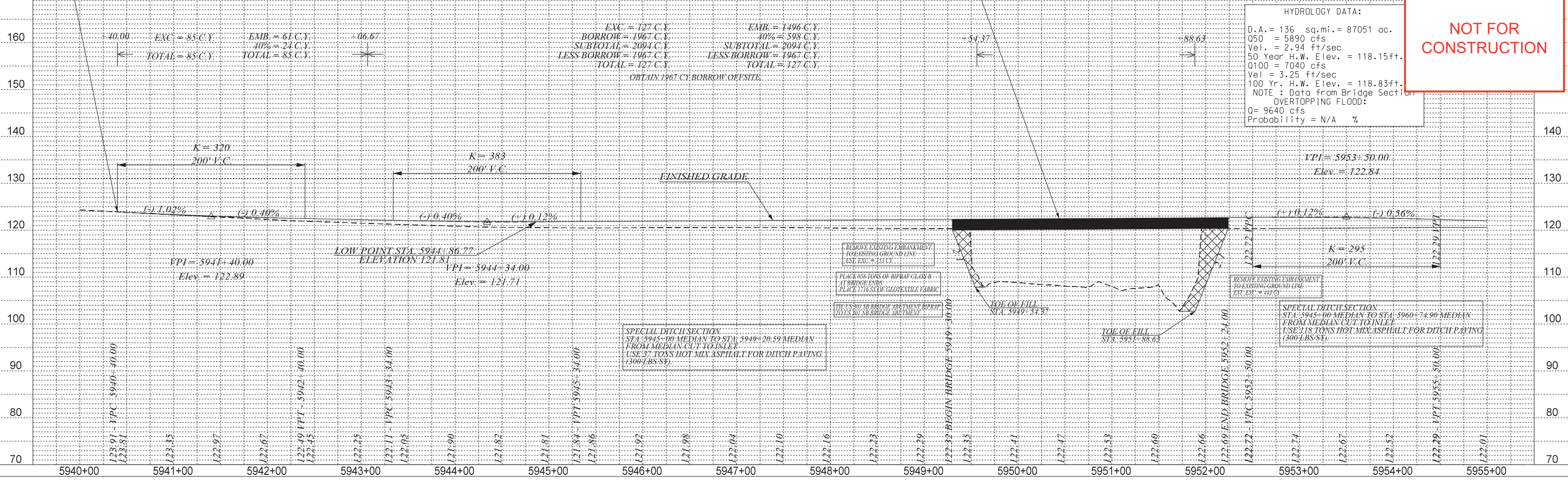
DATE	BY	REVISION

McKownWR
P:\orangeburg\40308-us301\road\40308p6.dgn
02-NOV-2016

DATE	BY	REVISION



FOR INFORMATION ONLY



NOT FOR CONSTRUCTION

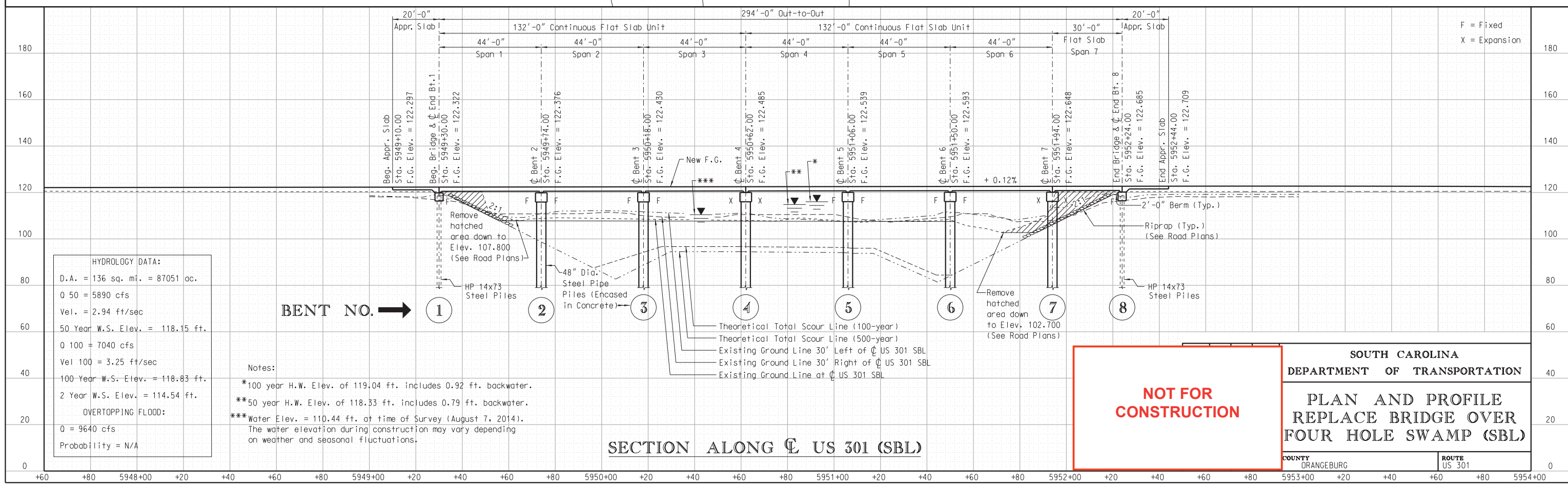
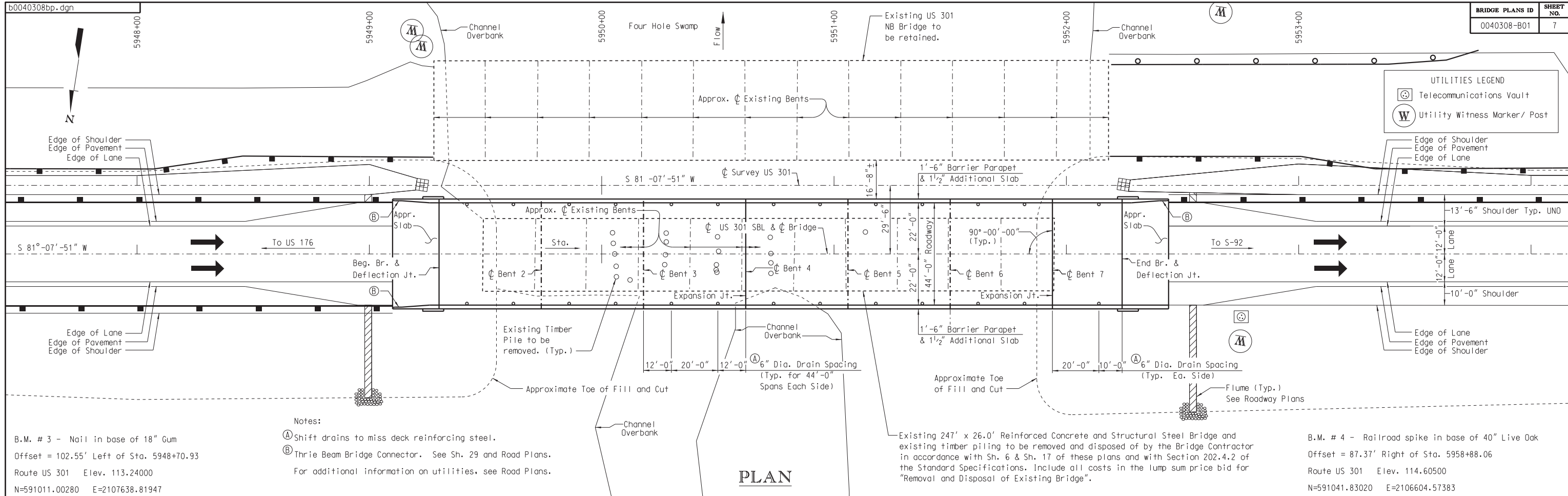
HYDROLOGY DATA:
 D.A. = 136 sq.mi. = 87051 ac.
 Q50 = 5890 cfs
 Vel. = 2.94 ft/sec
 50 Year H.W. Elev. = 118.15ft.
 Q100 = 7040 cfs
 Vel. = 3.25 ft/sec
 100 Yr. H.W. Elev. = 118.83ft.
 NOTE: Data from Bridge Section
OVERTOPPING FLOOD:
 Q = 9640 cfs
 Probability = N/A %

SPECIAL DITCH SECTION
 STA. 5945+00 MEDIAN TO STA. 5949+00 MEDIAN
 FROM MEDIAN CUT TO INLET
 USE 37 TONS HOT MIX ASPHALT FOR DITCH PAVING
 (300 LBS/SY)

REMOVE EXISTING EMBANKMENT
 TO EXISTING GROUND LINE
 EXT. EXC. = 131.13'

REMOVE EXISTING EMBANKMENT
 TO EXISTING GROUND LINE
 EXT. EXC. = 48.00'

SPECIAL DITCH SECTION
 STA. 5945+00 MEDIAN TO STA. 5960+74.90 MEDIAN
 FROM MEDIAN CUT TO INLET
 USE 118 TONS HOT MIX ASPHALT FOR DITCH PAVING
 (300 LBS/SY)



Printed: Friday, February 10, 2017 3:21:45 PM
 Border Sheet 6/08

5948+00

5949+00

5950+00

5951+00

5952+00

5953+00

5954+00



Four Hole Swamp



Existing US 301 NBL Bridge to be retained.



UTILITIES LEGEND

-  Telecommunications Vault
-  Utility Witness Marker/ Post

Boring B-1
Sta. 5949+31.00
13'-0" Left of
US 301 SBL

Boring B-3A
Sta. 5950+10.72
6'-3" Left of
US 301 SBL

Boring B-5
Sta. 5950+98.00
8'-0" Left of
US 301 SBL

Boring B-6A
Sta. 5951+42.68
7'-3 3/8" Left of
US 301 SBL

Boring B-7
Sta. 5951+86.00
8'-0" Left of
US 301 SBL

Boring B-9
Sta. 5952+28.00
8'-0" Left of
US 301 SBL

S 81°-07'-51" W

Survey US 301

S 81°-07'-51" W

To US 176

End Bent 1 & Beg. Br.

Existing Timber Pile (Typ.)

90°-00'-00" (Typ.)

Sta.

Approx. Existing Bents

US 301 SBL & Bridge

16'-8 1/2"

29'-6"

22'-0"

44'-0" Roadway

22'-0"

To S-92

Appr. Slab

End Bent 8 & End Br.

13'-6" Shoulder Typ. UNO

12'-0" Lane

12'-0" Lane

10'-0" Shoulder

Boring B-1A
Sta. 5949+31.74
8'-9" Right of
US 301 SBL

Boring B-2
Sta. 5949+65.00
9'-0" Right of
US 301 SBL

Boring B-3
Sta. 5950+02.00
3'-0" Right of
US 301 SBL

Boring B-4
Sta. 5950+42.00
8'-0" Right of
US 301 SBL

Boring B-5A
Sta. 5950+99.11
8'-1 1/2" Right of
US 301 SBL

Boring B-6
Sta. 5951+41.00
8'-0" Right of
US 301 SBL

Boring B-7A
Sta. 5951+87.63
8'-4 1/8" Right of
US 301 SBL

Boring B-8
Sta. 5952+17.00
8'-0" Right of
US 301 SBL



Existing US 301 SBL Bridge to be removed.

PLAN

FOR INFORMATION ONLY

**NOT FOR
CONSTRUCTION**

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

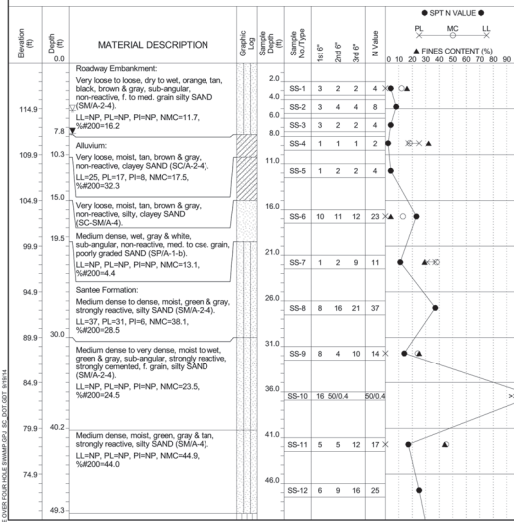
BORING LOCATIONS

COUNTY ORANGEBURG	ROUTE US 301
--------------------------	---------------------

+60 +80 5948+00 +20 +40 +60 +80 5949+00 +20 +40 +60 +80 5950+00 +20 +40 +60 +80 5951+00 +20 +40 +60 +80 5952+00 +20 +40 +60 +80 5953+00 +20 +40 +60 +80 5954+00

SCDOT Soil Test Boring Log

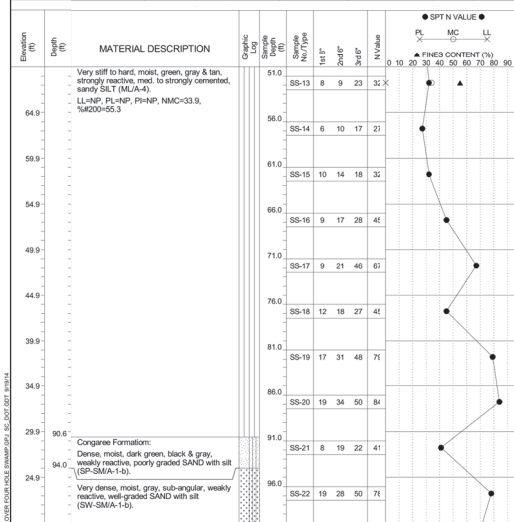
File No.: 38.040308 Project No. (PIN): BR38(019) County: Orangeburg Eng./Geo.: R. DeLoat
Site Description: Bridge Replacement over Four Hole Swamp Route: US 301
Boring No.: B-1 Boring Location: 5949+31.174 Offset: 13' LL Alignment: US 301
Elev.: 119.9 ft Latitude: 33.45753 Longitude: 80.64727 Date Started: 4/22/2014
Total Depth: 102.5 ft Soil Depth: 102.5 ft Core Depth: 0 ft Date Completed: 4/23/2014
Bore Hole Diameter (in): 4 Sampler Configuration Liner Required: Y (S) Liner Used: Y (S)
Drill Machine: CME 45C Drill Method: RW/DC Hammer Type: Automatic Energy Ratio: 79%
Core Size: NA Driller: M. Morgan Groundwater: TOB 5.2 ft 24HR 7.7 ft



LEGEND SAMPLER TYPE DRILLING METHOD
SS - Split Spoon NQ - Rock Core, 1-7/8" HSA - Hollow Stem Auger RW - Rotary Wash
ST - Shelby Tube CU - Cutoff CFA - Continuous Flight Augers RC - Rock Core
AWG - Rock Core, 1-1/8" CT - Continuous Tube DC - Driving Casing

SCDOT Soil Test Boring Log

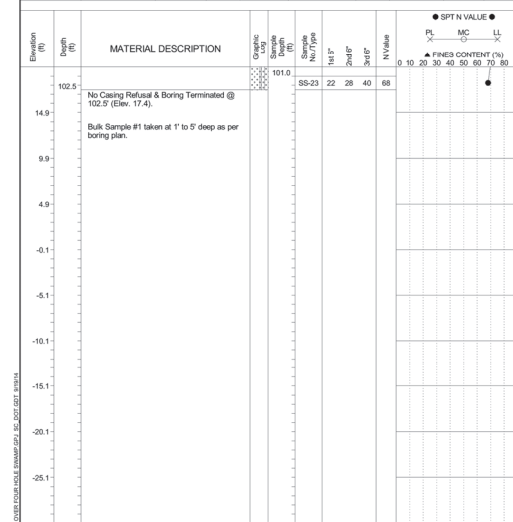
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Site Description: Bridge Replacement over Four Hole Swamp Route: US 301
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LEGEND SAMPLER TYPE DRILLING METHOD
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SCDOT Soil Test Boring Log

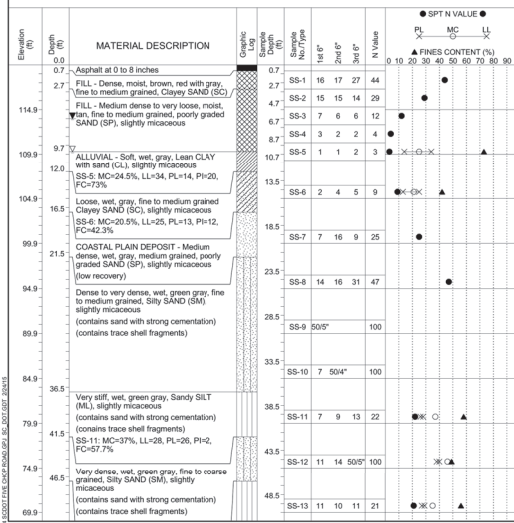
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SCDOT Soil Test Boring Log

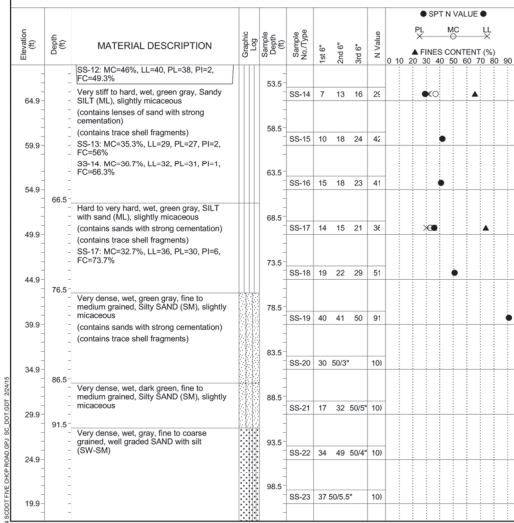
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Site Description: Bridge Replacement over Four Hole Swamp Route: US301
Boring No.: B-1A Boring Location: 5949+31.74 Offset: 8.75 R Alignment: Proposed
Elev.: 119.9 ft Latitude: 33.45753 Longitude: -80.6472 Date Started: 12/4/2014
Total Depth: 120 ft Soil Depth: 120 ft Core Depth: 0 ft Date Completed: 12/4/2014
Bore Hole Diameter (in): 4 Sampler Configuration Liner Required: Y (S) Liner Used: Y (S)
Drill Machine: CME 55 Drill Method: Mud Rotary Hammer Type: Safety Hammer Energy Ratio: 76.4%
Core Size: NA Driller: Carolina Drilling Groundwater: TOB 9.7 ft 24HR 6 ft



LEGEND SAMPLER TYPE DRILLING METHOD
SS - Split Spoon NQ - Rock Core, 1-7/8" HSA - Hollow Stem Auger RW - Rotary Wash
ST - Shelby Tube CU - Cutoff CFA - Continuous Flight Augers RC - Rock Core
AWG - Rock Core, 1-1/8" CT - Continuous Tube DC - Driving Casing

SCDOT Soil Test Boring Log

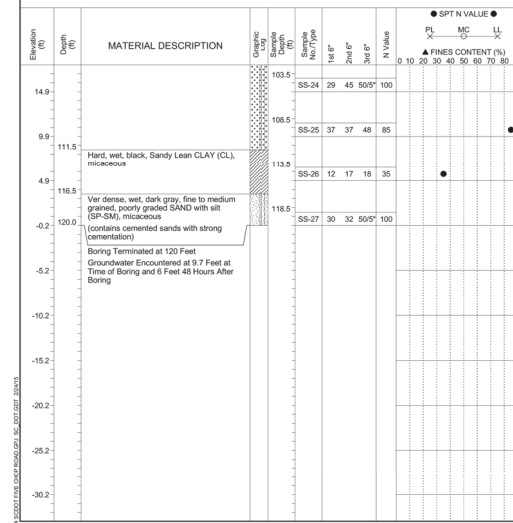
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Site Description: Bridge Replacement over Four Hole Swamp Route: US301
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SCDOT Soil Test Boring Log

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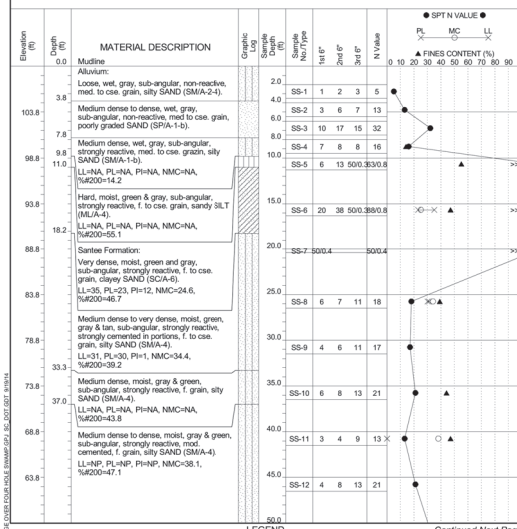
FOR INFORMATION ONLY

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SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
BORING LOGS (1 OF 8)

SCDOT Soil Test Boring Log

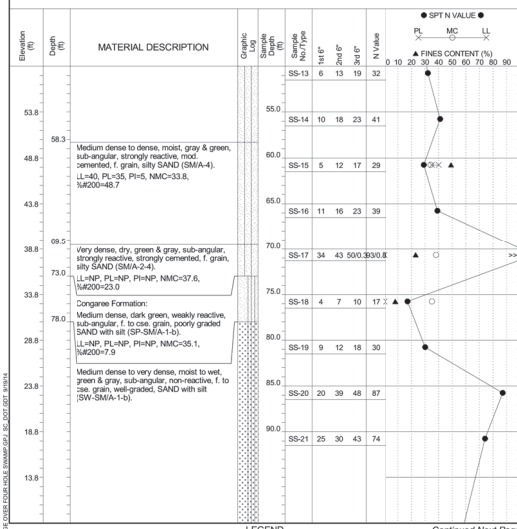
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 Site Description: Bridge Replacement over Four Hole Swamp Route: US 301
 Boring No.: B-2 Boring Location: 5949+65 Offset: 9' RL Alignment: US 301
 Elev.: 108.8 ft Latitude: 33.45757 Longitude: 80.6474 Date Started: 4/3/2014
 Total Depth: 111.5 ft Soil Depth: 111.5 ft Core Depth: ft Date Completed: 4/5/2014
 Bore Hole Diameter (in): 4 Sampler Configuration Liner Required: Y (N) Liner Used: Y (N)
 Drill Machine: CME 45C Drill Method: RW/DC Hammer Type: Automatic Energy Ratio: 79%
 Core Size: NA Driller: M. Morgan Groundwater: TOB NA 24HR NA



LEGEND
 SS - Split Spoon; ST - Shelby Tube; AWG - Rock Core 1-18"
 NO - Rock Core, 1-7 1/8"; CU - Collaps; CT - Continuous Tube
 HSA - Hollow Stem Auger; CFA - Continuous Flight Augers; DC - Driving Casing
 RW - Rotary Wash; RC - Rock Core

SCDOT Soil Test Boring Log

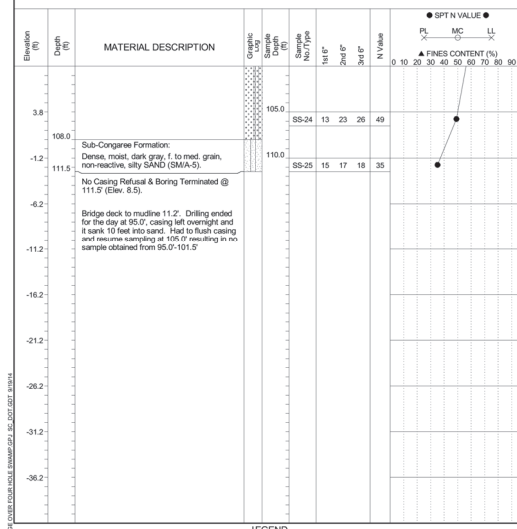
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 Site Description: Bridge Replacement over Four Hole Swamp Route: US 301
 Boring No.: B-2 Boring Location: 5949+65 Offset: 9' RL Alignment: US 301
 Elev.: 108.8 ft Latitude: 33.45757 Longitude: 80.6474 Date Started: 4/3/2014
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 Core Size: NA Driller: M. Morgan Groundwater: TOB NA 24HR NA



