

REVIEWED	DR.	BY	CHK	DATE
		BFS	WRS	7-22

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12/9/2022

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South Carolina Department of Transportation



PROPOSED PLANS
FOR
RICHLAND COUNTY
PROJECT ID P039719
US 176 WB (BROAD RIVER ROAD)
BRIDGE OVER I-20

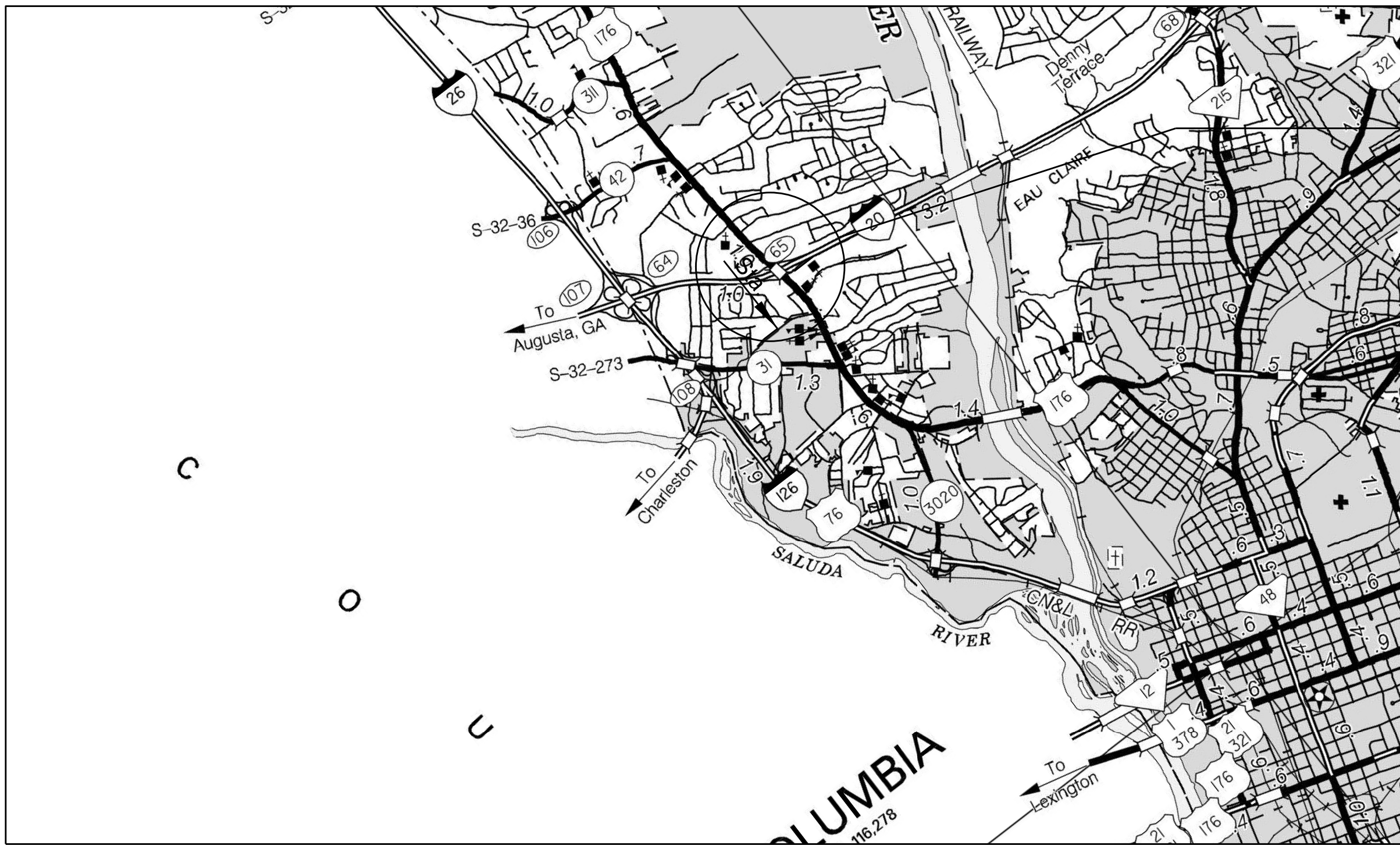
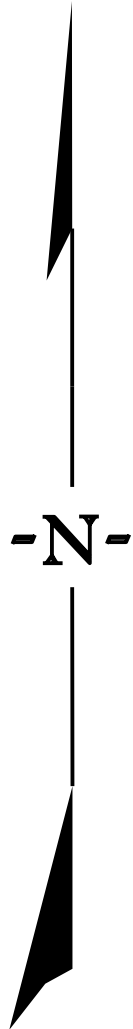
Submit Shop Plans to:

Infrastructure Consulting & Engineering
110 Midlands Court
West Columbia, SC 29169

Telephone: (803) 822-0333

Approximate Location of Bridge is

Latitude 34°02'22" N
Longitude 81°05'37" W



SITE LOCATION

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 10738

TRAFFIC DATA

2020 ADT 12,300 V.P.D.
2040 ADT 14,700 V.P.D.
TRUCKS 8 %



LAYOUT

NET LENGTH OF ROADWAY	0.000	MILES
NET LENGTH OF BRIDGES	0.043	MILES
NET LENGTH OF PROJECT	0.043	MILES
LENGTH OF EXCEPTIONS	0.000	MILES
GROSS LENGTH OF PROJECT	0.043	MILES

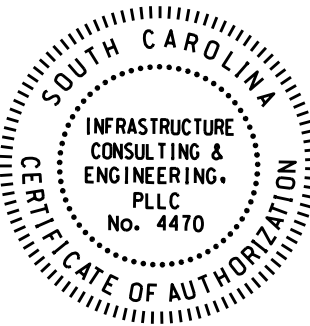
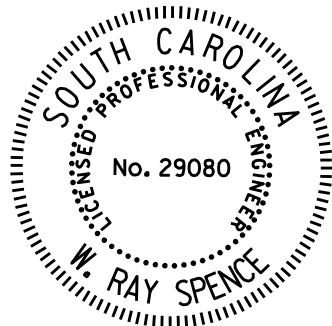
NOTE: EXCEPT AS MAY OTHERWISE BE SPECIFIED ON THE PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIALS AND WORKMANSHIP ON THIS PROJECT SHALL CONFORM TO THE SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION (2007 EDITION) AND THE STANDARD DRAWINGS FOR ROAD CONSTRUCTION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

PLANS PREPARED BY:



110 MIDLANDS COURT
WEST COLUMBIA, SC 29169
Telephone: (803) 822-0333

ENGINEER OF RECORD



FOR CONSTRUCTION :

12/20/2022
DATE

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BRIDGE PLANS ID	SHEET NO.
P039719-B42a	2

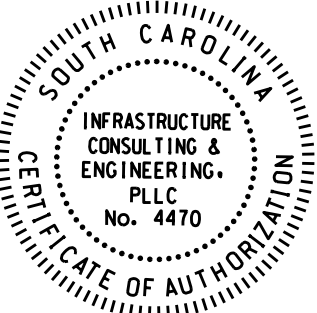
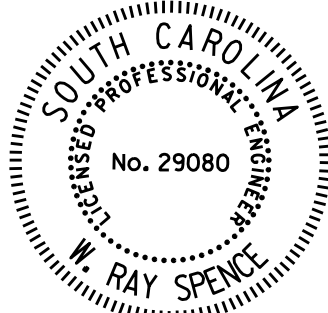
TABULATION OF ESTIMATED QUANTITIES																	
LOCATION ITEM	NO.	STRUCTURE EXCAVATION FOR RETAINING WALL	WET & DRY EXCAVATION FOR BRIDGES	2.0" SCHEDULE 80 PVC CONDUIT	CONCRETE FOR STRUCTURES CLASS 4000	GROOVED SURFACE FINISH	REINFORCING STEEL FOR STRUCTURES (BRIDGE)	HOOP REINF. STEEL FOR STRUCTURES (BRIDGE)	GALVANIZED REINFORCING STEEL FOR STRUCTURES (BRIDGE)	PRESTRESSED CONCRETE FLORIDA I-BEAM (54")	42" MASH CONCRETE BARRIER PARAPET/RAILING WALL	DYNAMIC PILE ANALYZER TEST SET-UP	PILE DRIVING SET-UP	STEEL H BEARING PILING (HP14x73)	STEEL H BEARING INDEX PILING (HP14x73)	STEEL H BEARING PILING (HP14x89)	STEEL H BEARING INDEX PILING (HP14x89)
		CY	CY	LF	CY	SY	LBS.	LBS.	LBS.	LF	LF	EACH	EACH	LF	LF	LF	LF
SUPERSTRUCTURE	1	--	--	952.0	793.3	1,712	12,570	--	127,459	2,107.3	475.9	--	--	--	--	--	--
END BENT 1	1	--	--	--	68.9	--	12,789	--	--	--	--	2	13	--	--	865	162
END BENT 3	1	--	--	--	49.6	--	9,350	--	--	--	--	2	9	--	--	568	167
INTERIOR BENT 2	1	--	359	--	189.7	--	44,532	2,741	--	--	--	2	32	1,655	115	--	--
APPROACH SLAB NO. 1	1	--	--	90.5	83.4	--	21,817	--	3,019	--	45.3	--	--	--	--	--	--
APPROACH SLAB NO. 2	1	--	--	78.5	50.5	--	13,207	--	2,534	--	38.3	--	--	--	--	--	--
SLEEPER SLABS	4	--	--	--	2.4	--	428	--	---	--	--	--	--	--	--	--	--
MSE WALL NO. 1	1	5,000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MSE WALL NO. 2	1	2,635	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TOTALS		7,635	359	1,121.0	1,237.8	1,712	114,693	2,741	133,012	2,107.3	559.5	6	54	1,655	115	1,433	329