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 SS - Split Spoon; ST - Shelby Tube; AWG - Rock Core 1-18"
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SCDOT Soil Test Boring Log

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 Boring No.: B-2 Boring Location: 5949+65 Offset: 9' RL Alignment: US 301
 Elev.: 108.8 ft Latitude: 33.45757 Longitude: 80.6474 Date Started: 4/3/2014
 Total Depth: 111.5 ft Soil Depth: 111.5 ft Core Depth: ft Date Completed: 4/5/2014
 Bore Hole Diameter (in): 4 Sampler Configuration Liner Required: Y (N) Liner Used: Y (N)
 Drill Machine: CME 45C Drill Method: RW/DC Hammer Type: Automatic Energy Ratio: 79%
 Core Size: NA Driller: M. Morgan Groundwater: TOB NA 24HR NA



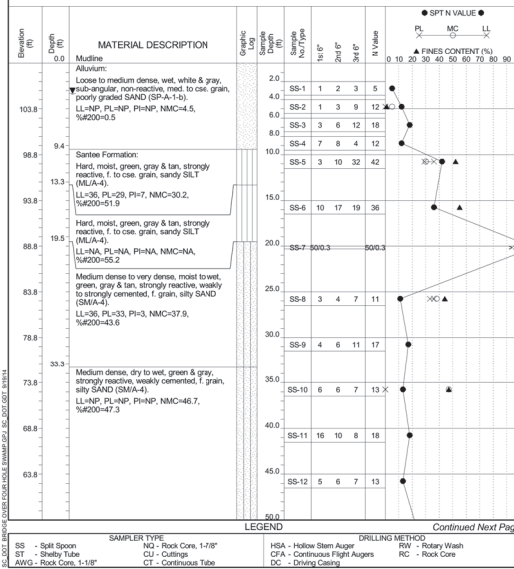
LEGEND
 SS - Split Spoon; ST - Shelby Tube; AWG - Rock Core 1-18"
 NO - Rock Core, 1-7 1/8"; CU - Collaps; CT - Continuous Tube
 HSA - Hollow Stem Auger; CFA - Continuous Flight Augers; DC - Driving Casing
 RW - Rotary Wash; RC - Rock Core

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		<p>BORING LOGS (2 OF 8)</p>	
COUNTY		ORANGEBURG	ROUTE
			US 301

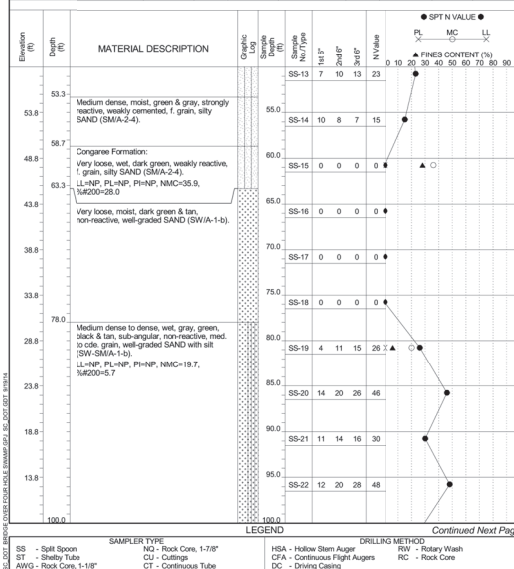
SCDOT Soil Test Boring Log

File No.: 38.040308 Project No. (PIN): BR38(019) County: Orangeburg Eng./Geo.: R. DeLoe
Site Description: Bridge Replacement over Four Hole Swamp Route: US 301
Boring No.: B-3 Boring Location: 5950+02 Offset: 3' RL Alignment: US 301
Elev.: 108.8 ft Latitude: 33.45751 Longitude: 80.64752 Date Started: 4/21/14
Total Depth: 101.5 ft Soil Depth: 101.5 ft Core Depth: 0 ft Date Completed: 4/22/2014
Bore Hole Diameter (in): 4 Sampler Configuration: Liner Required: Y (S) Liner Used: Y (S)
Drill Machine: CME 45C Drill Method: RW/DC Hammer Type: Automatic Energy Ratio: 79%
Core Size: NA Driller: M. Morgan Groundwater: TOB 3.3 ft 24HR 3.3 ft



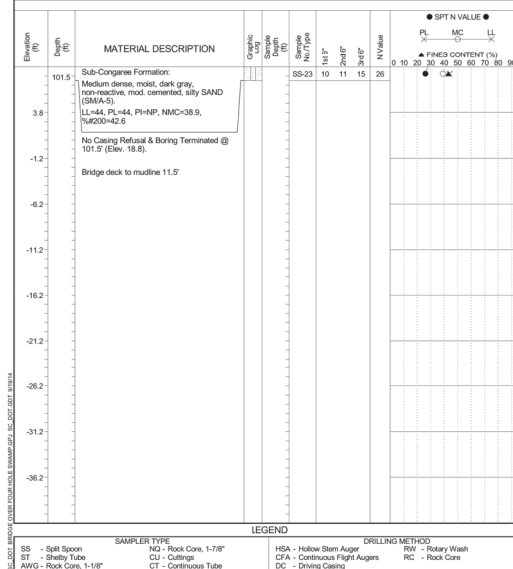
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Boring No.: B-3 Boring Location: 5950+02 Offset: 3' RL Alignment: US 301
Elev.: 108.8 ft Latitude: 33.45751 Longitude: 80.64752 Date Started: 4/21/14
Total Depth: 101.5 ft Soil Depth: 101.5 ft Core Depth: 0 ft Date Completed: 4/22/2014
Bore Hole Diameter (in): 4 Sampler Configuration: Liner Required: Y (S) Liner Used: Y (S)
Drill Machine: CME 45C Drill Method: RW/DC Hammer Type: Automatic Energy Ratio: 79%
Core Size: NA Driller: M. Morgan Groundwater: TOB 3.3 ft 24HR 3.3 ft



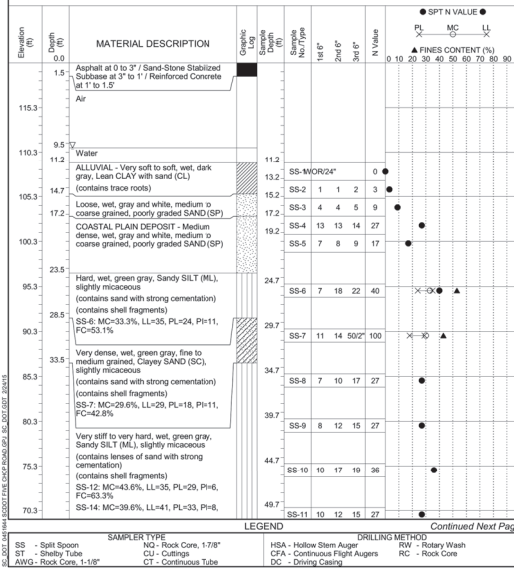
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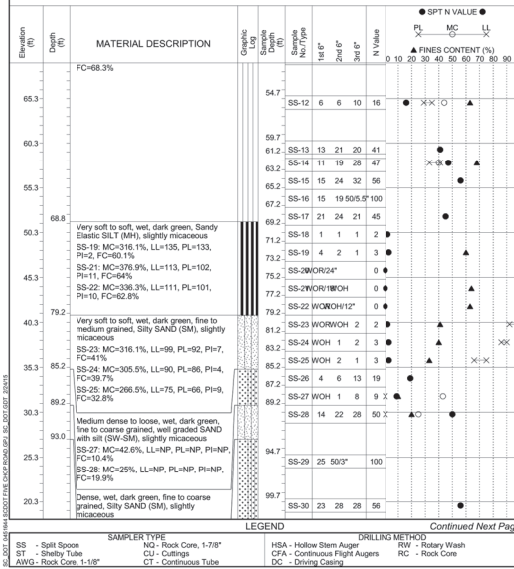
SCDOT Soil Test Boring Log

File No.: 38.040308.2 Project No. (PIN): 0040308 County: Orangeburg Eng./Geo.: B. Livingston
Site Description: Bridge Replacement Over Four Hole Swamp Route: US301
Boring No.: B-3A Boring Location: 5950+10.72 Offset: 6.25 L Alignment: Proposed
Elev.: 120.3 ft Latitude: 33.4575 Longitude: -80.6475 Date Started: 12/8/2014
Total Depth: 131.2 ft Soil Depth: 120 ft Core Depth: 0 ft Date Completed: 12/8/2014
Bore Hole Diameter (in): 4 Sampler Configuration: Liner Required: Y (S) Liner Used: Y (S)
Drill Machine: CME 55 Drill Method: Mud Rotary Hammer Type: Safety Hammer Energy Ratio: 76.4%
Core Size: NA Driller: Carolina Drilling Groundwater: TOB 9.5 ft 24HR



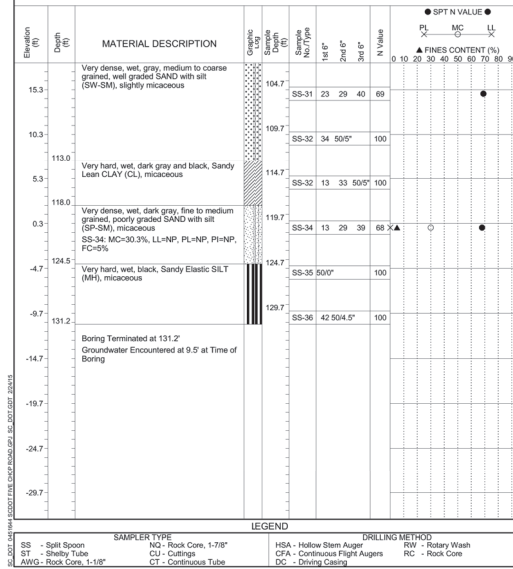
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Site Description: Bridge Replacement Over Four Hole Swamp Route: US301
Boring No.: B-3A Boring Location: 5950+10.72 Offset: 6.25 L Alignment: Proposed
Elev.: 120.3 ft Latitude: 33.4575 Longitude: -80.6475 Date Started: 12/8/2014
Total Depth: 131.2 ft Soil Depth: 120 ft Core Depth: 0 ft Date Completed: 12/8/2014
Bore Hole Diameter (in): 4 Sampler Configuration: Liner Required: Y (S) Liner Used: Y (S)
Drill Machine: CME 55 Drill Method: Mud Rotary Hammer Type: Safety Hammer Energy Ratio: 76.4%
Core Size: NA Driller: Carolina Drilling Groundwater: TOB 9.5 ft 24HR



SCDOT Soil Test Boring Log

File No.: 38.040308.2 Project No. (PIN): 0040308 County: Orangeburg Eng./Geo.: B. Livingston
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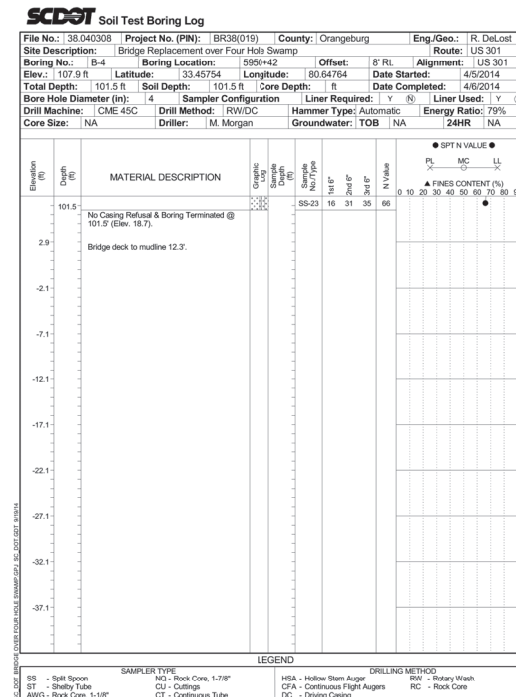
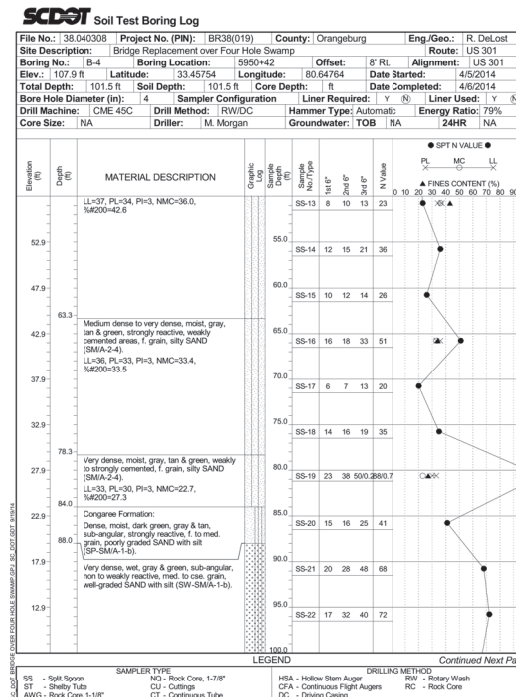
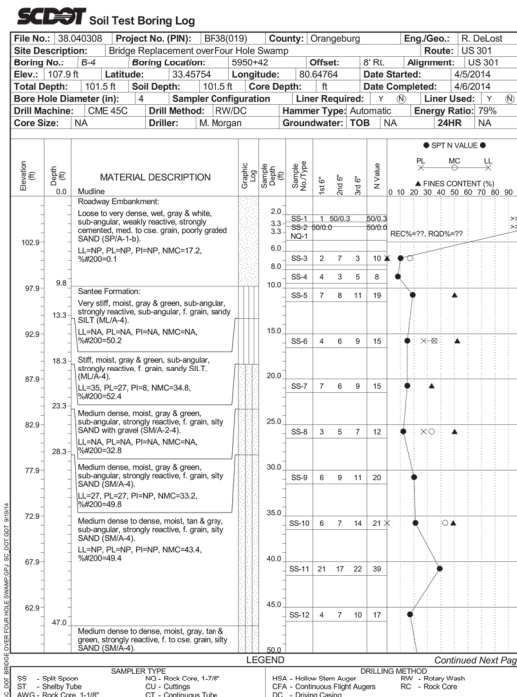
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BORING LOGS (3 OF 8)

COUNTY ORANGEBURG ROUTE US 301



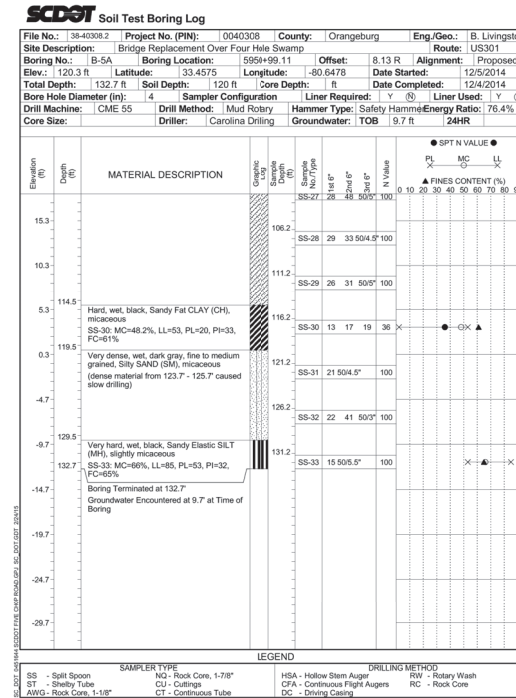
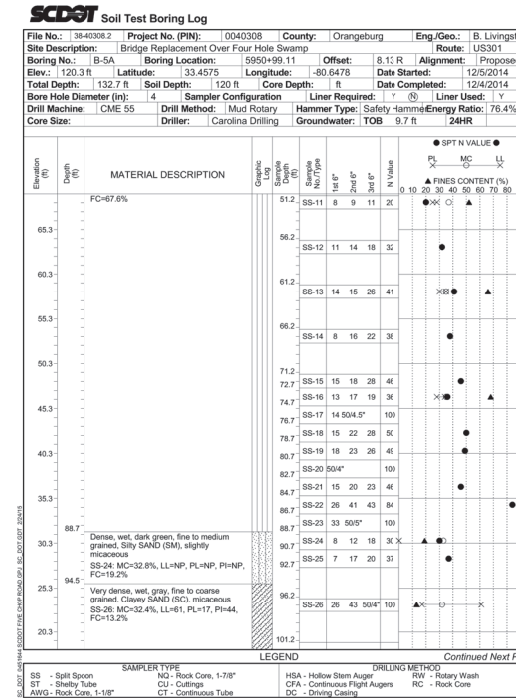
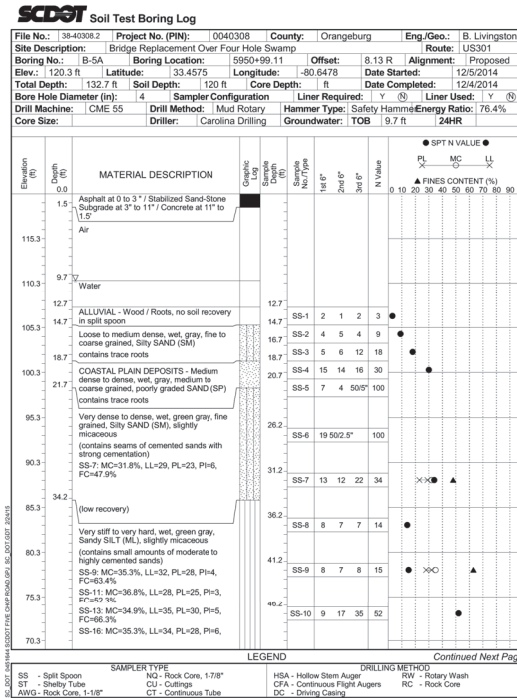
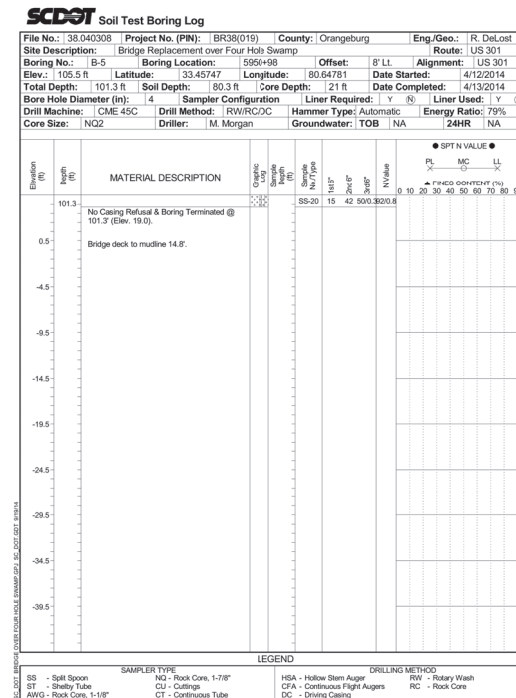
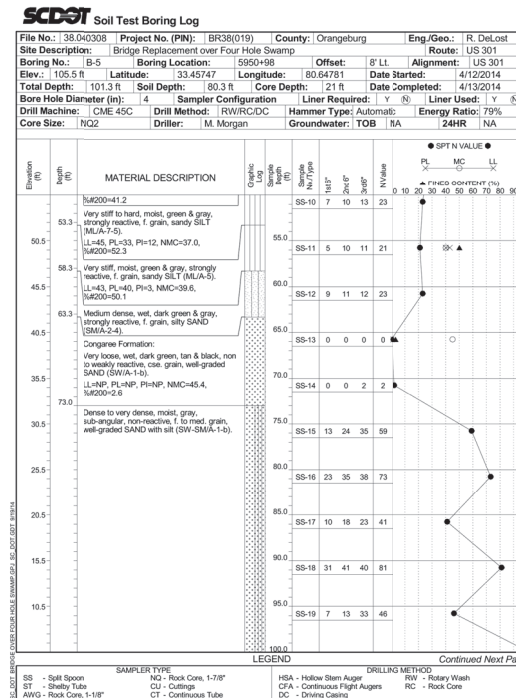
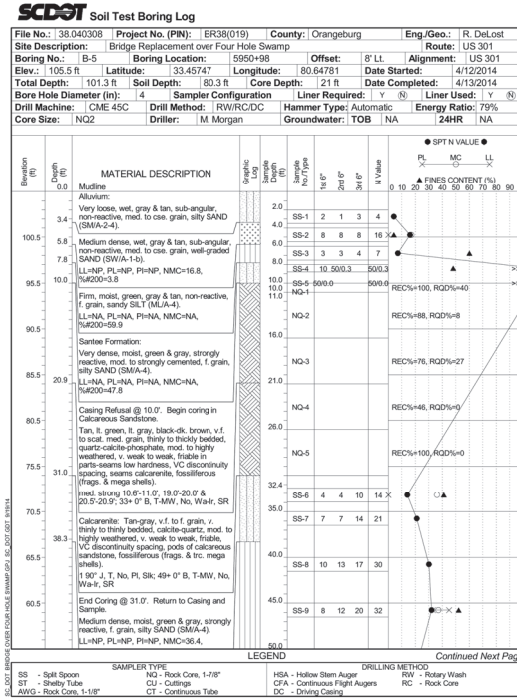
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BORING LOGS (4 OF 8)

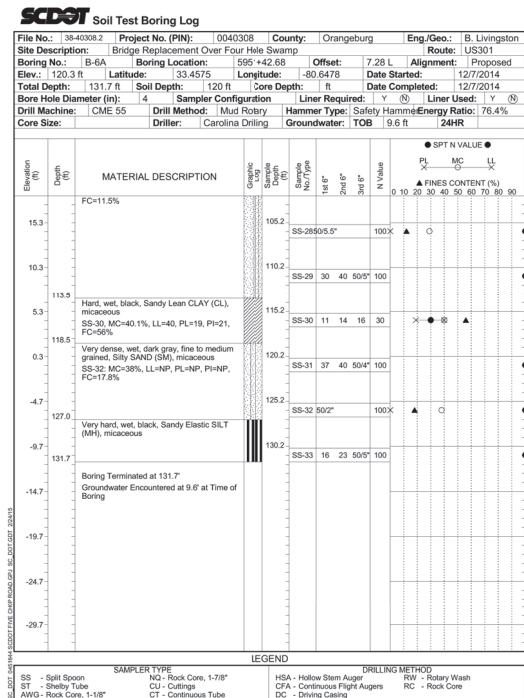
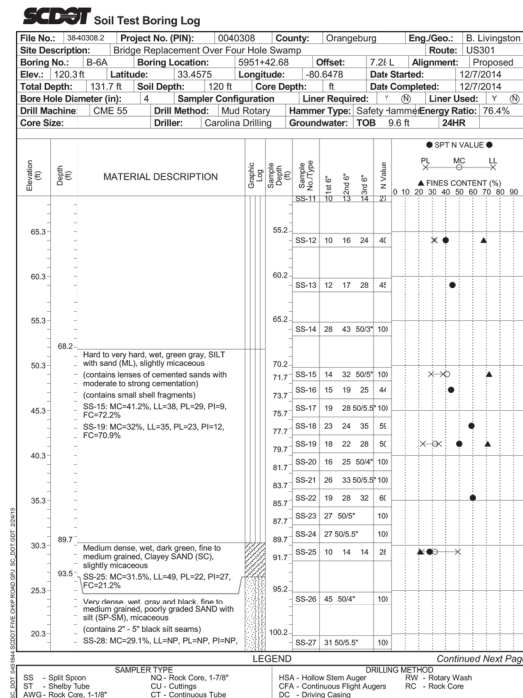
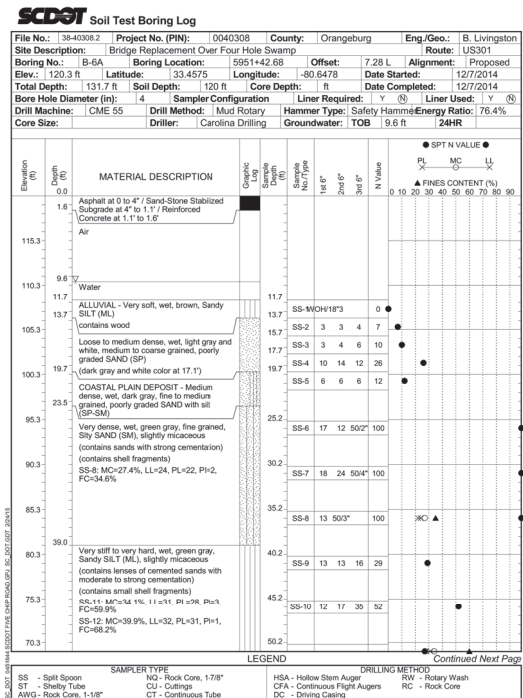
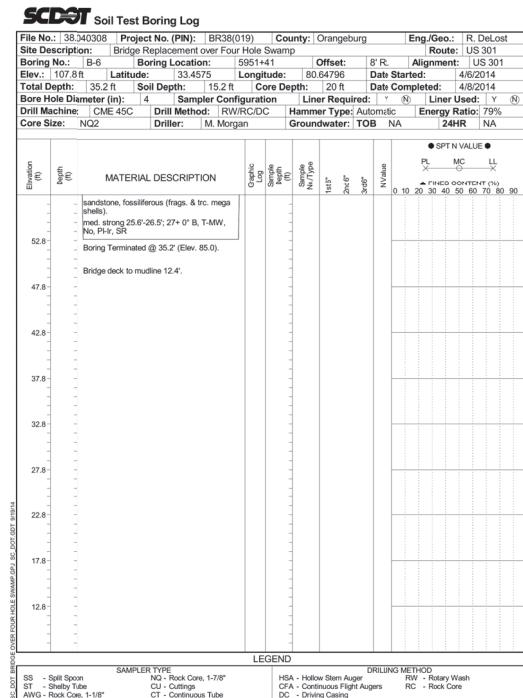
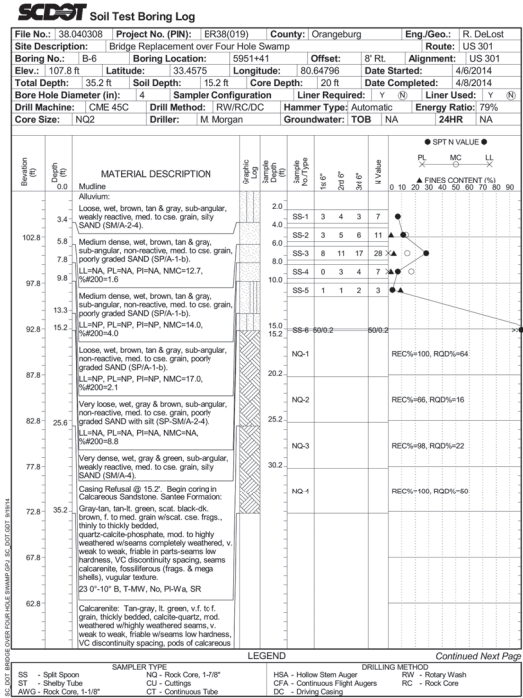
COUNTY ORANGEBURG ROUTE US 301



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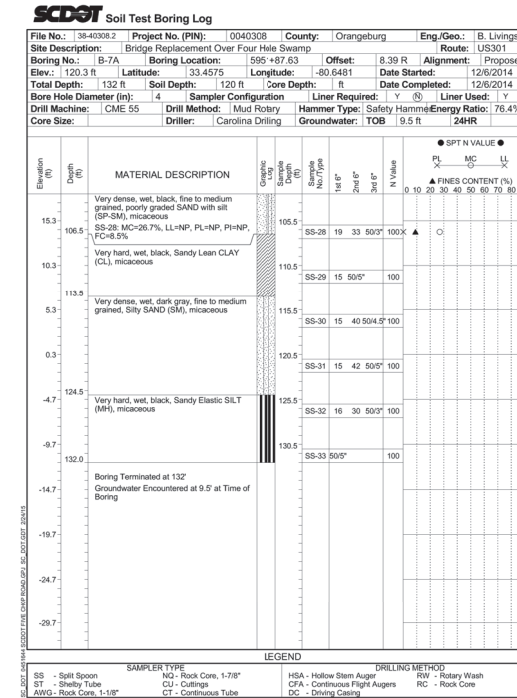
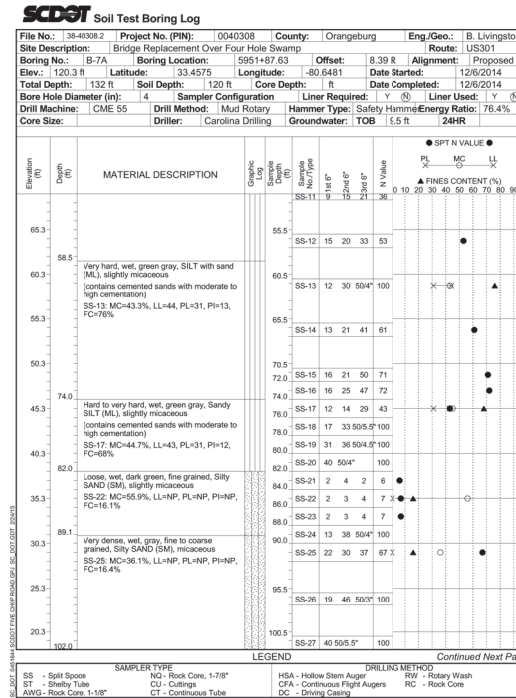
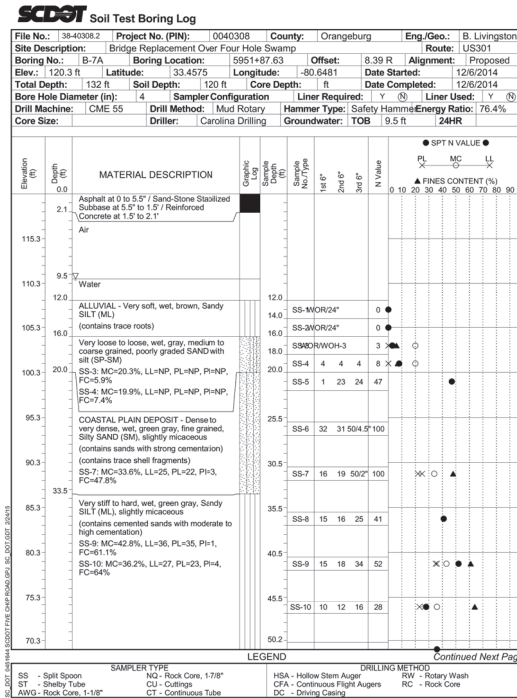
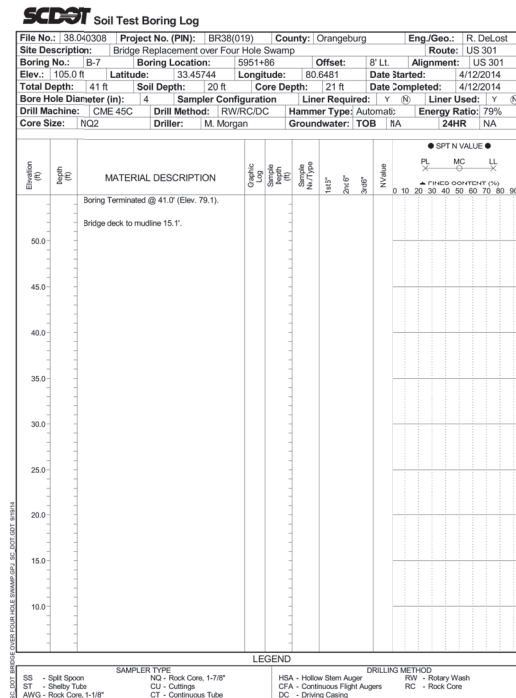
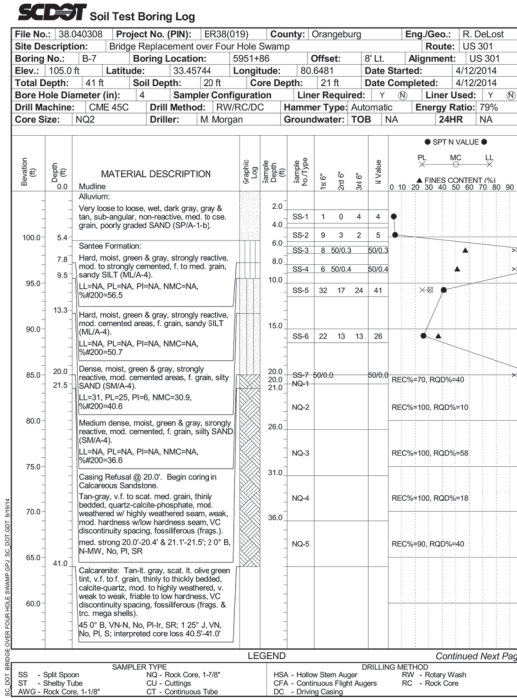


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BORING LOGS (6 OF 8)
COUNTY ORANGEBURG ROUTE US 301



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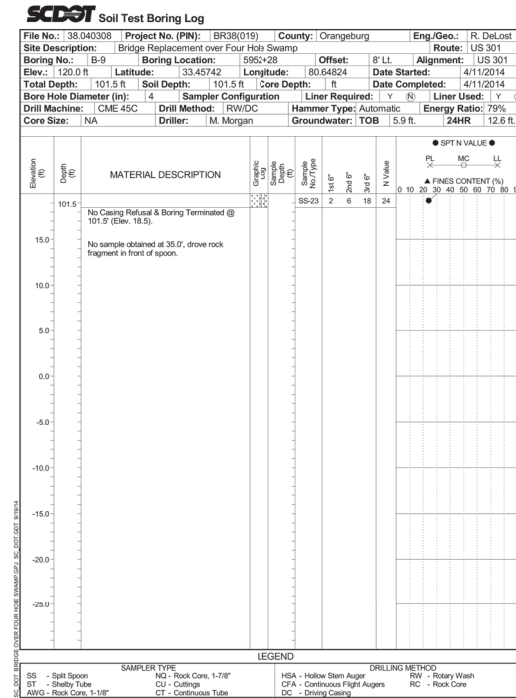
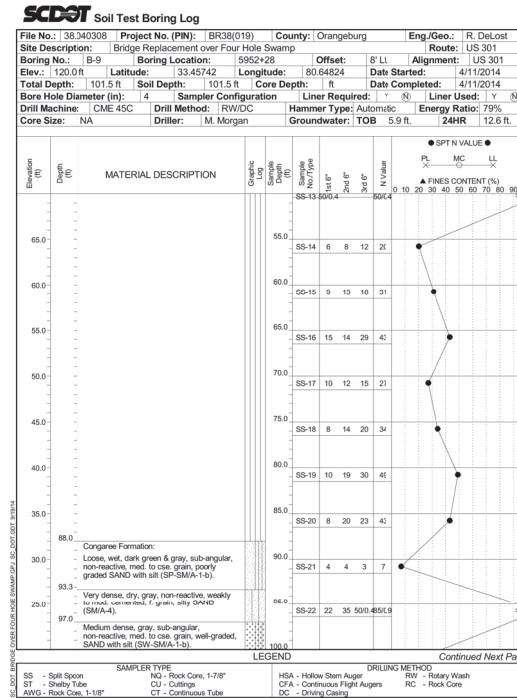
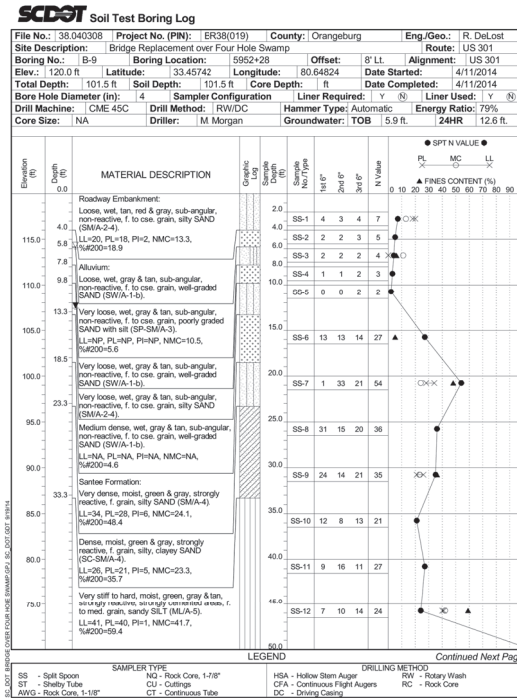
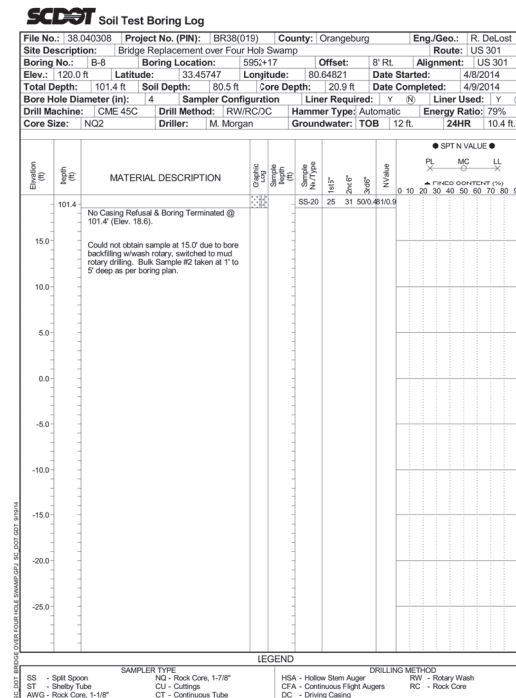
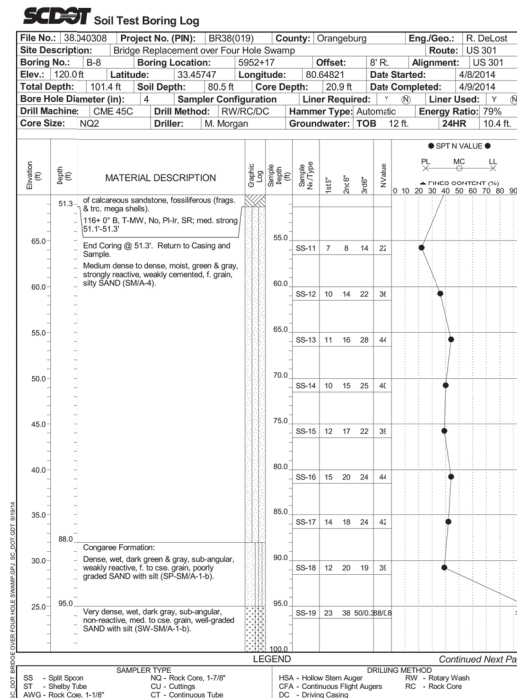
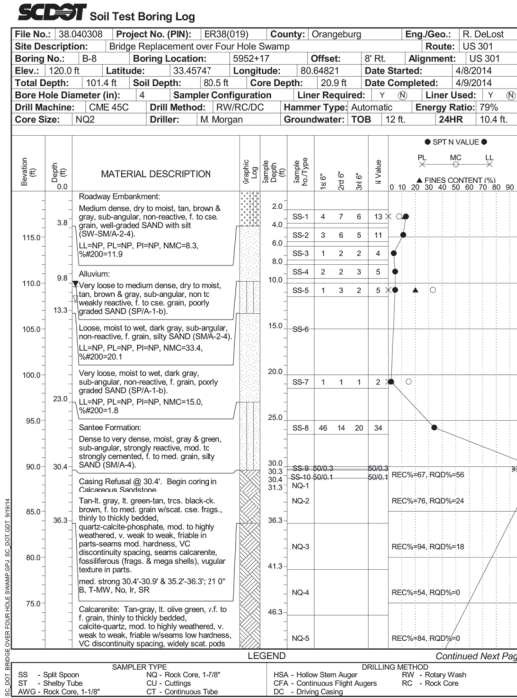
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BORING LOGS (7 OF 8)

COUNTY ORANGEBURG ROUTE US 301



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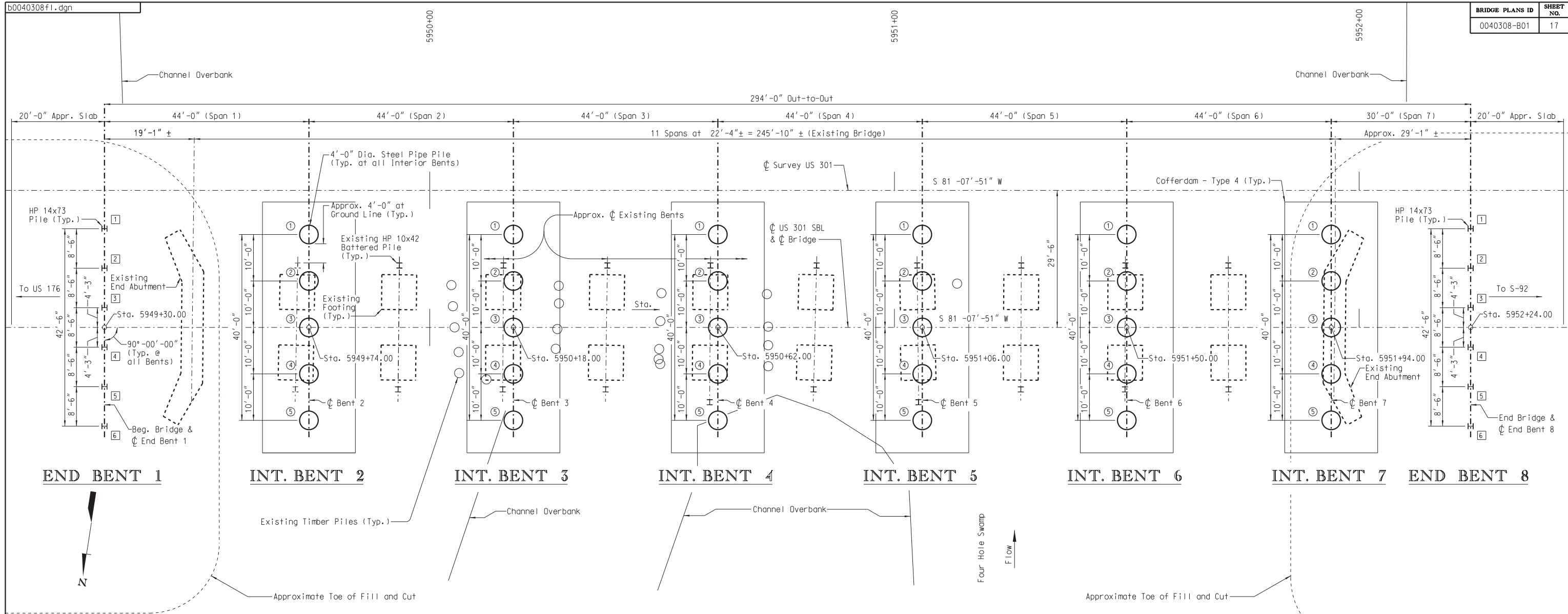
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BORING LOGS (8 OF 8)

COUNTY ORANGEBURG ROUTE US 301



BRIDGE PLANS ID	SHEET NO.
0040308-B01	17

FOUNDATION LAYOUT

Notes:

No more than two cofferdams are allowed to be in the channel at any point in time during construction. Maximum size of cofferdams is limited to 22' x 56' in plan to conform with environmental permit.

Bridge plans for the original portion of the existing bridge have not been located. The original substructure is assumed to be supported by footings, based on details provided in plans for the widened portions of the existing bridge. Whether the footings are spread footings or supported on piles is unknown. Also, exact dimensions for the footings are unknown. Therefore, the footings shown in the Foundation Layout are representative and do not necessarily show all potential conflicts between the existing foundations and the new foundations. While best effort has been made to locate potential conflicts between the existing foundations and the new foundations, other conflicts may occur that are not indicated in the Foundation Layout.

Completely remove portions of the existing foundations that interfere with the installation of the new steel pipe piles. Remove all other portions of existing foundations including existing piling from previous bridge(s) according to Section 202.4.2 of the Standard Specifications or as directed by the RCE. Include all costs for this work in the lump sum price bid for "Removal and Disposal of Existing Bridge".

- Ⓜ Indicates HP Pile Number.
- Ⓢ Indicates Steel Pipe Pile Number.

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	FOUNDATION LAYOUT	
COUNTY	ORANGEBURG	ROUTE US 301

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REINFORCING STEEL SCHEDULE							
(Reinforcing Quantities are for one bent only)							
MARK	EB 1 NO. REQ'D	EB 8 NO. REQ'D	DIMENSION				LENGTH
			"a"	"b"	"c"	"d"	
A1601	6	6	49'-1"	—	—	—	49'-1"
A1901	20	20	7'-7"	—	—	—	7'-7"
A2501	90	90	1'-8"	—	—	—	1'-8"
A2901	9	9	49'-1"	—	—	—	49'-1"
C1901	8	8	5'-1"	3'-2"	—	—	8'-3"
C1902	8	8	7'-7"	3'-2"	—	—	10'-9"
J1601	18	—	8"	4'-6 1/2"	—	—	9'-9"
J1602	—	18	8"	4'-3 1/2"	—	—	9'-3"
J2901	5	5	7'-2"	2'-0"	—	—	11'-2"
S1601	63	63	2'-8"	2'-7"	0'-8"	—	11'-10"
SA1601	18	18	2'-8"	2'-7"	0'-7"	—	9'-0"
V1901	12	12	1'-10"	—	—	—	3'-8"

QUANTITIES			
ITEM	UNIT	BENT 1	BENT 8
Concrete, Class 5000	CY	18.8	18.6
Reinforcing Steel	LB	4,051	4,042
Pile Driving Set-up	EA	6	6
Dynamic Pile Analyzer Test Set-up	EA	2	2
Steel Piling (HP14x73) (4)	LF	185	190
Steel Index Piling (HP14x73) (4)	LF	39	40

Note:

HP14x73 Steel Piling to conform to the latest AASHTO Specifications for M270 Steel and have a Minimum Yield Strength of 50 ksi.

HP piles are numbered from left to right looking in direction of stationing.

For Index Pile and pile installation requirements, see Geotechnical Notes on Sh. 19.

For Reinforcing Bending Details, see Sh. 4.

For A2501 dowel bar details, see Sh. 3.