TABULATION OF ESTIMATED QUANTITIES								
LOCATION ITEM	NO.	MECH. STAB. EARTH RETAINING WALL BACKFILL (STONE)	MECH. STAB. EARTH RETAINING WALL (PANEL FACING) BRIDGE	COPING FOR MSE RETAINING WALL (BRIDGE)	ELASTOMERIC BEARING	AGGREGATE UNDERDRAIN #789 W/4" PERF. PIPE FOR STRUCTURES	SLOPE PROTECTION 4" CONC. (FIBER REINFORCED)	WATERPROOFING SUBSTRUCTURE (SECOND- METHOD)
		CY	SF	LF	EACH	TON	SY	SY
SUPERSTRUCTURE	1	--	--	--	--	--	--	--
END BENT 1	1	--	--	--	--	9	--	26.0
END BENT 3	1	--	--	--	--	9	--	19.6
INTERIOR BENT 2	1	--	--	--	18	--	--	--
APPROACH SLAB NO. 1	1	--	--	--	--	--	--	--
APPROACH SLAB NO. 2	1	--	--	--	--	--	--	--
SLEEPER SLABS	4	--	--	--	--	--	--	--
MSE WALL NO. 1	1	4,315	3,452	164	--	--	61	--
MSE WALL NO. 2	1	2,450	2,471	137	--	--	94	--
TOTALS		6,765	5,923	301	36	424	155	45.6

NOTE:

STEEL H BEARING PILING SHALL HAVE A MINIMUM YIELD STRENGTH OF 50 KSI.

SUMMARY OF ESTIMATED QUANTITIES			
ITEM NO.	BID ITEM	UNIT	QUANTITY
2028100	REMOVAL & DISPOSAL OF EXISTING BRIDGE	LS	NEC.
2041005	STRUCTURE EXCAVATION FOR RETAINING WALL	CY	7,635
2043500	WET & DRY EXCAVATION FOR BRIDGES	CY	359
6750278	2.0" SCHEDULE 80 PVC CONDUIT	LF	1,121.0
7011400	CONCRETE FOR STRUCTURES - CLASS 4000	CY	1,237.8
7023200	GROOVED SURFACE FINISH	SY	1,712
7031200	REINF. STEEL FOR STRUCTURES (BRIDGE)	LBS.	114,693
7031220	HOOP REINF. STEEL FOR STRUCTURES (BRIDGE)	LBS.	2,471
7031400	GALVANIZED REINF. STEEL FOR STRUCTURES (BRIDGE)	LBS.	133,012
7045454	PRESTRESSED CONCRETE FLORIDA I-BEAM (54")	LF	2,107.3
7051050	42" MASH CONCRETE BARRIER PARAPET/RAILING WALL	LF	559.5
7110001	DYNAMIC PILE ANALYZER TEST SET-UP	EACH	6
7110010	PILE DRIVING SET-UP	EACH	54
7112220	STEEL H BEARING PILING (HP14 X 73)	LF	1,655
7112222	STEEL H BEARING INDEX PILING (HP14 X 73)	LF	115
7112230	STEEL H BEARING PILING (HP14 X 89)	LF	1,433
7112232	STEEL H BEARING INDEX PILING (HP14 X 89)	LF	329
7137007	MECH. STAB. EARTH RETAINING WALL BACKFILL (STONE)	CY	6,765
7137230	MECH. STAB. EARTH RETAINING WALL (PANEL FACING) BRIDGE	SF	5,923
7137290	COPING FOR MSE RETAINING WALL (BRIDGE)	LF	301
7243100	ELASTOMERIC BEARING	EACH	36
8011210	AGGREGATE UNDERDRAIN #789 W/4" PERF. PIPE FOR STRUCTURES	TON	424
8047041	SLOPE PROTECTION - 4" CONCRETE (FIBER REINFORCED)	SY	155
8142100	WATERPROOFING (SUBSTRUCTURE-SECOND METHOD)	SY	45.6



REV.			
REV.			
REV.			
REVIEWED	WRS	09-22	
QUAN.			
DR.	JLJ	WRS	08-22
DES.			
BY	CHK.	DATE	



INFRASTRUCTURE
CONSULTING & ENGINEERING

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

**SUMMARY OF
ESTIMATED QUANTITIES**
US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

COUNTY **RICHLAND** ROUTE **US 176**

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MATERIAL & 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.

COORDINATION OF PLANS, SPECIFICATIONS, AND SPECIAL PROVISIONS

Generally, in case of discrepancy, this General Notes 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.

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.

PRESTRESSED CONCRETE BEAMS

Beam lengths given are based on horizontal span only. Increase lengths to correct for concrete shrinkage, concrete shortening when the strands are cut, and for beams being on a grade.