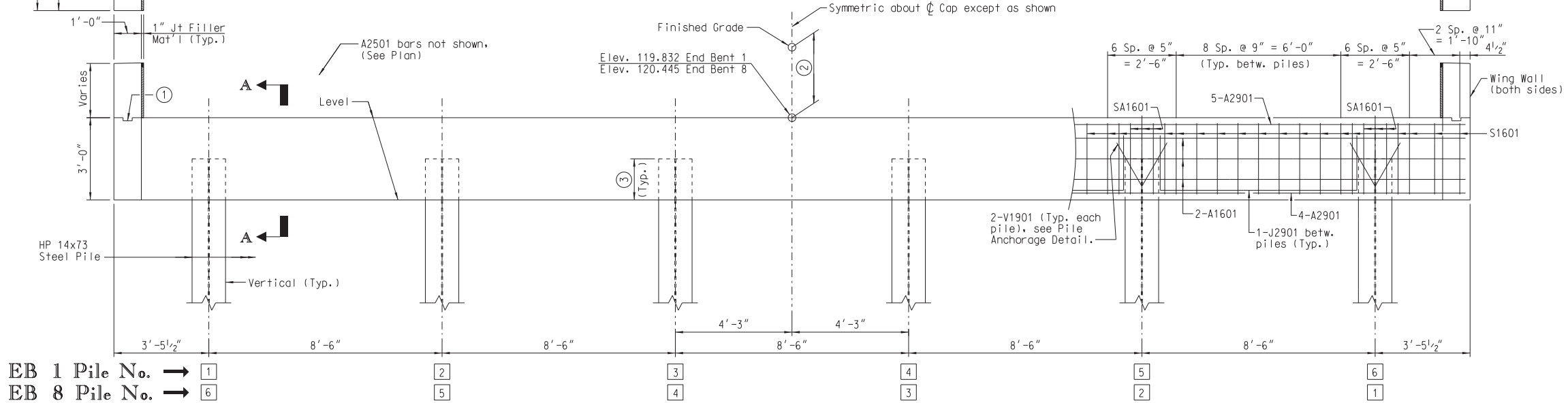
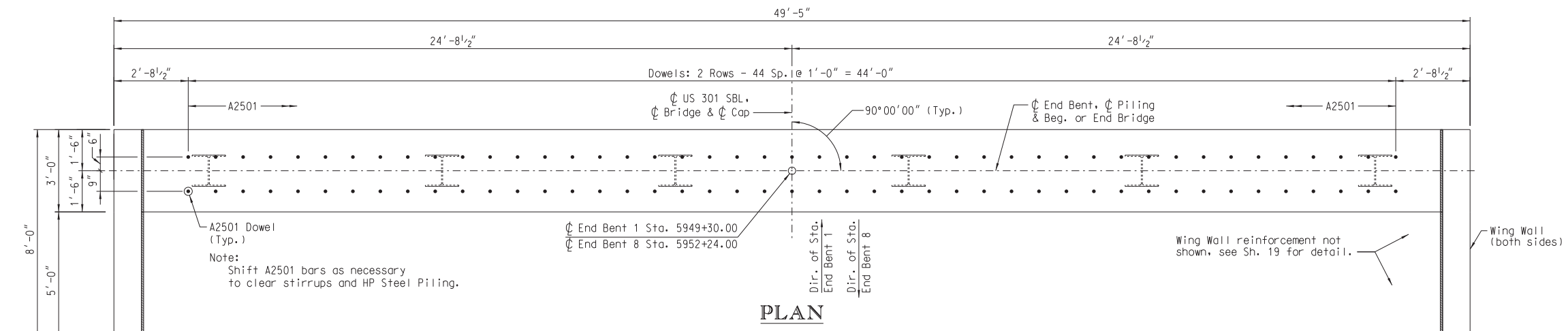
UND - Unless Noted Otherwise.
 EB 1 - End Bent 1
 EB 8 - End Bent 8

① Construction joint. Cast bottom portion of Wing Wall with End Bent Cap. Cast top portion of Wing Wall after Deck slab and Approach slab have been constructed. See Sh. 3 for Construction Joint detail.

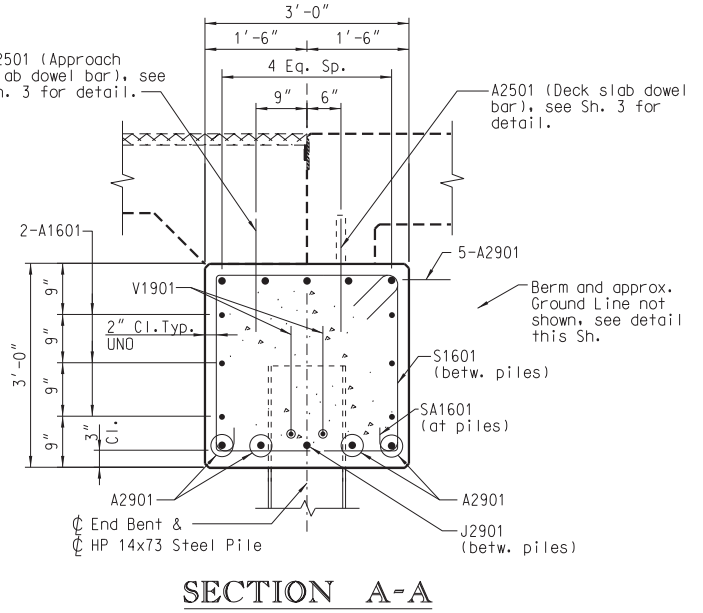
② 2'-5 7/8" at ϕ End Bent 1, and 2'-2 7/8" at ϕ End Bent 8.

③ Piles to be embedded a minimum of 1'-6" and a maximum of 2'-0" into the end bent cap. See this Sh. for pile anchorage details.

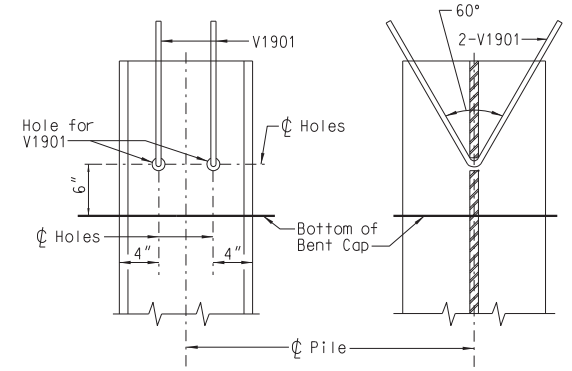
④ Pile length calculated based on an assumed pile embedment of 2'-0".



ELEVATION
 (EB 1: Looking in direction of stationing)
 (EB 8: Looking in opposite direction of stationing)

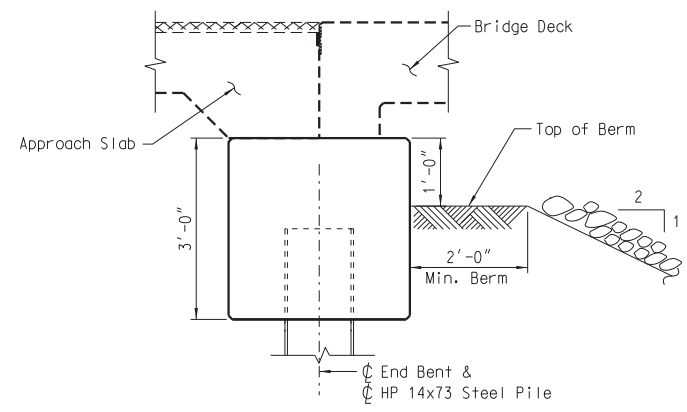


SECTION A-A



PILE ANCHORAGE DETAIL

Holes for V1901 to be 1" min. and 1 1/2" max.
 Drill or flame cut the holes. Grind area around flame cut holes to remove burrs. Tie or wedge tightly the reinforcing bar against the top of the hole.



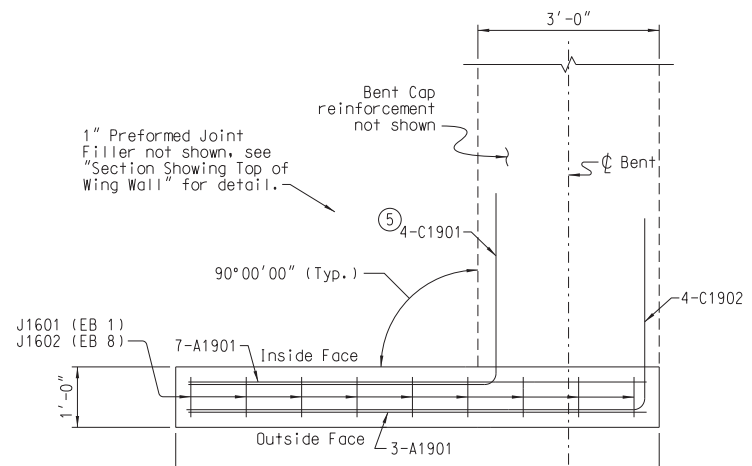
BERM AND APPROXIMATE GROUND LINE

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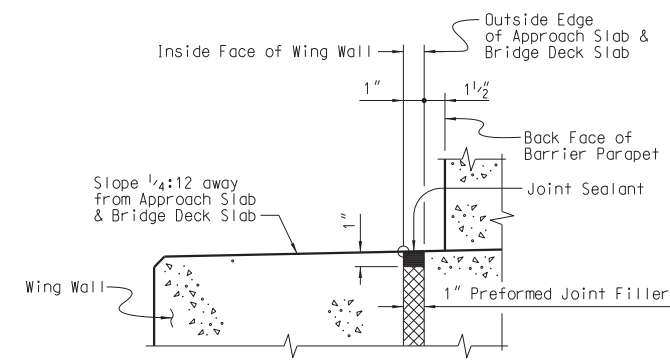
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END BENTS 1 AND 8

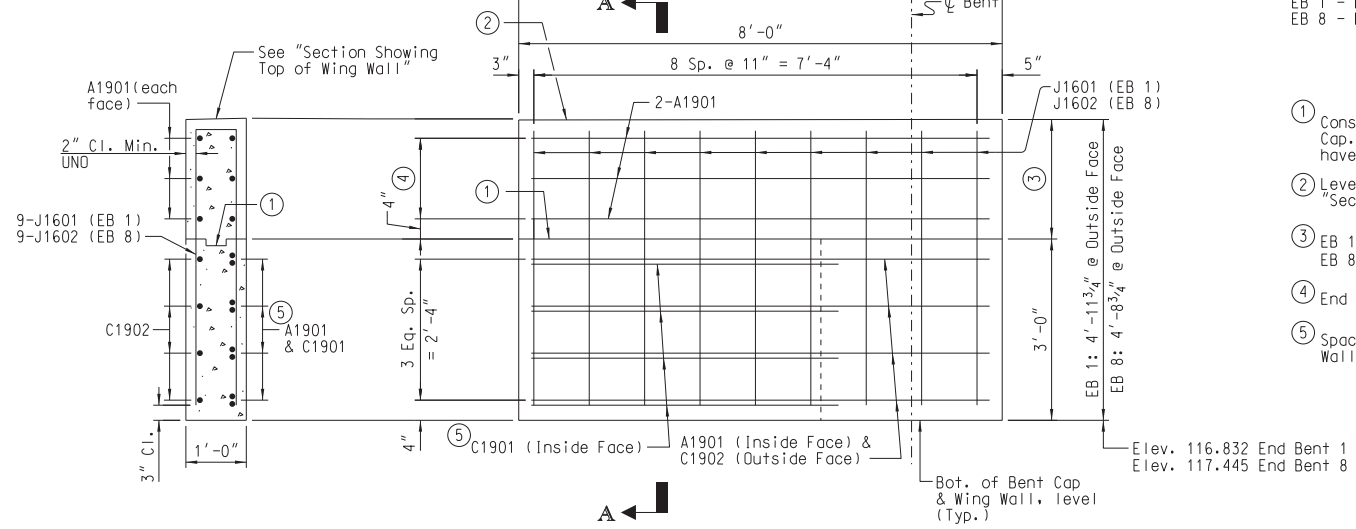
COUNTY	ORANGEBURG	ROUTE	US 301
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WING WALL PLAN



SECTION SHOWING TOP OF WING WALL



SECTION A-A

WING WALL ELEVATION

- Note:
 UNO - Unless Noted Otherwise
 EB 1 - End Bent 1
 EB 8 - End Bent 8
- Construction joint. Cast bottom portion of Wing Wall with End Bent Cap. Cast top portion of Wing Wall after Deck slab and Approach slab have been constructed. See Sh. 4 for Construction Joint detail.
 - Level in longitudinal direction. Slope in transverse direction, see "Section Showing Top of Wing Wall" for detail.
 - EB 1: 1'-11³/₄" @ Outside Face
 EB 8: 1'-8³/₄" @ Outside Face
 - End Bent 1: 2 Sp. @ 8" = 1'-4". End Bent 8: 2 Sp. @ 6¹/₂" = 1'-1".
 - Space C1901 with A1901 (Inside Face) in bottom portion of Wing Walls (below construction joint).

GEOTECHNICAL NOTES

PILE BEARING END BENTS 1 and 8	
Factored Axial Compression Load	105 Tons
Geotechnical Resistance Factor	0.65
Nominal Resistance	162 Tons
Estimated loss of Resistance due to Scour	0 Tons
Estimated loss of Resistance due to Downdrag	0 Tons
Required Driving Resistance	162 Tons

Method of controlling installation of piles and verifying their capacity: Dynamic Testing with PDA and CAPWAP analysis

GOVERNING CONDITIONS	
Loading Type	Loading Direction
Static	Axial (Compression)

The following estimated parameters were used for performing a driveability analysis:

DRIVEABILITY PARAMETERS			
Skin Quake (QS)	0.10 in	% Skin Friction	54%
Toe Quake (QT)	0.10 in	Distribution Shape No.	0.00
Skin Damping (SD)	0.05 s/ft	Pile Penetration	100%
Toe Damping (TD)	0.15 s/ft	Bearing Graph	Proportional

Note: GRLWEAP (2010-6) was used to perform the wave equation analysis.

A pile hammer having a rated energy between 29 kip-feet and 65 kip-feet should be suitable for driven pile installation. However, the Contractor is responsible for selecting a hammer, based on a wave equation analysis that accurately reflects the Contractor's proposed pile driving system, which will properly install the piling.

The estimated pile tip elevation to achieve axial capacity (static) for the HP 14x73 steel H-pile for End Bents 1 and 8 is 79 feet-msl. The required minimum tip elevation to achieve critical depth (lateral stability) for the HP 14x73 steel H-pile is 90 feet-msl for End Bents 1 and 8. Piles must be installed as shown on plans.

Pile Driving Analyzer (PDA) testing shall be performed on the first production pile driven at End Bent 1 and End Bent 8. These piles shall include an additional two feet of HP14x73 steel H-pile length in order to accommodate the initial PDA testing. If a CAPWAP analysis determines that capacity has not been achieved, a restrike of one of the production piles may be required. The restrike shall be performed on the production pile exhibiting the lowest blows per foot. PDA testing shall also be performed on the restrike. The time between initial driving and restrike will be determined by the Engineer, but should be between a minimum of 3 days and a maximum of 7 days. Within seven days of completion of the PDA testing (on initial drive and/or restrike, if required), the results will be evaluated by the RPG3 GDS. Construction of the bent caps shall not proceed until the end bent piles have been accepted by the RPG3 GDS.

Reference the 2007 SCDOT Standard Specifications for Driven Pile Foundation (Section 711). Notes included in these plans are in addition to the requirements of the Standard Specifications.

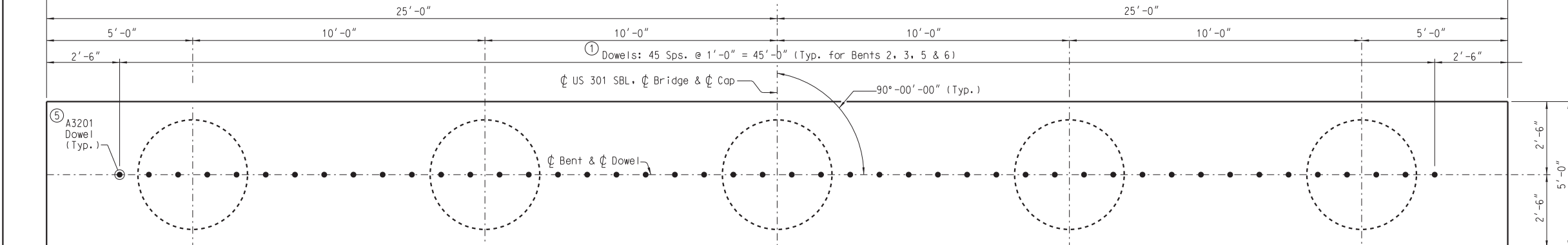
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END BENT DETAILS

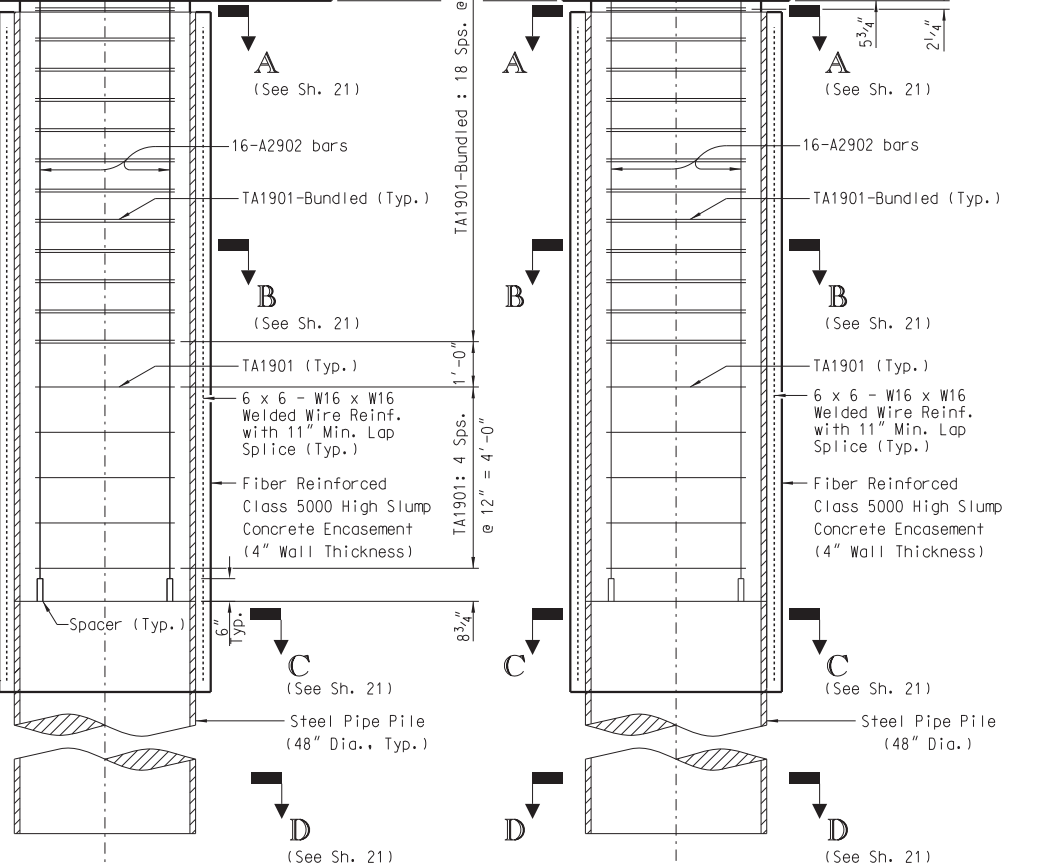
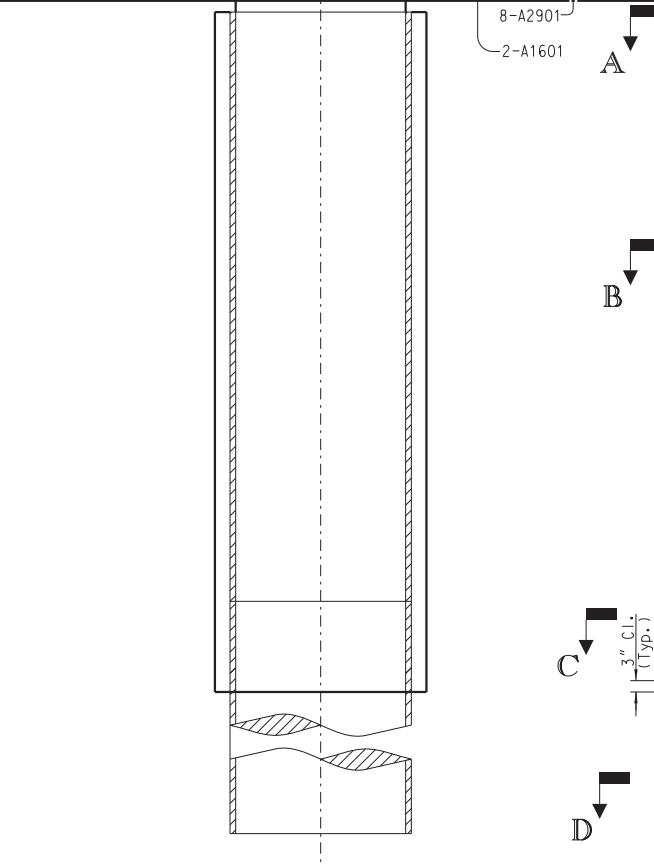
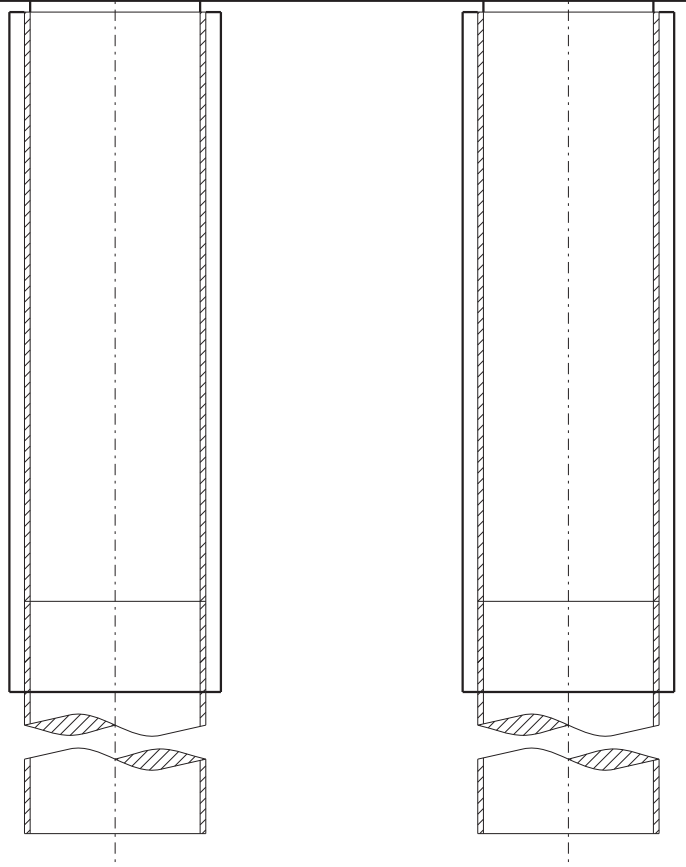
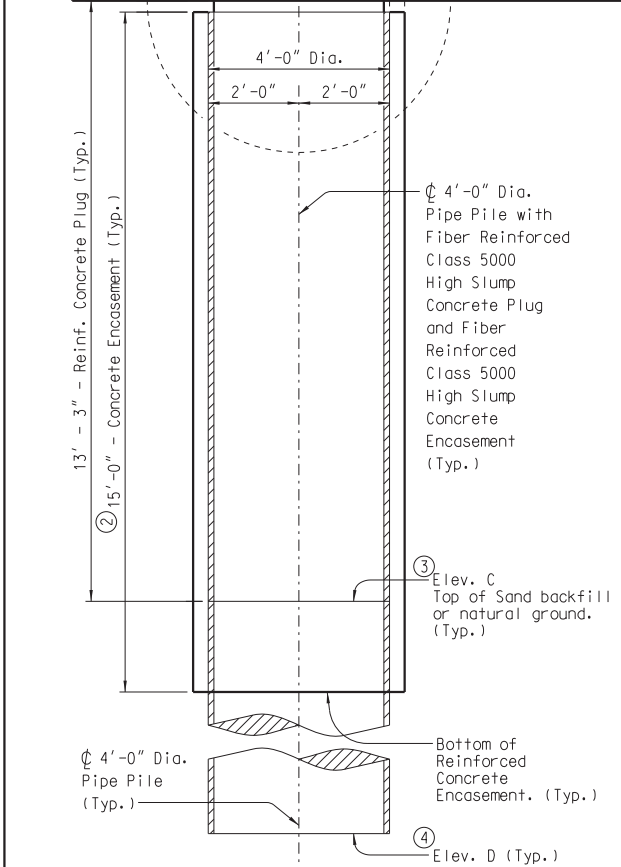
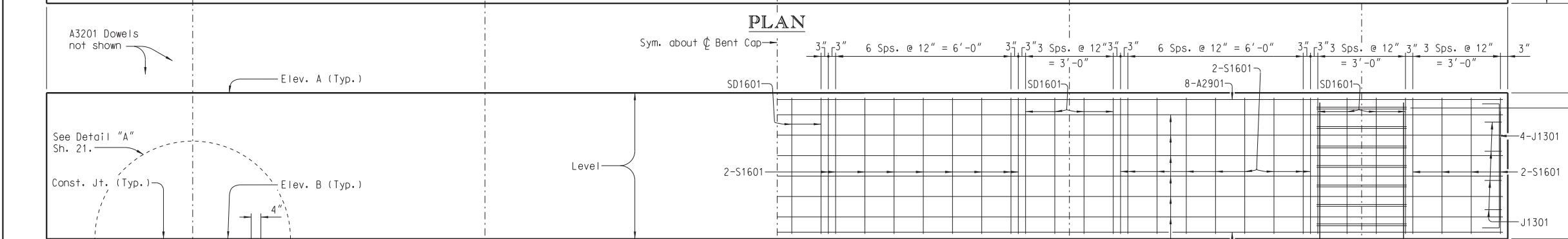
COUNTY ORANGEBURG

ROUTE US 301



ELEVATIONS						
	BENT 2	BENT 3	BENT 4	BENT 5	BENT 6	BENT 7
Elev. A	119.886	119.940	119.995	120.049	120.103	★
Elev. B	114.886	114.940	114.995	115.049	115.103	115.158
Elev. C	101.636	101.690	101.745	101.799	101.853	101.908
Elev. D	10.000	10.000	10.000	10.000	10.000	10.000

★ Elev. 120.158 MSL at low side and 120.408 MSL at high side of bent cap.