All overhang brackets in the top flange of exterior beams shall be galvanized in accordance with AASHTO M 111, AASHTO M 232, or ASTM F 2329 as appropriate and shall be detailed accordingly in the shop plans.

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.

When holes are cast in beams to accommodate falsework, fill the holes with a non-shrink structural grout suitable for overhead repairs after falsework is removed.

After erection of the beams and prior to the erection of the deck slab falsework, measure beam cambers. Compare the measured beam cambers to the values shown on the Plans to aid in determining if field adjustments are needed. Submit beam camber measurements and any proposed field adjustments to the RCE for approval.

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 build-ups and shear keys on bent caps monolithic with the cap unless indicated otherwise in these plans. Construct the top of each build-up 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.

ALLOWANCE FOR DEAD LOAD DEFLECTION & SETTLEMENT

In setting forms for structural steel or prestressed concrete beam spans, apply an allowance to the design finished grade to compensate for computed dead load deflections.

Prior to making deck pours on any stage construction work, and bridge widening projects, consider and make adjustments as necessary for partially loaded beams adjacent to closure pour areas. Verify that any proposed adjustment on partially loaded beams does not create a change in the deck thickness or a reduction in the concrete cover over the reinforcing steel. Welded studs on steel beams and reinforcing steel extending up out of prestressed beams shall meet the requirements for a composite section (extend up into the deck past the bottom mat of reinforcing steel) regardless of any adjustments.

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.

PERMANENT STEEL BRIDGE DECK FORMS

Permanent stay-in-place steel bridge deck forms for concrete deck slabs may be used at the Contractor's option.

Notify the Department and the Fabricator of the beams if using this option so that shop plans can be properly detailed.

DRIVEN PILE FOUNDATIONS

Where piles occur in fill, place fill before driving piles except in the vicinity of MSE walls. See MSE wall sheets for more details.

STRUCTURAL STEEL

Layout dimensions and standard lengths of beams shown are horizontal dimensions which must be increased when bridge is on grade.

When holes are placed in webs to accommodate falsework, install high strength bolts in the holes after falsework is removed.

Notify the Department of the name and address of the Fabricator of the structural steel as soon as the Fabricator has been given the contract to fabricate so that the inspection procedure can be set up.

Do not field or shop weld erection hardware to the structural steel members.

Make all bolted connections with 7/8" dia. ASTM F3125, Grade A325 bolts unless otherwise indicated.

Generally, holes for 7/8" dia. bolts shall be 15/16" dia. However, for straight girder spans, oversized holes, 3/16" larger than bolt dia. may be used in diaphragms and/or crossframes and their connection plates provided hardened washers are installed over oversize holes in the outer ply of the material gripped. Hardened washers are required under DTIs on oversized holes. In every case install a hardened washer under the element turned for each bolt of a bolted connection. Indicate on the Shop Plans which holes are to be oversize and where hardened washers are required.

PAINT FOR STRUCTURAL STEEL

Paint structural steel in accordance with Section 710 of the Standard Specifications.

BEARING ASSEMBLIES

If bearing assemblies support weathering steel beams or girders, fabricate bearing assembly components from weathering steel and paint them using the NS2 Paint System. Galvanize all other bearing assemblies in accordance with AASHTO M 111, AASHTO M 232, or ASTM F 2329 as applicable.

After the required field welding of painted bearing assemblies, field repair the weld areas and/or any damaged areas to the paint in accordance with Subsection 710.4.2 of the Standard Specifications. After the required field welding of galvanized bearing assemblies, field repair the weld areas and/or damaged areas of the galvanized coating in accordance with ASTM A 780.

ANCHOR BOLTS

Galvanize all components of anchor bolt assemblies in accordance with AASHTO M 232 or ASTM F 2329 as applicable. The weight of anchor bolt assemblies is included in the bent quantities for reinforcing steel.

ORIENTATION IN RELATION TO STATIONING

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

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 wall; 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 finish required.
- ☒ All Units
- ☐ Designated Units:

An Anti-Graffiti Coating shall be applied to precast panels and coping of MSE walls per RFP. See Special Provision on page 141 of Exhibit 5 of the RFP. Apply final surface finish and anti-graffiti coatings at rates specified by manufacturer.

SPECIFICATIONS

AASHTO 2017 LRFD Bridge Design Specifications, 8th Edition.

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.

All bolted connections, except for steel diaphragm members used with prestressed concrete beams, are designed as slip-critical connections having Class "B" contact surfaces.

An extra dead load of 0.016 KSF is incorporated into the design of this structure to accommodate the use of steel stay-in-place forms.