STEEL PIPE PILE NO. →

1	2	3	4	5
---	---	---	---	---

ELEVATION
(Looking in Direction of Stationing)

- Notes:
- For dowel location and spacing at Bents 4 & 7, see Sh. 21.
 - Excavate around pipe piles within the cofferdam to install concrete encasement. After encasement is constructed, backfill interior of Cofferdam in accordance with Cofferdam Backfill detail on Sh. 22.
 - For additional information, See Geotechnical Notes, Sh. 22.

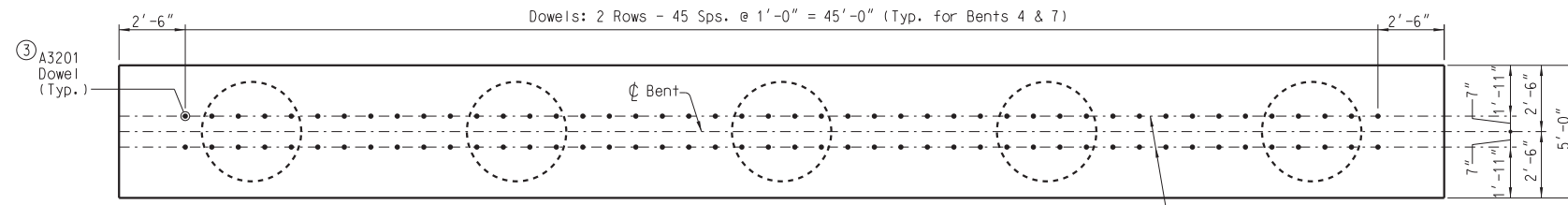
- Notes:
- This elevation is approximate and is used to determine quantities for bid purposes only.
 - Shift A3201 dowels as needed to clear stirrups. See Sh. 3 for dowel detail.
- For steel pipe pile construction sequence, see Sh. 21.

NOT FOR CONSTRUCTION

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

INTERIOR BENTS
2 THRU 7

COUNTY	ORANGEBURG	ROUTE	US 301
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DOWEL LOCATION AND SPACING

(Typ. for Bents 4 & 7)

CONSTRUCTION SEQUENCE FOR STEEL PIPE PILES⁵

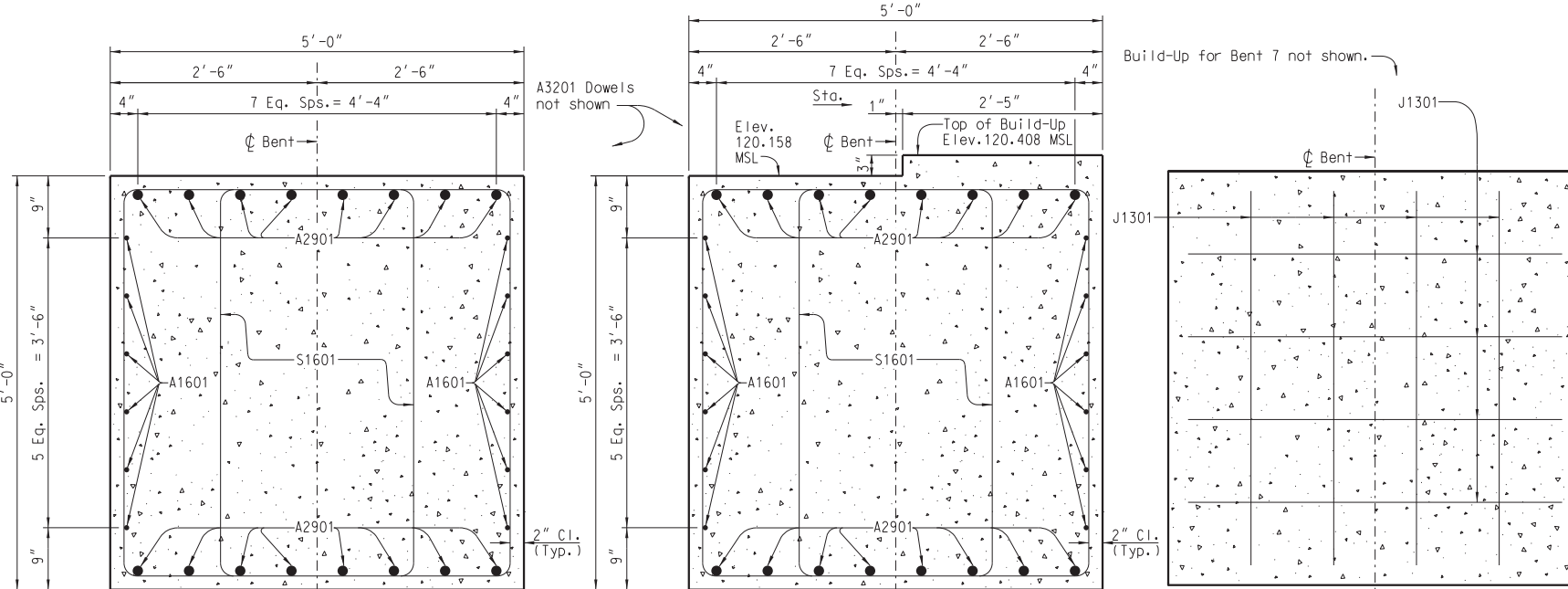
1. Construct cofferdam.
2. Remove existing bridge foundations as required.
3. Install pipe piles.
4. Excavate existing soil or backfill with loose sand in pipe piles as required.
5. Field point top 1'-0" (Min.) of pipe piles.
6. Construct reinforced concrete plug and 4" reinforced concrete encasement for pipe piles.
7. Construct bent cap.

REINF. STEEL SCHED. FOR ONE BENT

MARK	BENTS 2,3,5 & 6 NO. REQ'D	BENTS 4 & 7 NO. REQ'D	DIMENSION				LENGTH
			"a"	"b"	"c"	"d"	
A1601	12	12	49'-8"				49'-8"
A2901	16	16	49'-8"				49'-8"
A2902	80	80	17'-5"				17'-5"
A3201	46	92	1'-11"				1'-11"
J1301	16	16	4'-6 3/4"	8"			5'-11"
S1601	88	88	3'-6"	4'-8"	8"		17'-8"
SD1601	20	20	4'-8"	4'-8"	10"		15'-8"
TA1901	215	215	3'-1"				9'-6"

QUANTITIES FOR ONE BENT

ITEM	UNIT	BENTS 2,3,5 & 6	BENTS 4 & 7
Concrete, Class 5000	CY	*	*
Concrete, Class 5000 with Fiber (High Slump)	CY	39.7	39.7
Reinforcing Steel	LB	*12,747	*13,126
Hoop Reinforcing Steel	LB	3,068	3,068
Dynamic Pile Anal. Test Set-Up	EA	2	2
Pile Driving Set-Up	EA	5	5
Steel Pipe Piling (48" Dia.)	LF	(4) 420	(4) 420
Steel Pipe Index Piling (48" Dia.)	LF	(4) 107	(4) 107



SECTION THRU CAP

(Bents 2 thru 6 - Shown between piles)

SECTION THRU CAP

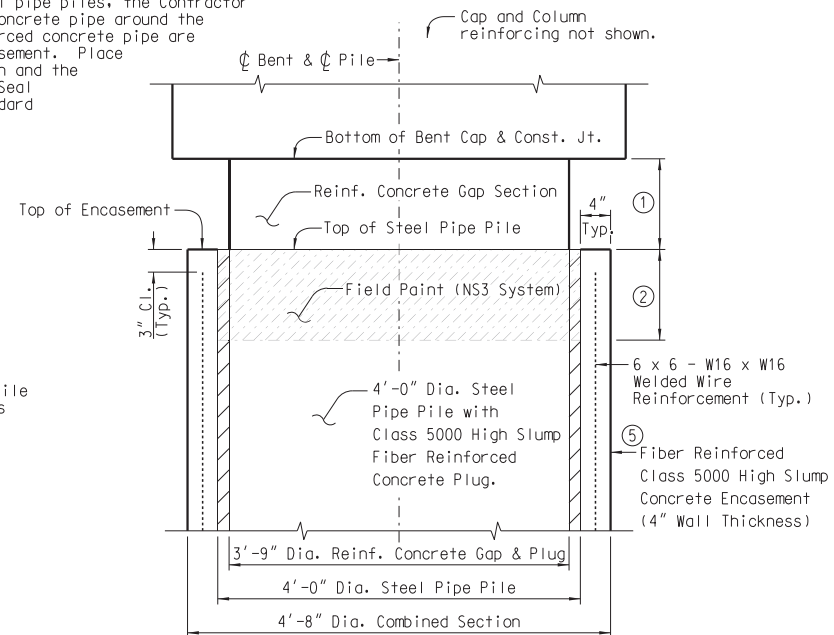
(Bent 7 only - Shown between piles)

END CAP ELEVATION

(Showing J1301 bars)

Notes:

- * Concrete quantity for Bents 2 thru 6 = 46.3 CY, Bent 7 = 47.4 CY.
- + Reinforcing steel quantities also includes 2,295 LB for Welded Wire Reinforcement.
- ③ Shift A3201 dowels as needed to clear stirrups. See Sh. 3 for dowel detail.
- ④ Steel Pipe Pile length calculated based on assumed distance of 3" from bottom of bent cap.
- ⑤ As an alternate method of encasing the steel pipe piles, the Contractor may elect to place 54" Class V reinforced concrete pipe around the steel pipe piles. The limits of the reinforced concrete pipe are the same as the limits of the concrete encasement. Place pipe vertical (plumb) with the bell end down and the pipe centered around the steel pipe pile. Seal joints in pipe with joint sealant (See Standard Drawing 714-205-01). Fill the void space between the reinforced concrete and the steel pipe pile with Class 5000 Concrete with Fiber (High Slump). No additional compensation or time extension will be granted for construction of either encasement alternative.

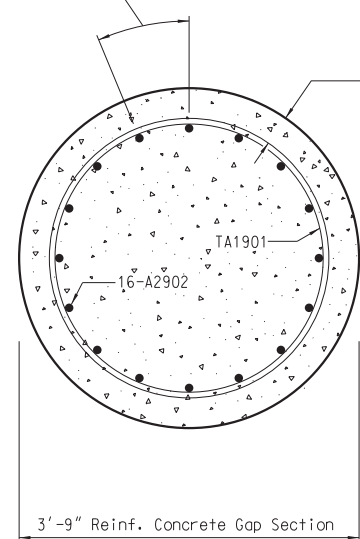


DETAIL "A"

- Notes:
- ① The allowable range for the top elevation of the driven Steel Pipe Piles is 3" Minimum and 1'-0" Maximum below the bottom of the Bent Cap. See Elev. B in table on Sh. 20.
 - ② Field point steel pipe piles using NS3 Point System a minimum of 1'-0" below the top of the pile including the top surface, inside and outside of the pile. Include all costs of field painting in the unit price bid for Steel Pipe Piling and Steel Index Pipe Piling.

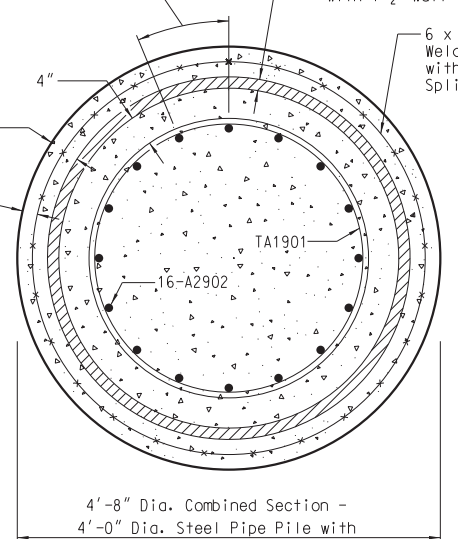
Equally spaced @ 6 5/8" centers (±) along the inside edge of the TA1901 bars.

Equally spaced @ 6 5/8" centers (±) along the inside edge of the TA1901 bars.



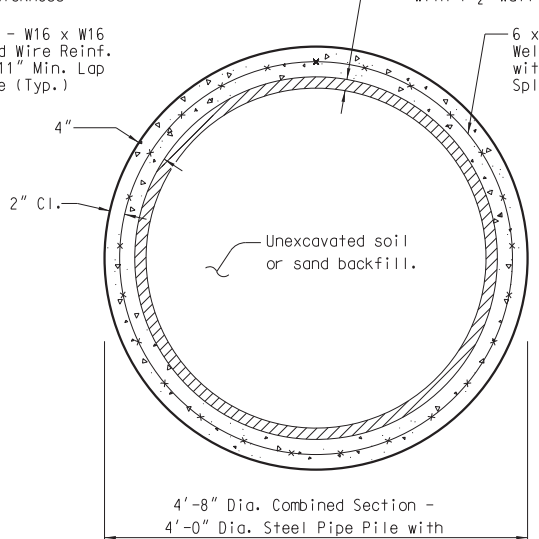
SECTION A-A

(See Sh. 20)



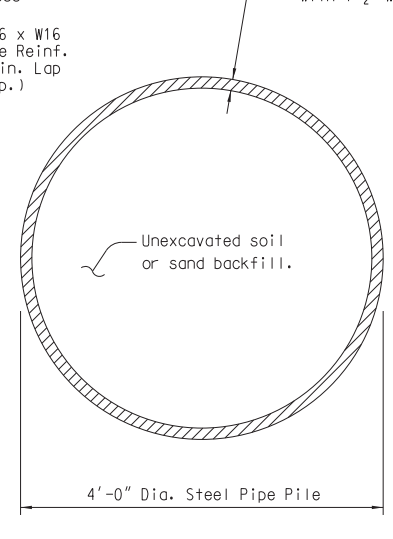
SECTION B-B

(See Sh. 20)



SECTION C-C

(See Sh. 20)



SECTION D-D

(See Sh. 20)

NOT FOR CONSTRUCTION

Foundation Plan Notes

48-inch PIPE PILE BEARING INTERIOR BENTS	
Factored Axial Compression Load (Tons)	186
Geotechnical Resistance Factor	0.65
Required Nominal Resistance (Tons)	286
Estimated Pile Tip Penetration (feet)	98
Estimated Pile Tip Elevation (feet-msl)	10
Unplugged Required Pile Driving Resistance (Tons)	1369
Plugged Required Pile Driving Resistance (Tons)	2801

Method of controlling installation of piles and verifying their capacity: Capacity will be verified by pile driving analyzer and CAPWAP analysis of index piles(s). A Pile Installation Chart developed from the analysis will be used to verify the capacity of production piles.

GOVERNING CONDITIONS	
Loading Type	Loading Direction
Static	Axial (Compression)

The following estimated parameters were used for performing a driveability analysis:

DRIVEABILITY PARAMETERS - UNPLUGGED CONDITIONS			
Skin Friction (QS)	0.10 in	% Skin Friction	92%
Toe Quake (QT)	0.10 in	Distribution Shape No.	Variable
Skin Damping (SD)	0.05 s/ft	Pile Penetration %	89%
Toe Damping (TD)	0.15 s/ft	Bearing Graph	Proportional

Note: GRLWEAP (2010-5) was used to perform the wave equation analysis.

DRIVEABILITY PARAMETERS - PLUGGED CONDITIONS			
Skin Friction (QS)	0.10 in	% Skin Friction	66%
Toe Quake (QT)	0.40 in	Distribution Shape No.	Variable
Skin Damping (SD)	0.05 s/ft	Pile Penetration %	89%
Toe Damping (TD)	0.15 s/ft	Bearing Graph	Proportional

Note: GRLWEAP (2010-5) was used to perform the wave equation analysis.

Cofferdam Plan Notes

Contractor is responsible for cofferdam design. For all soils, buoyant unit weights shall be used in computations for soils below the water level. The designer shall consider all unbalanced water forces. The designer is responsible for determining a design water level. The designer shall use the following soil strength parameters for determining earth pressure coefficients.

SOIL PARAMETERS FOR COFFERDAM DESIGN

IB2 (B-2)						
Depth (ft)	c (psf)	φ	γ _{sat} (pcf)	K _h	K _v	K _p
0-5	-	31	115	0.485	0.320	3.124
5-9	-	36	120	0.412	0.260	3.852
9-11	-	36	115	0.412	0.260	3.852
11-12	-	36	110	0.412	0.260	3.852
12-19	1700	15	115	0.741	0.589	1.698
19-74	-	36	115	0.412	0.260	3.852
74+	-	36	120	0.412	0.260	3.852

IB3 (B-3)						
Depth (ft)	c (psf)	φ	γ _{sat} (pcf)	K _h	K _v	K _p
0-5	-	31	120	0.485	0.320	3.124
5-9	-	36	120	0.412	0.260	3.852
9-20	1700	15	110	0.741	0.589	1.698
20-59	-	36	115	0.412	0.260	3.852
59-78	-	24	120	0.593	0.422	2.371
78+	-	36	120	0.412	0.260	3.852

IB3 (B-3A)						
Depth (ft)	c (psf)	φ	γ _{sat} (pcf)	K _h	K _v	K _p
0-4	400	0	110	1.000	1.000	1.000
4-13	-	32	120	0.470	0.307	3.255
13-18	1700	0	110	1.000	1.000	1.000
18-23	1780	15	115	0.741	0.589	1.698
23-47	-	36	110	0.412	0.260	3.852
47-59	2218	0	110	1.000	1.000	1.000
59-62	-	26	110	0.562	0.390	2.561
62-68	300	3	110	0.948	0.901	1.110
68-70	-	26	115	0.562	0.390	2.561
70-74	300	0	115	1.000	1.000	1.000
74+	-	36	120	0.412	0.260	3.852

A double-acting hydraulic pile driving hammer with monitoring and recording equipment capable of measuring continuously the hammer energy and rate of impact having a maximum rated energy between 66 kip-feet and 146 kip-feet should be suitable for driven pile installation under unplugged conditions. Larger hammers having a maximum rated energy between 292 kip-feet and 658 kip-feet may be suitable under plugged conditions; but, may require limiting the energy delivered. The Contractor is responsible for selecting a hammer(s), based on a wave equation analysis that accurately reflects the Contractor's proposed pile driving system, which will properly install the piling.

The estimated pile tip elevation for the 48-inch steel pipe piles at Interior Bents 2 through 7 is 10 feet-msl in order to achieve penetration 20 feet beyond a potentially weak soil zone below the Santee Limestone Formation. For very hard or stiff soils (i.e., Santee Limestone Formation) the inside of the pipe pile may need to be augered out in order to drive the pile. No pre-augering will be allowed. The inside of the pipe pile should not be augered out deeper than the bottom of the Santee Limestone Formation which varies in elevation from 51 to 24 feet-msl based on the boring logs. The Contractor is responsible for verifying the bottom of the Santee Limestone formation by referring to the test-hole logs and the Table of Approximate Formation Elevations.

Approximate Formation Elevations						
Bent No.	IB-2	IB-3	IB-4	IB-5	IB-6	IB-7
Offset direction	(L/R)	(L/R)	(L/R)	(L/R)	(L/R)	(L/R)
Top of SLF Elevation	Unk/91	92/99	Unk/98	96/99	97/93	100/100
Bottom of SLF Elevation & Top of WHF	Unk/36	51/50	Unk/24	42/32	31/Unk	Unk/38
Bottom of WHF & Top of CF	Unk/14	7/9	Unk/6	10/6	Unk/7	Unk/14
Pile Tip Elevation	10	10	10	10	10	10

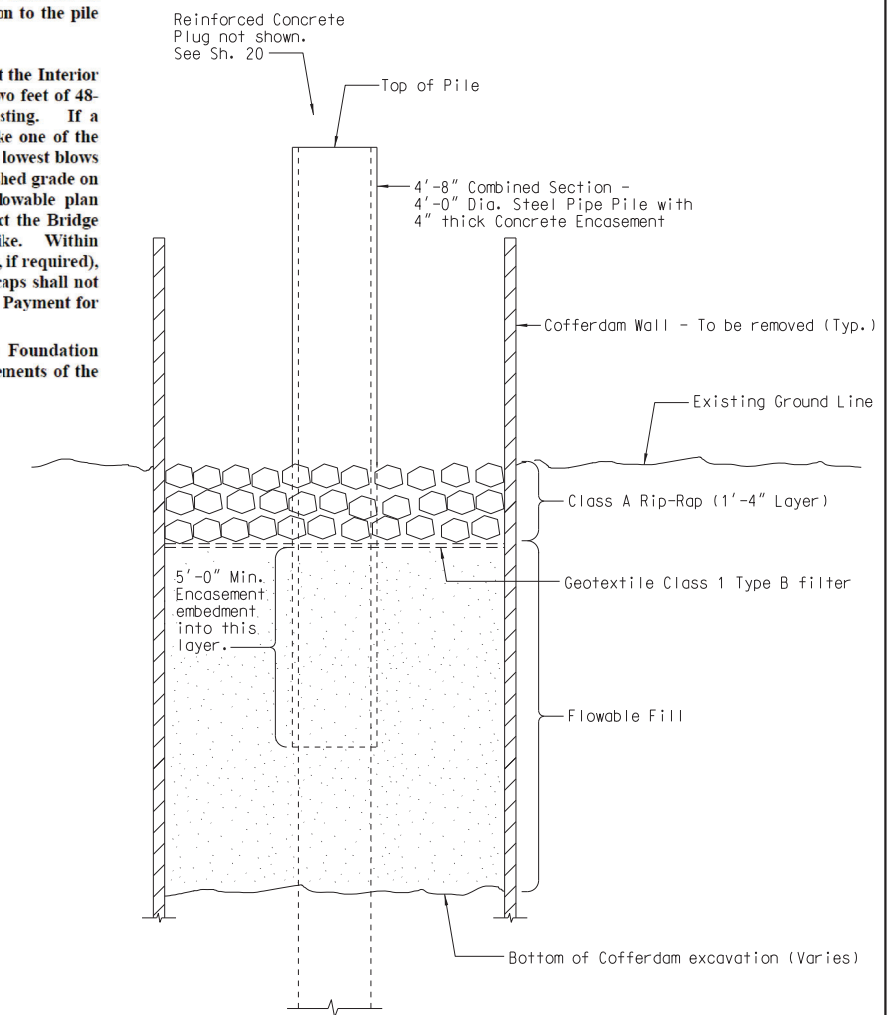
The elevations presented in this table are approximate. Actual field conditions may vary. SLF = Santee Limestone Formation, WHF = Warley Hill Formation, CF = Congaree Formation

The final pipe pile tip elevation must not be shallower than 20 feet below the augered depth if no weak soil zone is encountered. If a weak soil zone (i.e., Warley Hill Formation) is encountered the final pipe pile tip elevation must not be shallower than 20 feet below the weak soil zone.