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: A
Analysis Method: No Detailed Analysis
Operational Classification: II
Design Acceleration Coefficients:

PGA (FEE): 0.20 g
S_{DS} (FEE): 0.36 g
S_{D1} (FEE): 0.10 g
PGA (SEE): 0.39 g
S_{DS} (SEE): 0.82 g
S_{D1} (SEE): 0.28 g

FEE Acceleration Design Response Spectrum Data				SEE Acceleration Design Response Spectrum Data			
Period (Sec)	S _a (g)	Period (Sec)	S _a (g)	Period (Sec)	S _a (g)	Period (Sec)	S _a (g)
0.00	0.204	0.60	0.168	0.00	0.393	0.66	0.429
0.01	0.230	0.76	0.132	0.01	0.464	0.81	0.347
0.02	0.256	0.92	0.109	0.02	0.535	0.97	0.291
0.03	0.282	1.08	0.093	0.03	0.607	1.12	0.250
0.04	0.308	1.24	0.081	0.05	0.678	1.28	0.220
0.05	0.334	1.40	0.072	0.06	0.749	1.44	0.196
0.06	0.360	1.56	0.064	0.07	0.820	1.59	0.177
0.07	0.360	1.72	0.058	0.09	0.820	1.75	0.161
0.09	0.360	1.88	0.053	0.11	0.820	1.91	0.148
0.11	0.360	2.04	0.049	0.14	0.820	2.06	0.137
0.13	0.360	2.20	0.046	0.16	0.820	2.22	0.127
0.15	0.360	2.36	0.043	0.18	0.820	2.37	0.119
0.17	0.360	2.52	0.040	0.21	0.820	2.53	0.111
0.19	0.360	2.68	0.037	0.23	0.820	2.69	0.105
0.20	0.360	2.84	0.035	0.25	0.820	2.84	0.099
0.22	0.360	3.00	0.033	0.27	0.820	3.00	0.094
0.24	0.360			0.30	0.820		
0.26	0.360			0.32	0.820		
0.28	0.360			0.34	0.820		
0.44	0.229			0.50	0.564		

Values determined from: Three-Point Method

ARCHER UNITED

JOINT VENTURE

INFRASTRUCTURE CONSULTING & ENGINEERING

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

GENERAL NOTES

US 176 WB (BROAD RIVER RD.) BRIDGE OVER I-20

COUNTY RICHLANDROUTE US 176

South Carolina Professional Engineer
No. 29080
W. RAY SPENCE

South Carolina
Infrastructure Consulting & Engineering, PLLC
No. 4470
Certificate of Authorization

REV. ADG WRS 05-22
P039719-B42a

REV. PCW HL 09-20
ASTM F3125

REV. PCW HL 07-20
AASHTO 8th Ed.

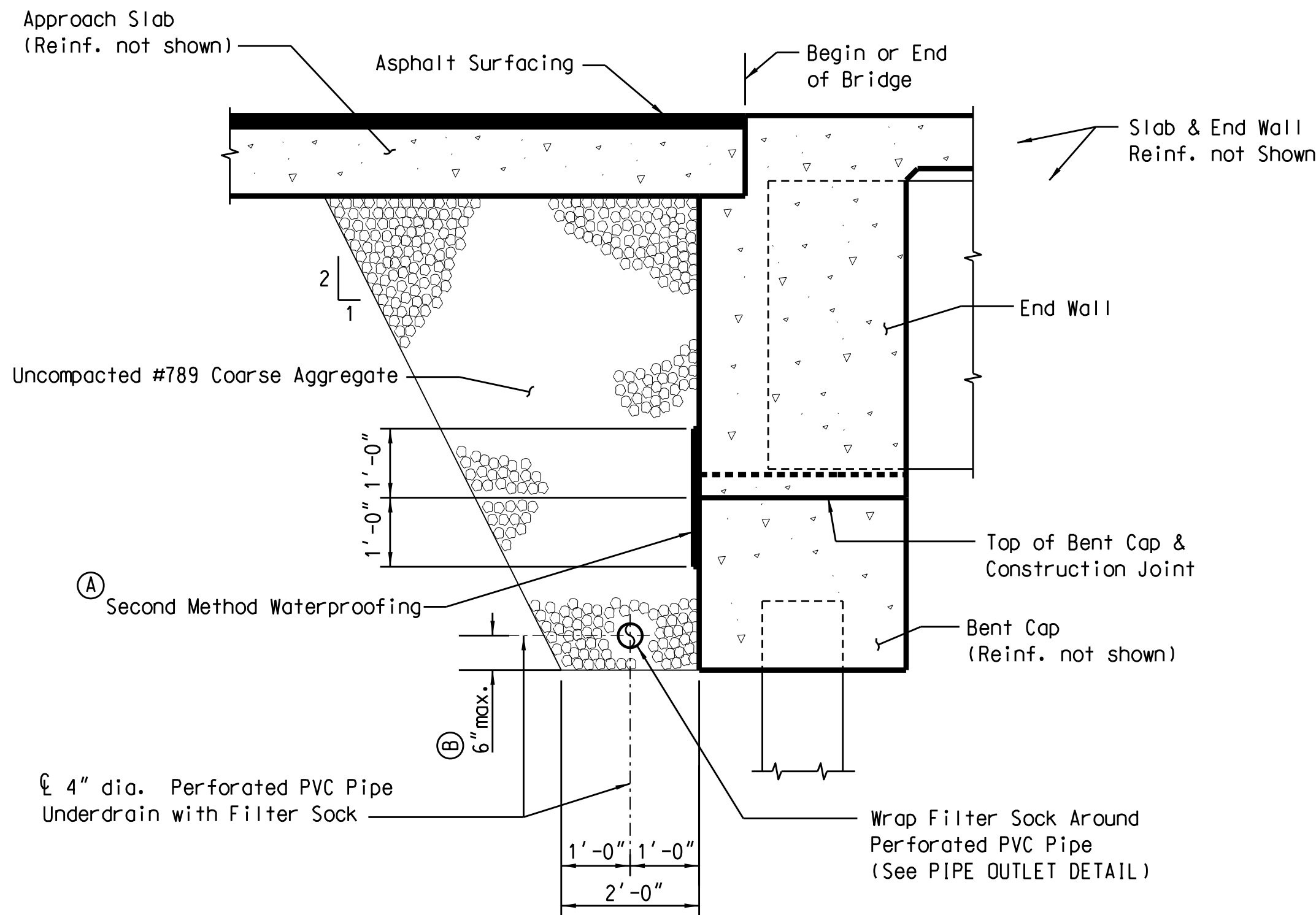
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QUAN. DR. GFD SAN 08-07

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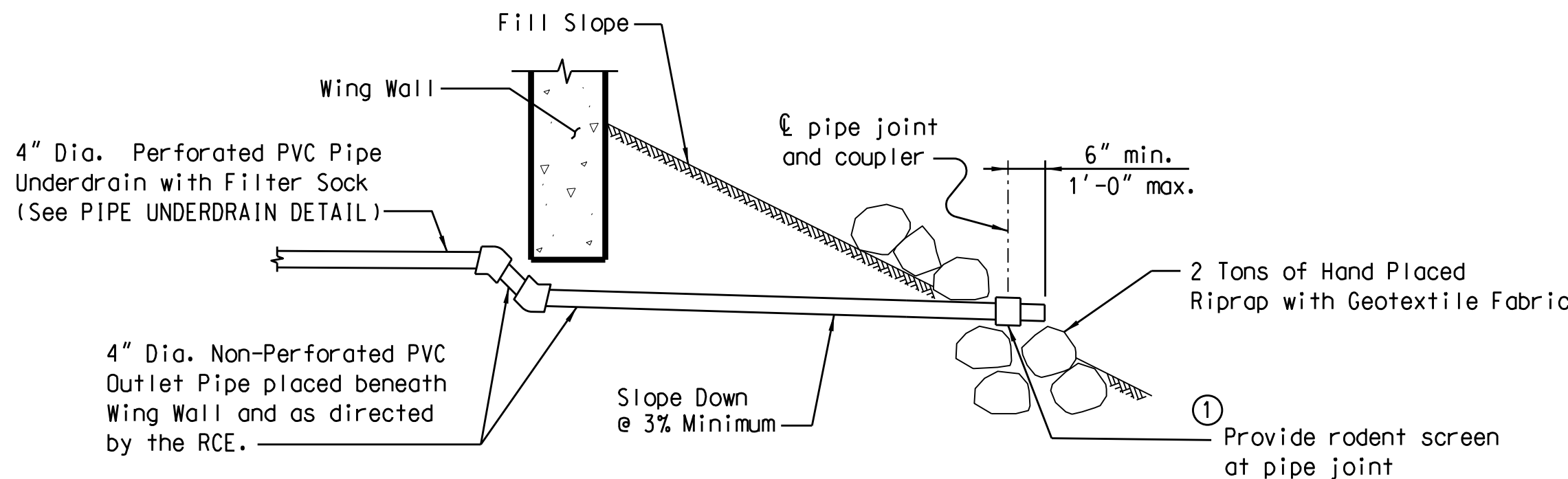
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BRIDGE PLANS ID	SHEET NO.
P039719-B42a	5



PIPE UNDERDRAIN DETAIL

- (A) Extend Second Method Waterproofing the full length of the End Wall and Wing Walls. See Section 814 of the Standard Specifications.
- (B) Slope Pipe a minimum of 0.5% to drain.

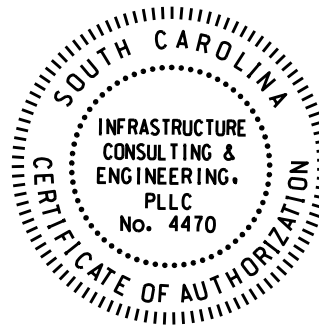
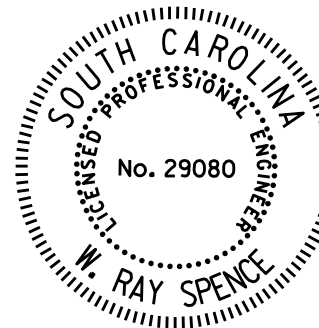


PIPE OUTLET DETAIL

Notes:

Install 4" Dia. Perforated Pipe Underdrain in accordance with Section 802 of the Standard Specifications. Use Uncompacted #789 Coarse Aggregate in accordance with Section 701 of the Standard Specifications. Use Geotextile for Drainage Filtration, Class 1 Fabric (Protected) for the Filter Sock in accordance with the Special Provisions.