Once the pipe pile is driven to the final bearing stratum, establish the final elevation of the material inside the pipe pile as the elevation of the bottom of the concrete plug as shown on the plans as Elevation C. If top elevation of material inside pipe pile is lower than the plans Elevation C, backfill with loose sand classified as A-1-a to the plans Elevation C. If top elevation of material inside pipe pile is higher than the plans Elevation C, remove material to the plans Elevation C. This soil shall be removed in order to construct the composite section at the top of the pile for connection to the pile cap.

Perform Pile Driving Analyzer (PDA) on the first production pile driven at the Interior Bents 2 through Interior Bents 7. These piles shall include an additional two feet of 48-inch steel pipe pile length in order to accommodate the initial PDA testing. If a CAPWAP analysis determines that capacity has not been achieved, restrrike one of the production piles. Perform the restrrike on the production pile exhibiting the lowest blows per foot. On initial drive, piles shall be stopped at the highest allowable finished grade on the plans to accommodate a restrrike while still remaining within an allowable plan finished grade elevation. Perform PDA testing during the restrrike. Contact the Bridge Construction Office to determine the time between initial driving and restrrike. Within seven days of completion of the PDA testing (on initial drive and/or restrrike, if required), the results will be evaluated by the RPG3 GDS. Construction of the bent caps shall not proceed until the interior bent piles have been accepted by the RPG3 GDS. Payment for the restrrike will be as indicated in the Standard Specifications.

Reference the 2007 SCDOT Standard Specifications for Driven Pile Foundation (Section 711). Notes included in these plans are in addition to the requirements of the Standard Specifications.



COFFERDAM BACKFILL DETAIL

(Bents 2 thru 7)

After Piles are driven, Reinforced Concrete Plug and Encasement are installed and prior to removal of the Cofferdam, backfill with the following materials in the following sequence:

- At the bottom of the Cofferdam begin with backfilling with flowable fill to approximately 1'-4" below the existing groundline surrounding the Cofferdam.
- Place Geotextile Class 1 Type B filter over entire cured layer of flowable fill.
- Place an approximate 1'-4" layer of Class A Rip-Rap over the Geotextile Class 1 Type B filter to the same elevation of the ground line surrounding the cofferdam.

NOT FOR CONSTRUCTION

**SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
INTERIOR BENT
GEOTECHNICAL &
COFFERDAM PLAN NOTES**

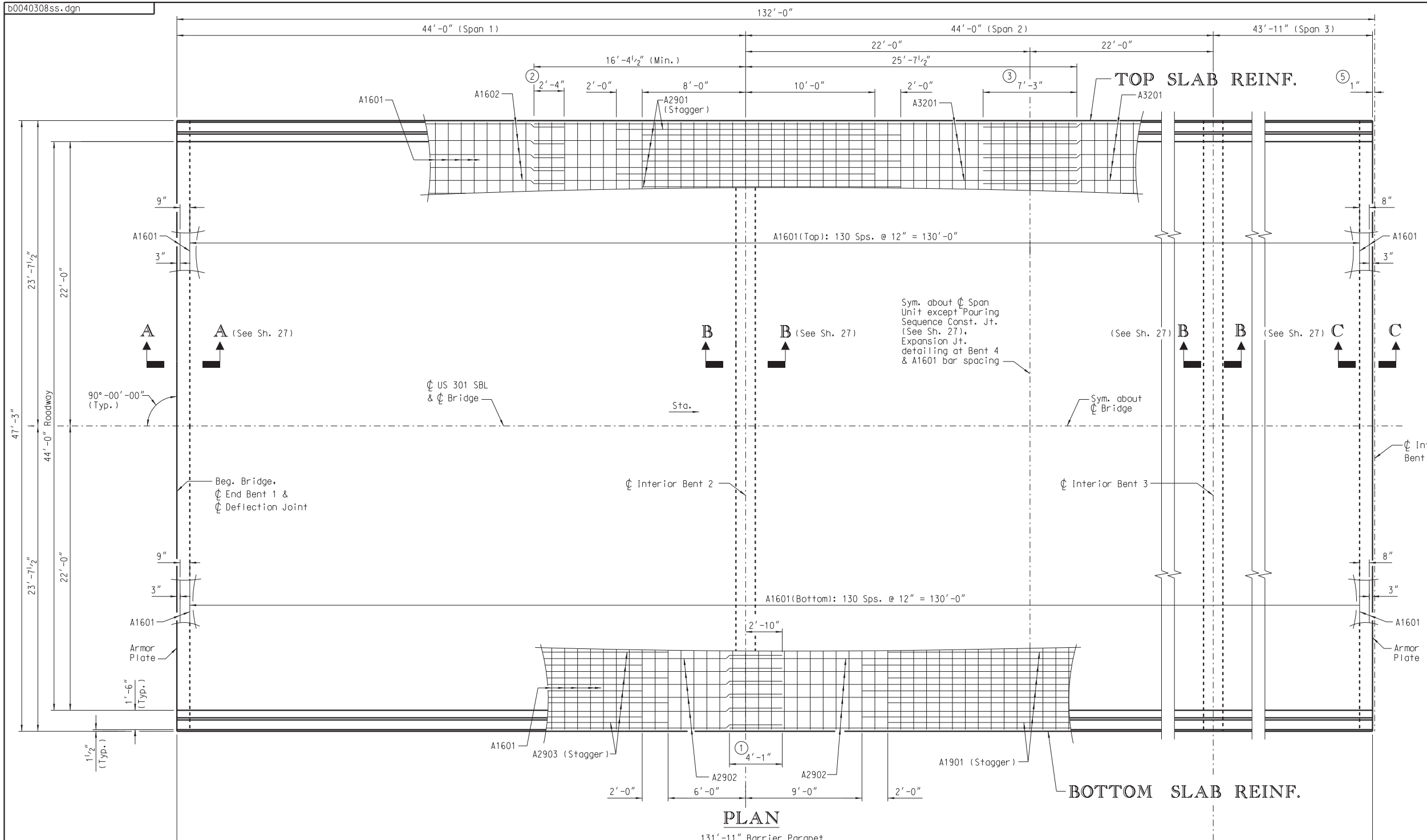
REINF. STEEL SCHED.

MARK	NO. REQ'D	DIMENSION				LENGTH
		"a"	"b"	"c"	"d"	
A1601	266	46'-9"				46'-9"
A1602	94	29'-10"				29'-10"
A1603	12	60'-0"				60'-0"
A1604	24	38'-10"				38'-10"
A1605	4	7'-0"				7'-0"
A1607	8	30'-2"				30'-2"
A1901	48	24'-0"				24'-0"
A2901	96	20'-0"				20'-0"
A2902	141	46'-8"				46'-8"
A2903	96	35'-10"				35'-10"
A3201	94	42'-0"				42'-0"
G1601	266	1'-10 ³ / ₈ "	2'-9 ¹ / ₈ "			7'-3"
H1601	266	2'-3 ³ / ₈ "	2'-3 ¹ / ₂ "	7 ³ / ₈ "		5'-2"
J1301	62	8"	1'-6"			3'-8"
J1302	62	1'-2"	1'-6"			4'-2"
SB		1" Ht.				As Necessary
CHCU		1'-3 ¹ / ₂ " Ht.				(6) As Necessary for Spans 1 & 3
CHCU		1'-2 ³ / ₄ " Ht.				(7) As Necessary

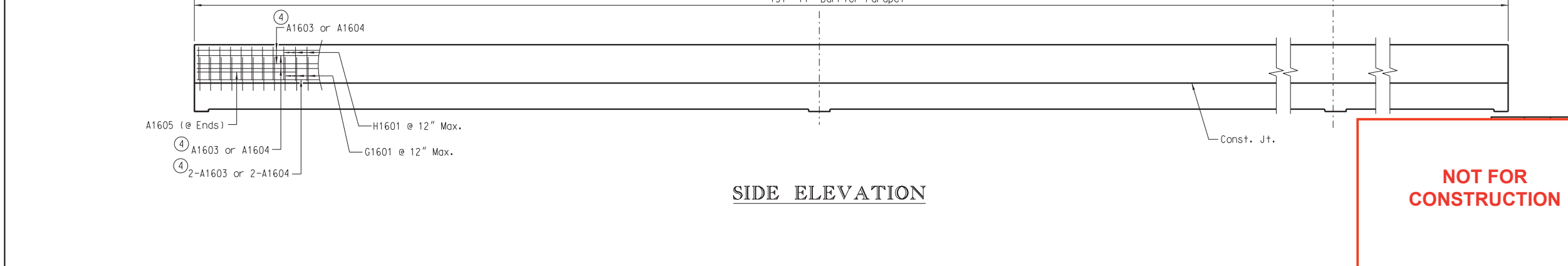
QUANTITIES

ITEM	UNIT	132' SPAN
Concrete, Class 4000	CY	426.5
Reinforcing Steel	LB	80,983
Barrier Parapet	LF	263.8
Elastomeric Bearing Assembly (Flat Slab)	EA	4

- Notes:
- For Reinforcing Bending Details, see Sh. 4.
 - For Slab Drain Locations, see Sh. 7.
 - For Section thru Span, see Sh. 26.
 - For Deck Pouring Sequence with locations of construction joints, see Sh. 27.
 - For Slab Drain Details, see Sh. 27.
- Splice A2902 to A2902 bars 4'-1" Min.
 - Splice A1602 to A3201 bars 2'-4" Min.
 - Splice A3201 to A3201 bars 7'-3" Min.
 - Splice A1603 to A1604 bars 3'-0" Min. & Splice A1604 to A1604 bars 3'-0" Min.
 - Expansion Joint not shown. 1" dimension corresponds to half of the Nominal Expansion Joint Width "W" of 2" at 70°F. See Compression Seal Expansion Joint Details, Sh. 30.
 - Use where the longitudinal A1602 bars are present in the top mat of reinforcement.
 - Use where the longitudinal A3201 bars are present in the top mat of reinforcement.



PLAN



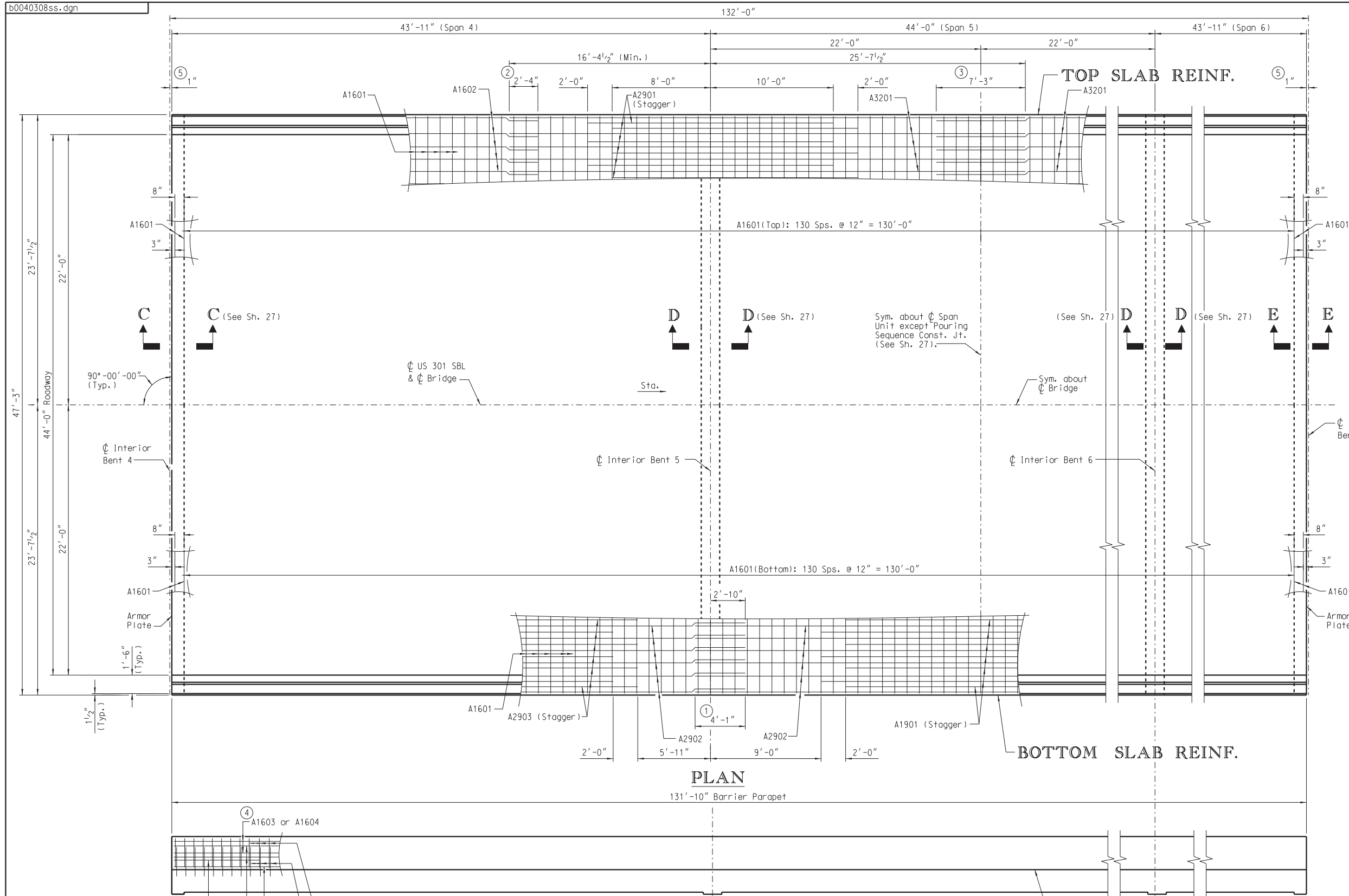
SIDE ELEVATION

NOT FOR CONSTRUCTION

**SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION**

**3 SPAN- 132'-0" UNIT
SUPERSTRUCTURE
(SPANS 1 - 3)**

COUNTY	ORANGEBURG	ROUTE	US 301
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REINF. STEEL SCHED.

MARK	NO. REQ'D	DIMENSION				LENGTH
		"a"	"b"	"c"	"d"	
A1601	266	46'-9"				46'-9"
A1602	94	29'-10"				29'-10"
A1603	12	60'-0"				60'-0"
A1604	24	38'-10"				38'-10"
A1605	4	7'-0"				7'-0"
A1607	8	30'-2"				30'-2"
A1901	48	24'-0"				24'-0"
A2901	96	20'-0"				20'-0"
A2902	141	46'-8"				46'-8"
A2903	96	35'-10"				35'-10"
A3201	94	42'-0"				42'-0"
G1601	266	1'-10 ³ / ₈ "	2'-9 ¹ / ₈ "			7'-3"
H1601	266	2'-3 ³ / ₈ "	2'-3 ¹ / ₂ "	7 ³ / ₈ "		5'-2"
J1301	62	8"	1'-6"			3'-8"
J1302	62	1'-2"	1'-6"			4'-2"
SB		1" Ht.				As Necessary
CHCU		1'-3 ¹ / ₂ " Ht.				(6) As Necessary for Spans 4 & 6
CHCU		1'-2 ³ / ₄ " Ht.				(7) As Necessary

QUANTITIES

ITEM	UNIT	132' SPAN
Concrete, Class 4000	CY	426.2
Reinforcing Steel	LB	80,983
Barrier Parapet	LF	263.7
Elastomeric Bearing Assembly (Flat Slab)	EA	4

- Notes:
- For Reinforcing Bending Details, see Sh. 4.
 - For Slab Drain Locations, see Sh. 7.
 - For Section thru Span, see Sh. 26.
 - For Deck Pouring Sequence with locations of construction joints, see Sh. 27.
 - For Slab Drain Details, see Sh. 27.
- ① Splice A2902 to A2902 bars 4'-1" Min.
 - ② Splice A1602 to A3201 bars 2'-4" Min.
 - ③ Splice A3201 to A3201 bars 7'-3" Min.
 - ④ Splice A1603 to A1604 bars 3'-0" Min. & Splice A1604 to A1604 bars 3'-0" Min.
 - ⑤ Expansion Joint not shown. 1" dimension corresponds to half of the Nominal Expansion Joint Width "W" of 2" at 70°F. See Compression Seal Expansion Joint Details, Sh. 30.
 - ⑥ Use where the longitudinal A1602 bars are present in the top mat of reinforcement.
 - ⑦ Use where the longitudinal A3201 bars are present in the top mat of reinforcement.

PLAN

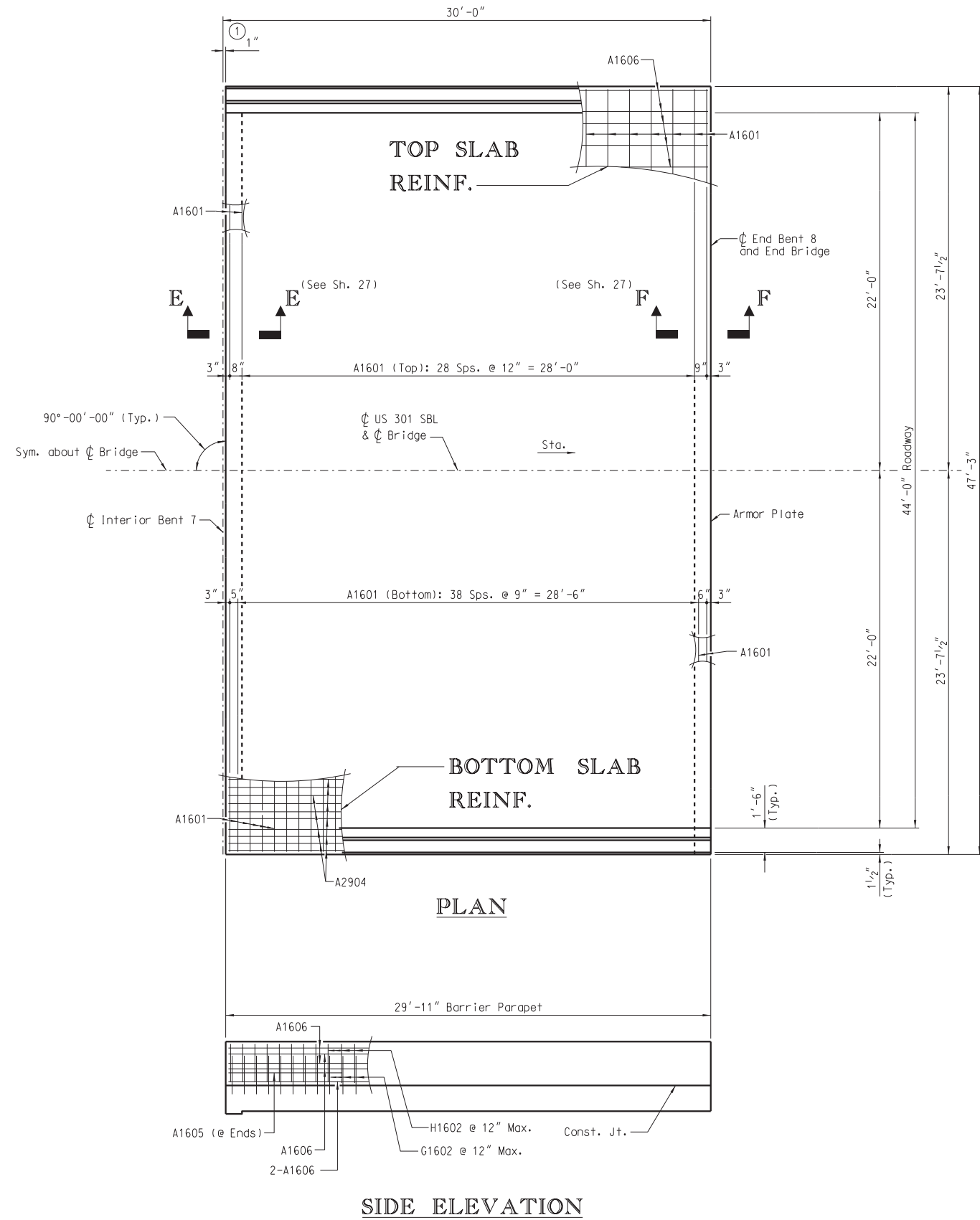
SIDE ELEVATION

NOT FOR CONSTRUCTION

**SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION**

**3 SPAN- 132'-0" UNIT
SUPERSTRUCTURE
(SPANS 4 - 6)**

COUNTY	ORANGEBURG	ROUTE	US 301
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REINF. STEEL SCHED.

MARK	NO. REQ'D	DIMENSION				LENGTH
		"a"	"b"	"c"	"d"	
A1601	72	46'-9"				46'-9"
A1605	4	7'-0"				7'-0"
A1606	59	29'-7"				29'-7"
A1607	4	30'-2"				30'-2"
A2904	95	29'-7"				29'-7"
G1602	62	1'-7 1/4"	2'-6 3/4"			6'-9"
H1602	62	2'-3 1/8"	2'-3 1/2"	7 3/8"		5'-2"
J1301	62	8"	1'-6"			3'-8"
SB	1" Ht.		As Necessary			
CHCU	12 1/2" Ht.		As Necessary			

QUANTITIES

ITEM	UNIT	50' END SPAN
Concrete, Class 4000	CY	84.2
Reinforcing Steel	LB	15,964
Barrier Parapet	LF	59.8
Elastomeric Bearing Assembly (Flat Slab)	EA	2

Notes:

- For Reinforcing Bending Details, see Sh. 4.
- For Slab Drain Locations, see Sh. 7.
- For Section thru Span, see Sh. 26.
- For Deck Pouring Sequence, see Sh. 27.
- For Slab Drain Details, see Sh. 27.

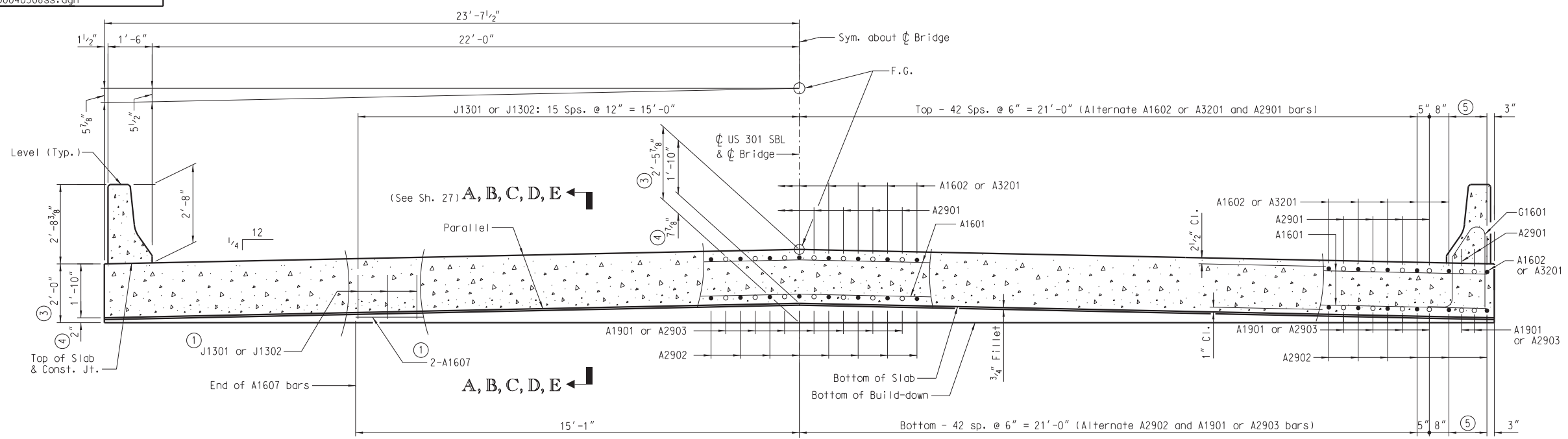
① Expansion Joint not shown. 1" dimension corresponds to half of the Nominal Expansion Joint Width "W" of 2" at 70°F. See Compression Seal Expansion Joint Details, Sh. 30.