- (1) Construct the pipe outlet with a pipe joint that is a minimum of 6" and a maximum of 1'-0" from the outlet end of the pipe. Provide rodent screen manufactured from T304 stainless steel or galvanized steel with a minimum wire diameter of 0.050". Provide a rodent screen with a minimum of 2 openings per inch and a maximum of 4 openings per inch.



REV.	ADG	WRS	05-22
REV.			P039719-B42a
REV.	PCW	HL	4-19
REVIEWED	WRS		09-22
QUAN.			
DR.	SRM	SAN	2-08
DES.			
BY	CHK.		DATE

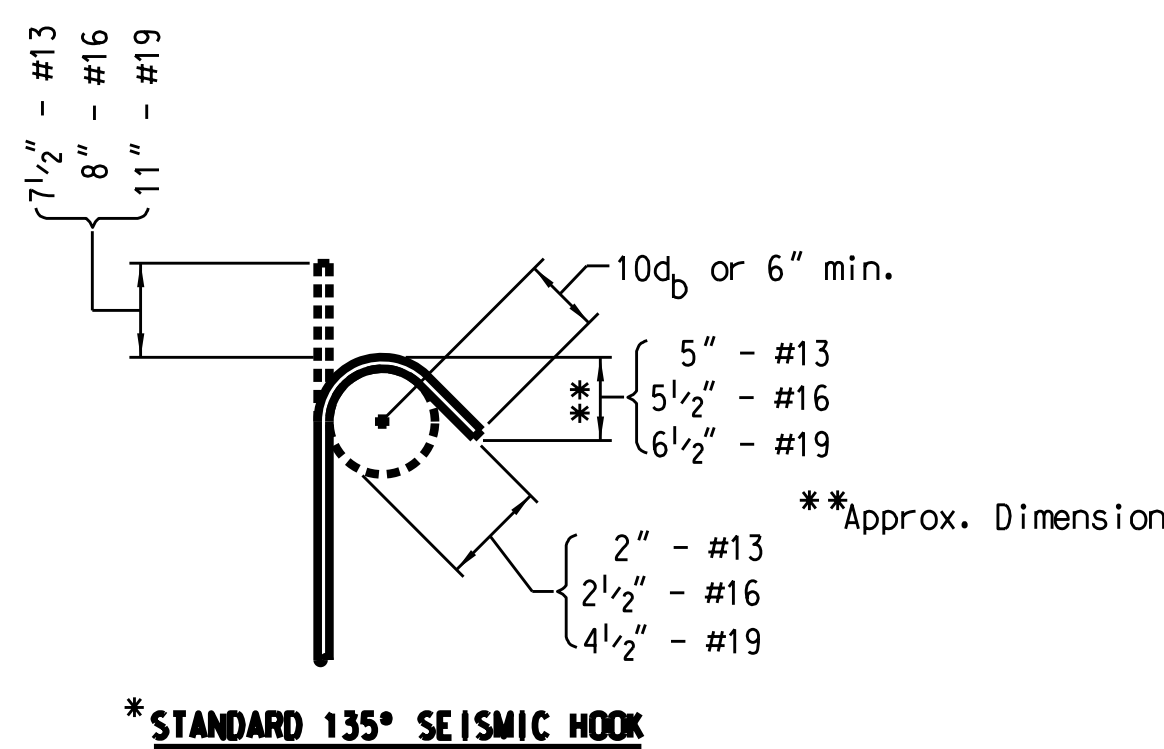


SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION



MISCELLANEOUS DETAILS

US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

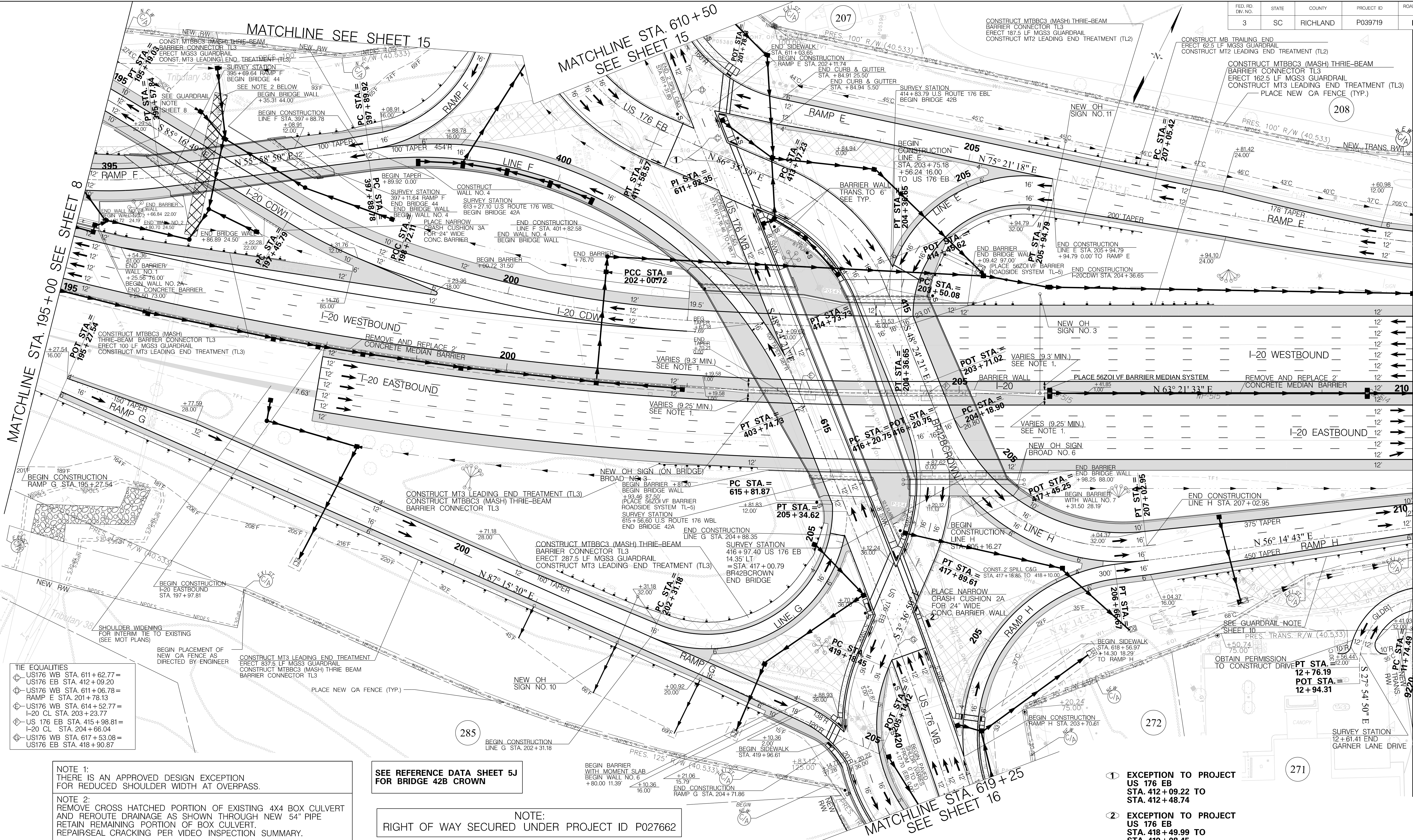
COUNTY RICHLAND ROUTE US 176



- ① 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.
- ② If a mechanical coupler is required, the reinforcing steel code includes a designation of "e" 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.
- ③ 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.
- ④ The fabrication tolerance for welded hoop diameter is $\pm \frac{1}{2}$ inch.