NOT FOR CONSTRUCTION

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

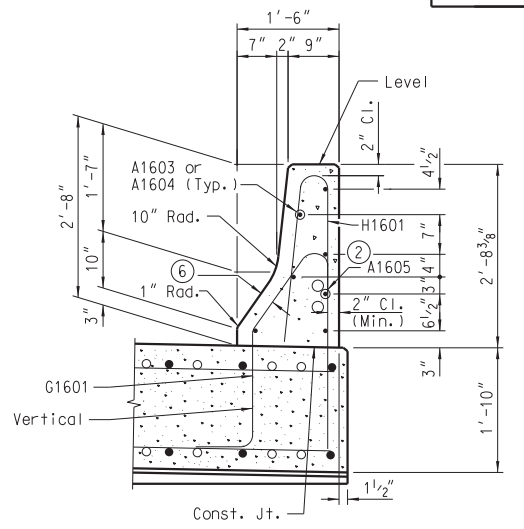
**30'-0" END SPAN
SUPERSTRUCTURE
(SPAN 7)**

COUNTY	ORANGEBURG	ROUTE	US 301
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SECTION THRU 132' SPANS

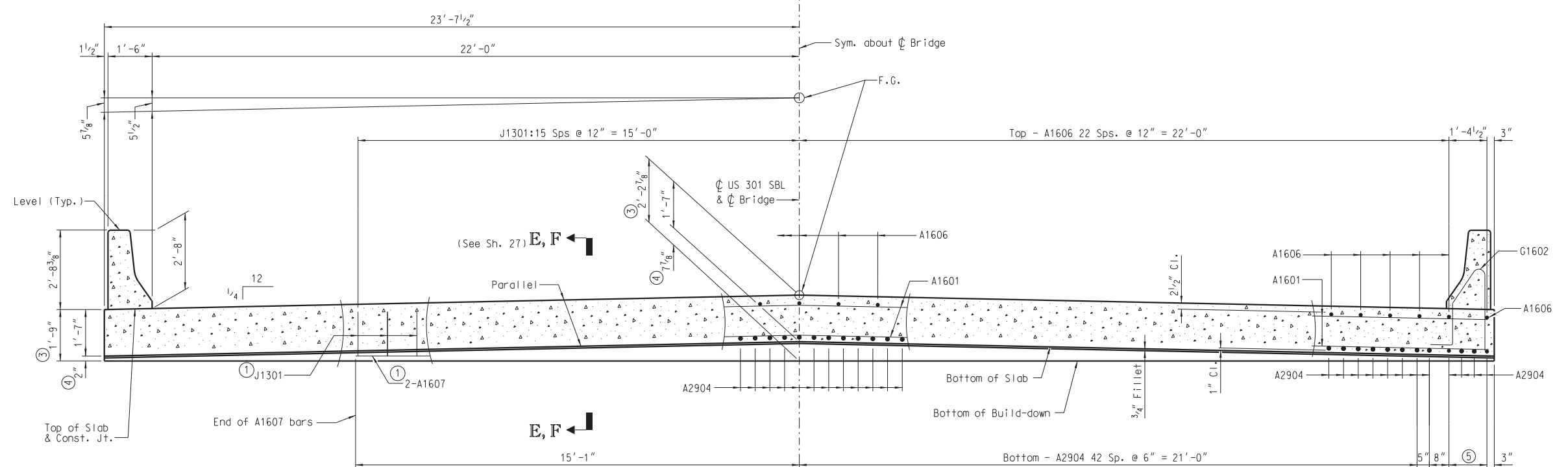
(Spans 1 - 3 and Spans 4 - 6)
(Deck Drains Not Shown)



SECTION THRU BARRIER PARAPET

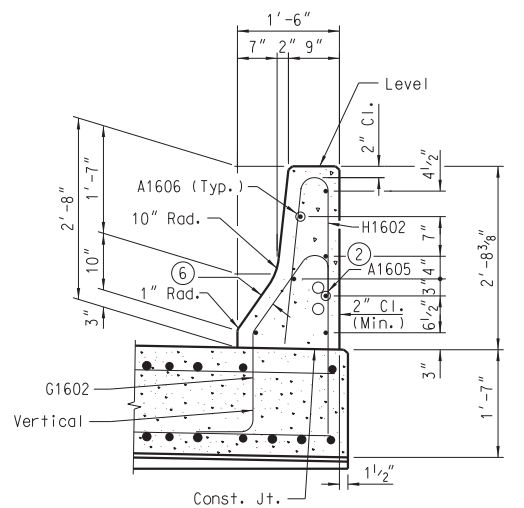
(Spans 1 - 3 and Spans 4 - 6)
(Deck Drains Not Shown)

- LEGEND**
- Continuous Reinforcement
 - Non-Continuous Reinforcement



SECTION THRU 30' END SPAN

(Span 7)
(Deck Drains Not Shown)



SECTION THRU BARRIER PARAPET

(Span 7)
(Deck Drains Not Shown)

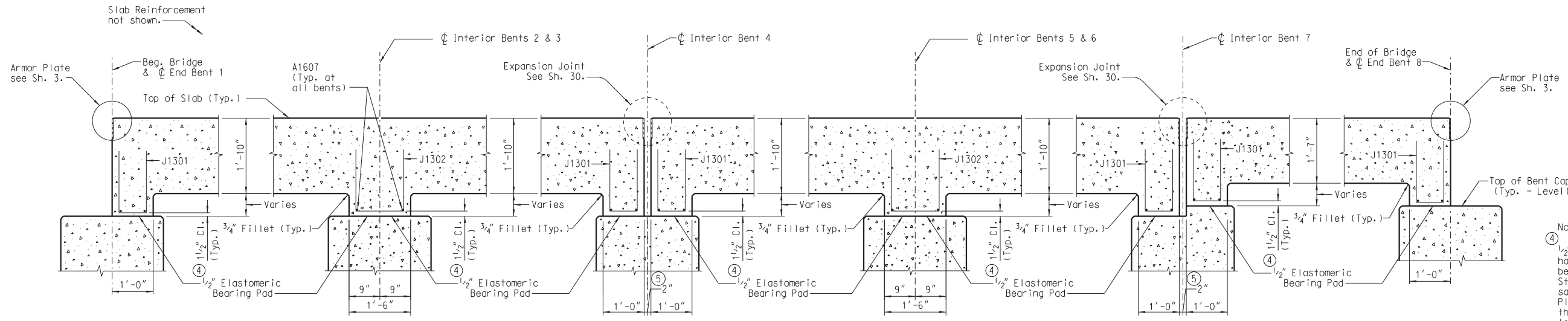
- Notes:**
- ① For slab build-down details, see Sh. 27.
 - ② At ends of parapet only.
 - ③ At ϕ Bent.
 - ④ Includes 1/2" elastomeric bearing pad.
 - ⑤ 3 eq. sp. = 1'-3 1/2"
 - ⑥ 2 1/2" C.I. (Min.)

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**SUPERSTRUCTURE
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SECT. A-A
(At End Bent 1)

SECT. B-B
(At Interior Bents 2 & 3)

SECT. C-C
(At Interior Bent 4)

SECT. D-D
(At Interior Bents 5 & 6)

SECT. E-E
(At Interior Bent 7 with split build-up)

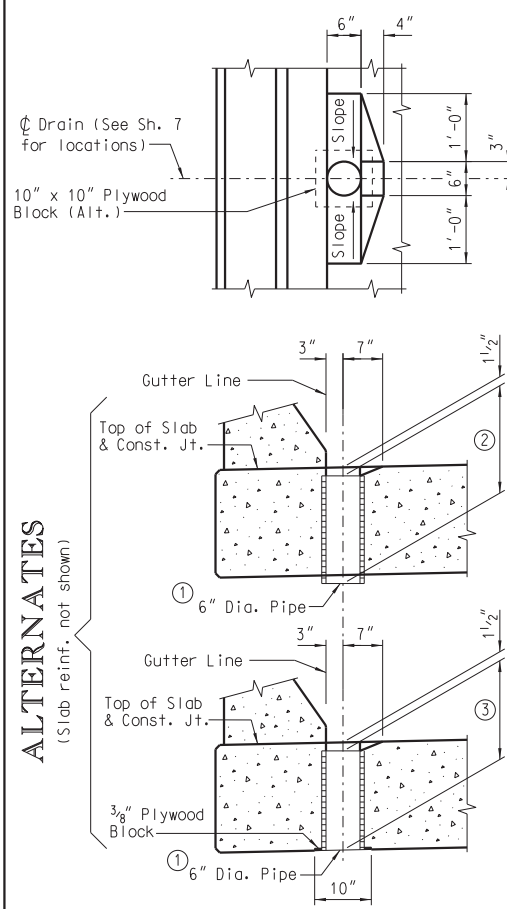
SECT. F-F
(At End Bent 8)

Note:

④ 1/2" elastomeric bearing pad 60 Durometer hardness. Provide materials for elastomeric bearings that conform to Section 724 of the Standard Specifications. Provide a pad the same length and width of slab build-down. Place stock length pieces end to end provided that no individual piece is less than 6'-0" in length. Include all costs for furnishing and placing the pads in the unit price bid for Elastomeric Bearing Assembly (Flat Slab).

⑤ Nominal Expansion Joint Width "W" of 2" at 70° F. See Compression Seal Expansion Joint Details, Sh. 30.

SLAB BUILD-DOWN DETAILS



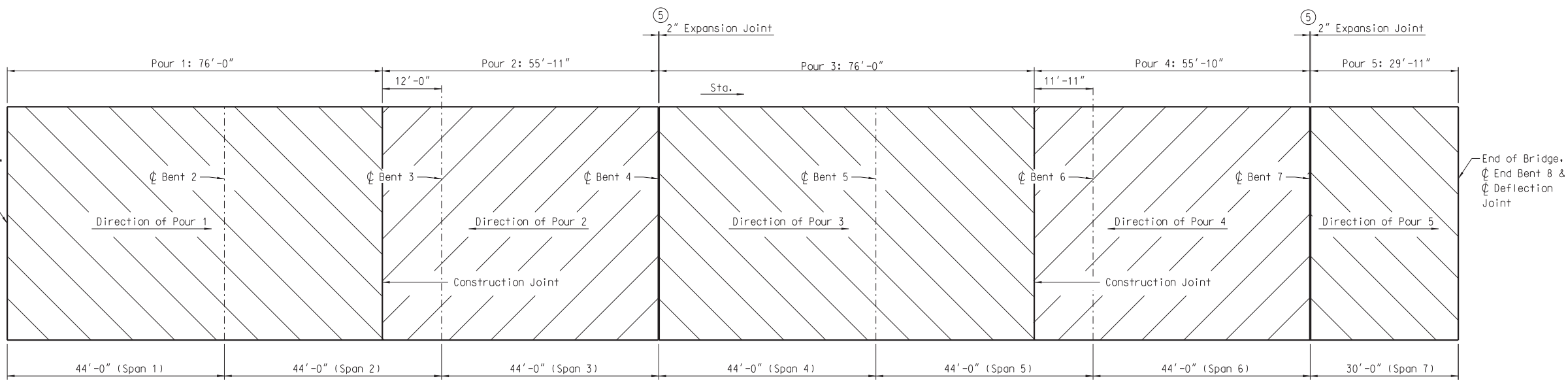
DRAIN DETAILS

Notes:

① Provide drain pipes that are 6" nominal diameter Schedule 40 PVC Pipe meeting the requirements of ASTM D 1785 or 6" nominal diameter fiberglass pipe meeting the requirements of ASTM D 2996. Cement at least two lugs, of a size suitable to anchor the pipe, to the portion of the pipe embedded in the concrete slab. Include all costs of furnishing and placing drains in the unit price bid for Concrete for Structures, Class 4000.

② 1'-10" for Spans 1 - 6, 1'-7" for Span 3.

③ 1'-8 1/2" for Spans 1 - 6, 1'-5 1/2" for Span 7.



DECK POURING SEQUENCE

Notes:

Cast the 132' continuous units using the construction joints shown with a suitable screed from the far end of the continuous span to the construction joint. Use an approved retarding agent and establish and maintain a minimum pouring rate of 50 CY per hour unless approved otherwise by the RCE.

Cast the 30' end span unit in one pour from one end of span to the other using a suitable screed. Use an approved retarding agent and establish and maintain a minimum pouring rate of 45 CY per hour unless approved otherwise by the RCE.

Do not remove slab falsework until each entire span unit has been poured and cured according to Section 702 of the Standard Specifications.

Cast parapet concrete after slab falsework has been struck.

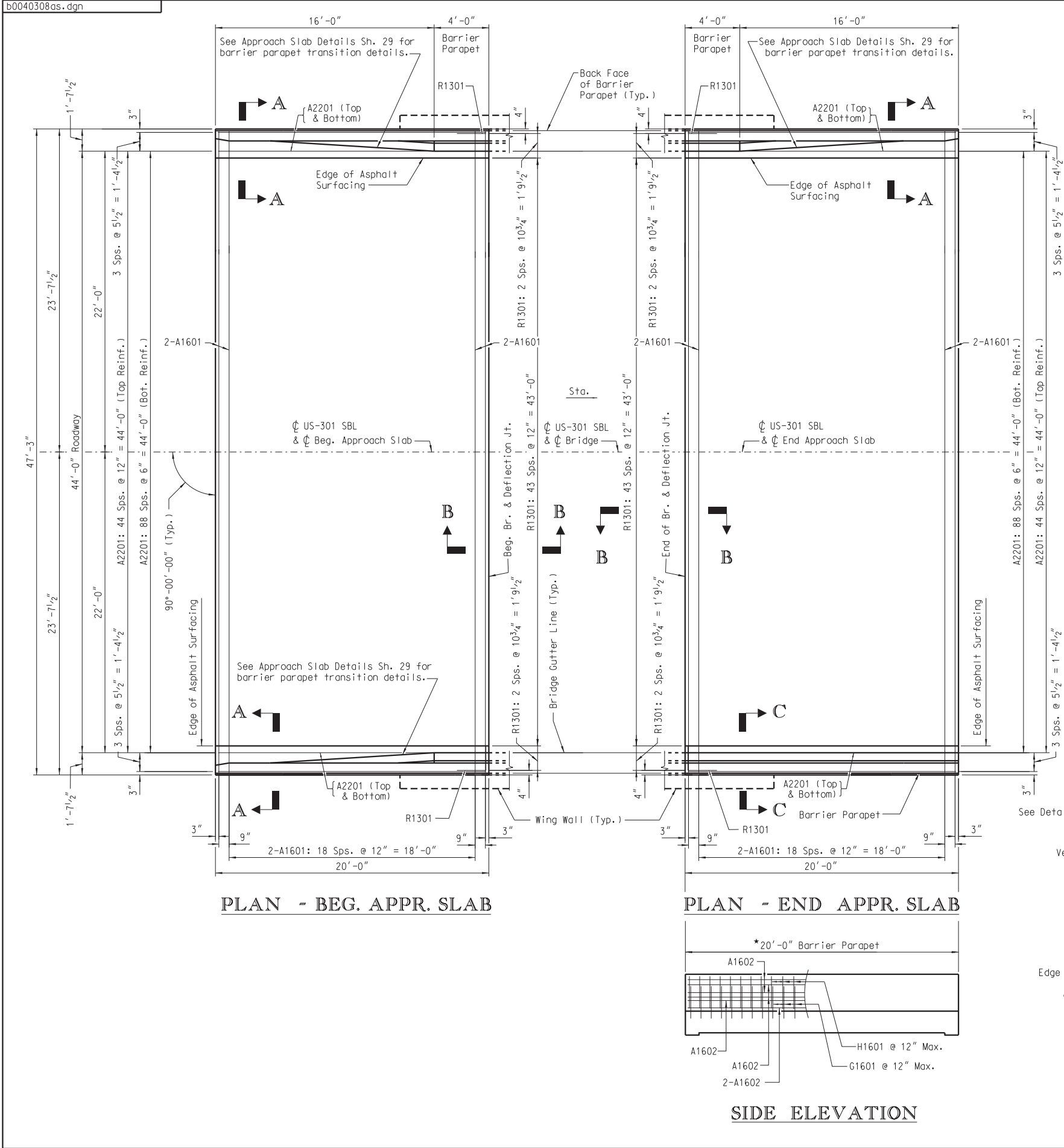
For Construction Joint Details and Notes, see Sh. 3.

Submit a pouring plan to the RCE for approval prior to pouring concrete.

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SUPERSTRUCTURE
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(2 OF 2)**

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Notes:

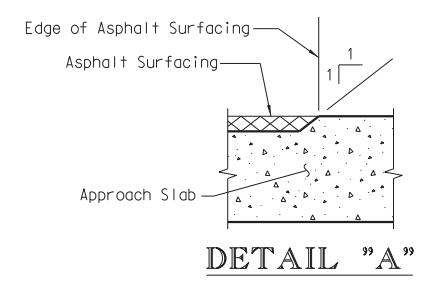
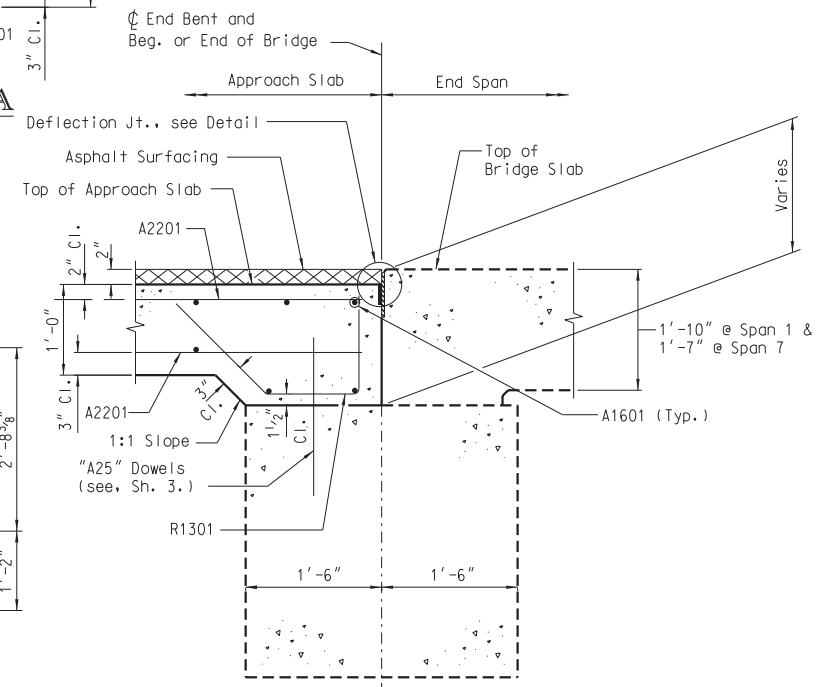
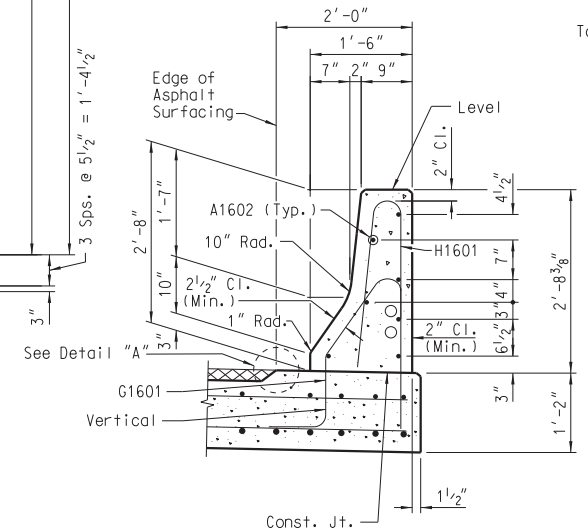
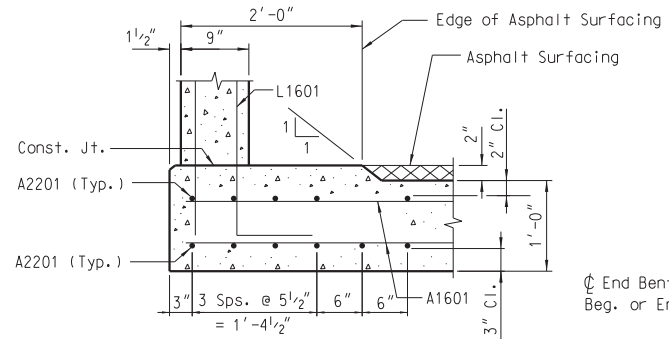
Construct approach slabs to the grades and elevations shown on the bridge Plan and Profile drawing. Construct approach slabs to the same crown as the bridge deck.

Grade fill under approach slabs to a uniform surface 1'-2" below the finished surface of roadway. Thoroughly compact fill under the approach slab in accordance with Section 208 of the Standard Specifications. Include all costs associated with compaction of fill beneath approach slab to not less than 95% of maximum density in the unit price bid for Concrete for Structures - Class 4000.

Support the bottom mat of reinforcing steel using concrete block or similar material. Provide a minimum concrete cover of 3" below the bottom reinforcing steel.

Space CHCU bolsters to provide adequate support for top reinforcing steel, approximately 2'-6" on center and parallel to centerline of approach slab. Weight of bar supports is not included in the reinforcing steel quantities. Consider bar supports as incidental to the reinforcing steel, and include all costs for furnishing and placing bar supports in the unit price bid for reinforcing steel.

*Construct a 1/2" open joint between barrier parapets for the End Span and End Approach Slab at the End of the Bridge.



REINF. STEEL SCHED.

MARK	BEG. APPR. SLAB NO. REQ'D	END APPR. SLAB NO. REQ'D	DIMENSION				LENGTH
			"a"	"b"	"c"	"d"	
A1601	42	42	46'-11"				46'-11"
A1602	12	13	19'-8"				19'-8"
A1603	2	1	16'-0"				16'-0"
A2201	146	146	19'-8"				19'-8"
C1601	42	21	2'-3"	10"			3'-1"
L1601	88	44	10"	3'-4"	5"	3'-4"	7'-11"
R1301	48	48	1'-5"	1'-1"	2'-0"	1'-5"	4'-6"
U1601	2	1	2'-0"	5"			4'-2"
G1601		21	1'-2 1/4"	2'-1 3/4"			5'-11"
H1601		21	2'-3 1/8"	2'-3 1/2"	7 3/8"		5'-2"
CHCU		4" Ht.					As Necessary

QUANTITIES

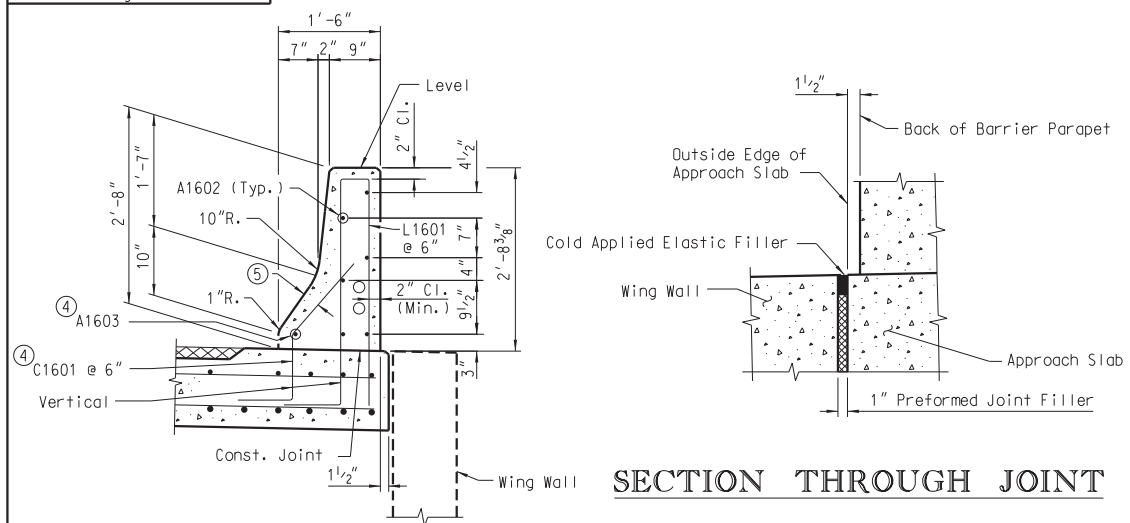
ITEM	UNIT	BEG APPR. SLAB	END APPR. SLAB
Concrete, Class 4000	CY	39.7	38.5
Reinforcing Steel	LB	9218	9030
Barrier Parapet	LF	8	24
Barrier Parapet Transition	EA	2	1

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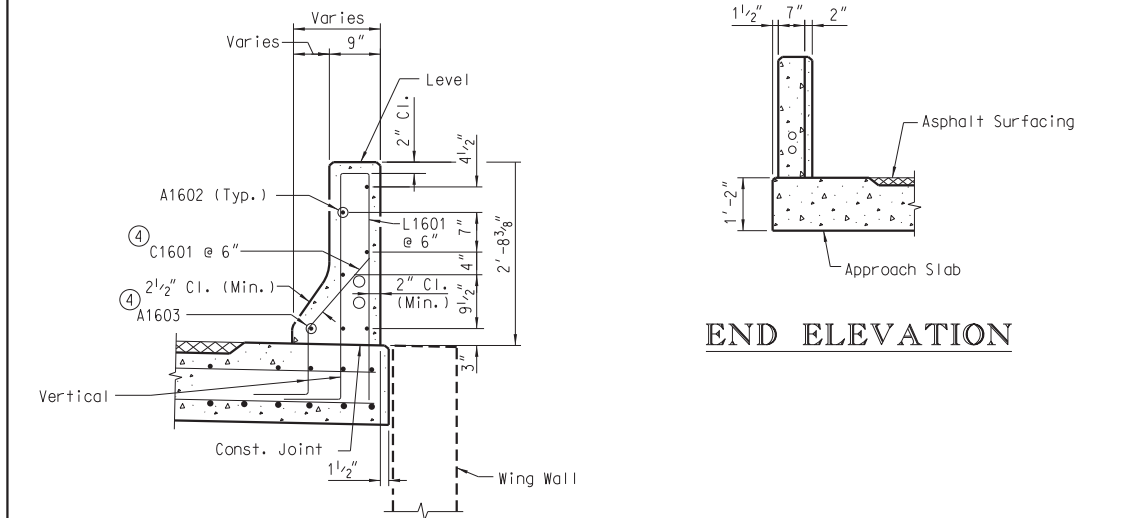
APPROACH SLAB BEG. & END OF BRIDGE

COUNTY ORANGEBURG ROUTE US 301



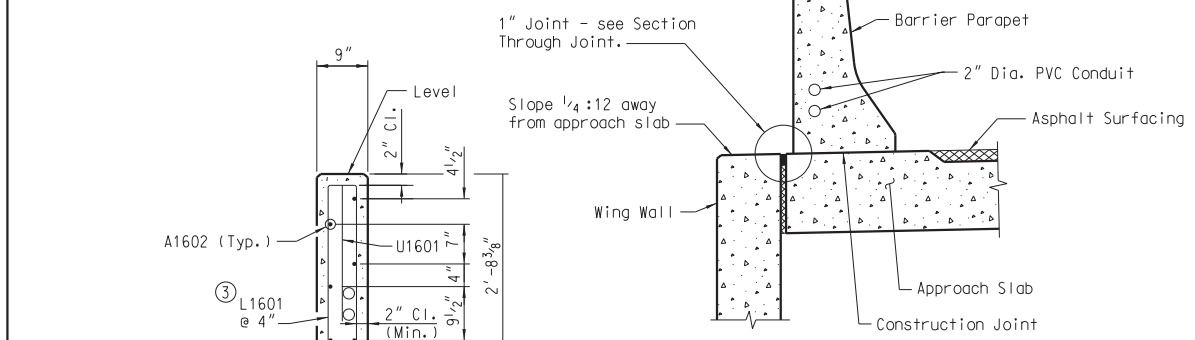
SECTION THROUGH JOINT

SECTION D-D



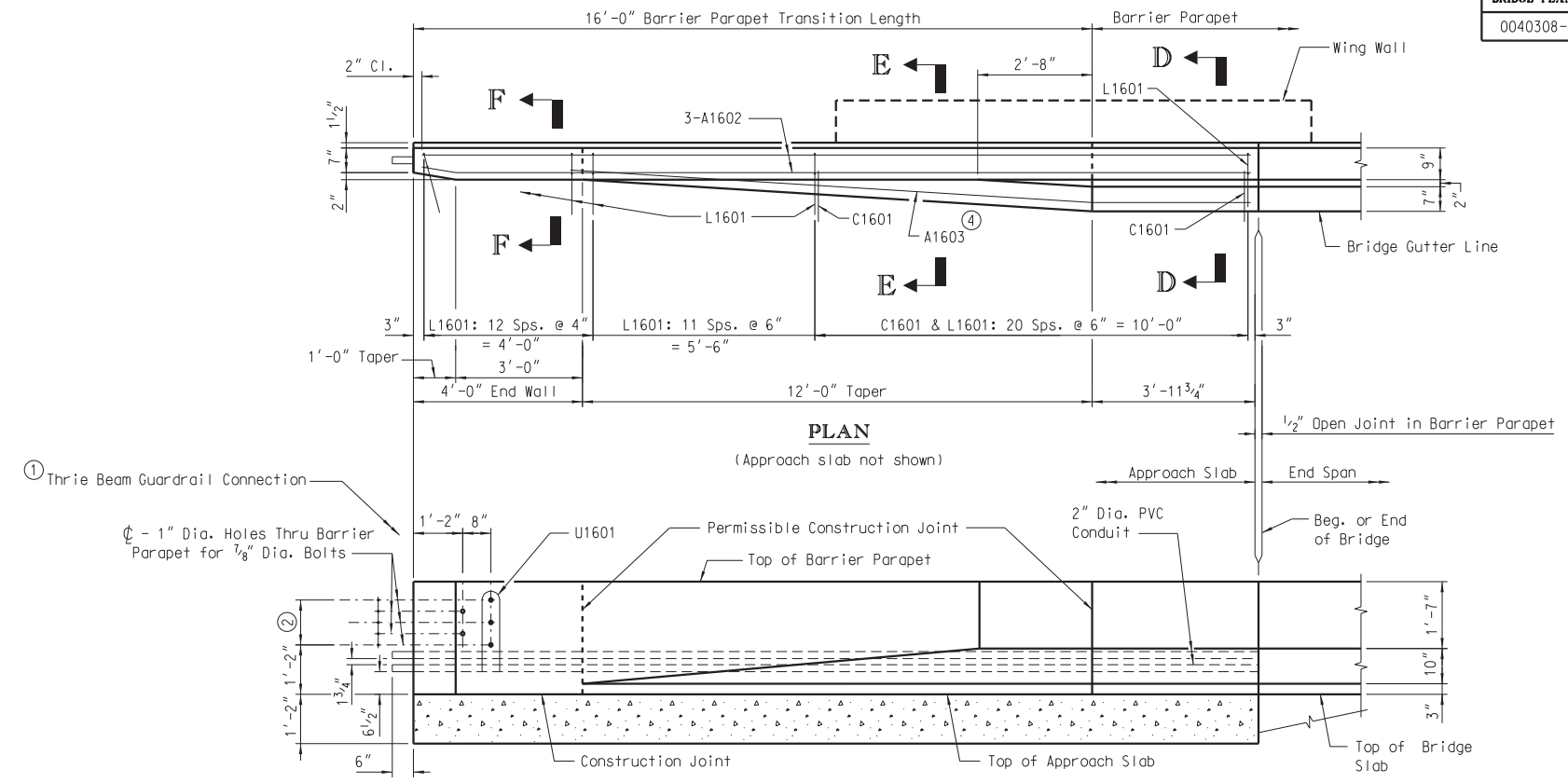
END ELEVATION

SECTION E-E



SECTION THROUGH WING WALL / APPROACH SLAB

SECTION F-F

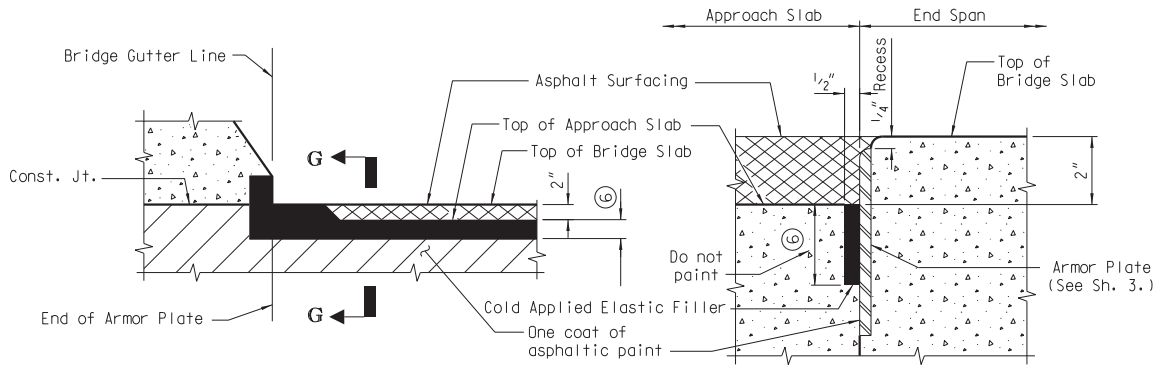


PLAN

ELEVATION

BARRIER TRANSITION DETAILS

Provide Concrete Bridge Barrier Parapet Transition conforming to the requirements of Section 705 of the Standard Specifications. Include all costs of furnishing, preparing and placing concrete, expansion joint material, and all of the materials required in the finished railing transition, except for the reinforcing steel, in the unit price bid for Concrete Bridge Barrier Parapet Transition. Payment for reinforcing steel is determined in accordance with Section 703 of the Standard Specifications.



SECTION ALONG DEFLECTION JOINT

SECTION G-G

DEFLECTION JOINT DETAIL

Form or saw cut the deflection joint.
Apply one coat of asphaltic paint to the joint to prevent bonding of end span and approach slab concrete. Alternate methods to prevent bonding may be proposed. Submit details of bond breaking method to RCE for approval.

Include all costs for furnishing and installing cold applied elastic filler in the unit price bid for Concrete for Structures - Class 4000.

Notes:
For additional notes and details see Approach Slab Sh. 28.

- ① Form the 1" Dia. holes with plastic, PVC, or galvanized standard weight steel pipe having an ID of 1". Include all cost of pipe and installation in the unit price bid for Reinforcing Steel. All pipe to remain in place when forms are removed. RCE to verify the location of the holes to ensure the guardrail shoe will fit properly when installed.
- ② 4 spaces @ 3 1/8" = 1'-3 1/4"
- ③ Rotate as required for clearance at the 7" transition.
- ④ Field Bend as necessary for clearance.
- ⑤ 2 1/2" Cl. (Min.)
- ⑥ Set this dimension in accordance with the Manufacturer's recommendations.

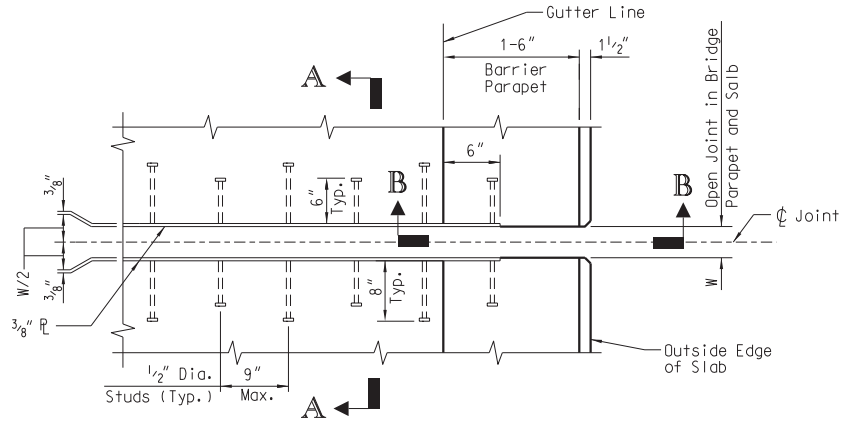
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DEPARTMENT OF TRANSPORTATION**

**APPROACH SLAB
DETAILS**

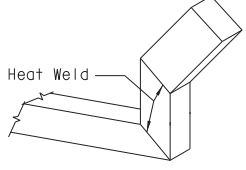
COUNTY	ORANGEBURG	ROUTE	US 301
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DESIGN DATA
 Concrete Shrinkage Coefficient = 0.0002
 Coefficient of Thermal Expansion and Contraction:
 Normal Weight Concrete = 0.00006 in/in per °F
 Structural Steel = 0.000065 in/in per °F
 Size the uncompressed seal within the following range:
 Min. width = 1.10W Max. width = 1.35W Preferred width = 1.25W
 For skewed joints, limit max. racking to 20% of uncompressed seal width.



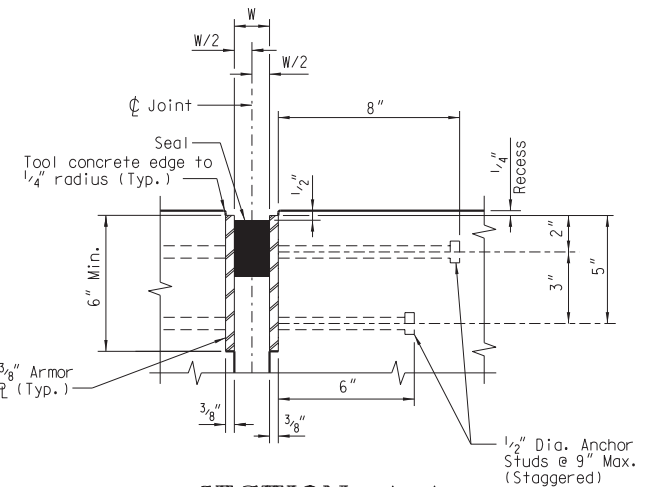
PART PLAN - EXPANSION JOINT
 (Seal Not Shown)

Seal Installation:
 Have the manufacturer's representative present for the first installation to insure proper installation. Follow the manufacturer's installation procedures and the instructions below.
 Begin seal installation at the low end of the joint. Apply mixed epoxy to both sides of the seal and joint. Ensure epoxy completely fills the grooves in the sides of the seal. With gloved hands, compress the seal and install seal into the joint recessing the seal 1/4" below the top of the steel plate. If assistance is needed in installing the seal, use a blunt probe to push down on the seal. Do not push the seal at any angle that will stretch the seal material. Once seal installation has begun on a joint, do not stop until the installation is completed. Clean the excess epoxy from the surface of the seal material quickly and thoroughly in accordance with the seal manufacturer's recommendations. Do not use solvents to clean or remove excess epoxy. Excess epoxy remaining on the joint seal may be cause for rejection of the joint.
 Provide a watertight joint and seal. The joint will not be tested, but the RCE will observe the joint condition and performance until final inspection.

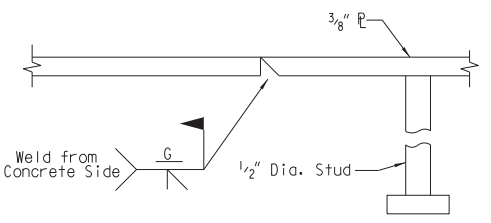


DETAIL FOR SEAL TURNS/SPLICES

- 1) Preheat the Teflon heating iron to 350° for approximately 30 minutes before welding the seal.
- 2) Using a sharp instrument such as a hacksaw, cut the seal to form the shape shown in Section B-B. This shape not necessary for welding seal at other approved splice locations.
- 3) Place the ends of seal to be welded against the Teflon heating iron at 350°F. Hold for a minimum of 10 seconds but no more than 20 seconds, depending on the ambient temperature. Then, quickly place these ends together tightly and hold for 20 seconds. Do not check the welded seal until the material has completely cooled.
- 4) If the edges do not seal completely, use a thin blade, such as a hacksaw blade to transfer heat into the edge to be sealed. Hold the heated blade between the edges of the material approximately 5 seconds, then remove and press the blade together quickly and hold for 10 to 20 seconds. Keep the blade on the heating iron under the Teflon cover between each use.



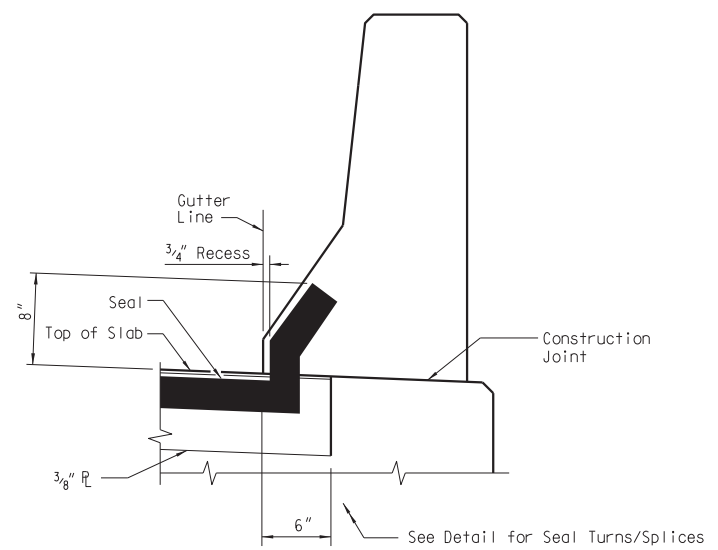
SECTION A-A



FIELD WELD DETAIL

Provide adhesive that complies with the requirements in the Table below.

TEST	TEST METHOD	REQUIREMENT
Tensile Strength	ASTM D 638	3500 psi Min.
Compressive Strength	ASTM D 695	7000 psi Min.
Shore D Hardness	ASTM D 2240	75 Min.
Water Absorption	ASTM D 570	0.25% by Weight
Bond Strength	ASTM C 882	430 psi Min.



SECTION B-B

Provide seal that complies with the requirements in the Table below.

TEST	TEST METHOD	REQUIREMENT
Elongation at Break	ASTM D 3575, Suffix T	≥ 180%
Tensile Strength	ASTM D 3575, Suffix T	≥ 110 psi
Tear Resistance	ASTM D 3575, Suffix G	≥ 14 pli
Density	ASTM D 3575, Suffix W - Method A	2.0 pcf to 3.4 pcf
Water Absorption	ASTM D 3575, Suffix L	< 0.03 psf
Compression Set	ASTM D 3575, Suffix B, 2 hour recovery	< 15%

Notes:

For each joint location as shown in the Joint Table below, provide seal having a normal uncompressed width as shown in the Joint Table. Set the nominal joint width "W" to the value shown in the Joint Table at 70° F. Use the actual air temperature, measured in the shade and averaged over the preceding 24 hour period, as the setting temperature. At the time of construction, decrease the joint opening by Dim "A" for each 10°F that the setting temperature is above 70°F or increase the joint opening by Dim "A" for each 10°F that the setting temperature is below 70°F.

JOINT TABLE			
LOCATION	NOMINAL JOINT WIDTH "W" @ 70° F.	DIM "A"	Seal Uncompressed Width
Interior Bent 4	2"	1/8"	2 1/2"
Interior Bent 7	2"	1/16"	2 1/2"

Ensure three copies of certifications are signed by an authorized agent of the manufacturer or supplier and submitted to the RCE prior to the installation of the seal. The required certifications are a copy of the manufacturer's test reports, or a statement by the supplier accompanied by the test results, certifying that the materials have been sampled, tested and inspected. Failure to provide the required certifications for seals and lubricant/adhesive is grounds for rejection of the materials.

Mark all seals with die markings that indicate the lot number and manufacturer. Mark each container of lubricant/adhesive with the manufacturer, lot number, and shelf life expiration date.

Provide preformed seals that are compatible with steel and concrete and resistant to abrasion, oxidation, oils, gasoline, salt, and other materials that may be spilled on or applied to the surface. Provide seal material that is resistant to weathering and ultra-violet rays. Provide a seal having a working movement range of 30% tension and 60% compression. Manufacture the seal from a low-density closed cell, cross-linked ethylene vinyl acetate polyethylene copolymer nitrogen blown material.

Manufacture seals with grooves along the bond surface running the length of the joint. The grooves shall be 1/8" wide by 1/8" deep and spaced between 1/4" and 1/2" apart. Provide seals with a minimum depth of at least 70% of the uncompressed width and meeting the manufacturer's recommendations. Design the seal so that, when compressed, the center portion of the top does not extend upward above the original height of the seal by more than 1/4".

Shop mark the seal to indicate the top side of the seal in such a way as to be clearly visible upon installation.

Install seals in accordance with the manufacturer's instructions unless stipulated otherwise in these plans or the Special Provisions.

Provide a watertight seal along the entire length including the ends of the seal.

Adhesives:

Provide a two component, 100% solid, modified epoxy adhesive meeting the requirements of ASTM C 881, Type I, Grade 2, Class B & C and in accordance with testing requirements shown on this sheet.

Provide adhesive that is workable to 40°F. For installation temperatures below 40°F or for application on moist, hard to dry concrete surfaces, provide adhesive as specified by the manufacturer of the joint material.

Joint Preparation:

Clean the armored joint opening in accordance with the manufacturer's recommendations. Bond the seal to the cleaned surface on the same day the cleaning is done.

Provide steel armor plates that conform to the requirements of the latest AASHTO M 270, Grade 50W (ASTM A 709, Gr. 50W) and are of weldable quality.

Provide 3/8" plates that conform to the crown of the finished roadway and have smooth edges. Fabricate the 3/8" plates in reasonable lengths and connect them at the job site using partial penetration groove welds. Grind welds at the exposed surfaces of plates flush. Perform welding of splices prior to bonding seals. If necessary to bolt the 3/8" plates to the forms, provide 3/16" Dia. holes at approximately 2' on center in the lower portion of the plates.

Provide 1/2" Dia. headed studs that meet the requirements of Section 709 of the Standard Specifications. Electrically weld all studs.

Field bend top slab reinforcing as required to clear anchor studs.

For payment purposes, measure along the centerline of the joint from the edge of slab to the edge of slab. Include all costs associated with furnishing labor, materials, fabrication, and installation of armor plates, cover plates, and seals complete and in place in the unit price bid per linear foot of Compression Seal Joint.

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**SOUTH CAROLINA
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**COMPRESSION SEAL
 EXPANSION JOINT
 DETAILS**

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