		REV.	ADG WRS 05-22	<div style="background-color: #e0e0e0; padding: 5px; font-weight: bold;">CONSULTING & ENGINEERING</div>	<div style="background-color: #e0e0e0; padding: 5px; font-weight: bold;">SOUTH CAROLINA</div> <div style="background-color: #e0e0e0; padding: 5px; font-weight: bold;">DEPARTMENT OF TRANSPORTATION</div>
			P039719-B42a		
		REV.	PCW HL 03-21		
			Rev. Bars LA		
		REV.	PCW HL 10-19		<div style="background-color: #e0e0e0; padding: 5px; font-weight: bold;">REINFORCING BENDING DETAILS</div>
			Rev. Bars LA		
		REVIEWED	WRS 09-22		
		QUAN.			
		DR.	BMH MRW 11-10		
		DES.			
		BY	CHK.	DATE	
					<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> COUNTY RICHLAND </div> <div style="width: 45%;"> ROUTE US 176 </div> </div>

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD / ROUTE NO.	SHEET NO.
3	SC	RICHLAND	P039719	I-20	7-9



TIE EQUALITIES

US176 WB STA. 611+62.77=
US176 EB STA. 412+09.20
US176 WB STA. 611+06.78=
RAMP E STA. 201+78.13
US176 WB STA. 614+52.77=
I-20 CL STA. 203+23.77
US 176 EB STA. 415+98.81=
I-20 CL STA. 204+66.04
US176 WB STA. 617+53.08=
US176 EB STA. 418+90.87

NOTE 1:
THERE IS AN APPROVED DESIGN EXCEPTION
FOR REDUCED SHOULDER WIDTH AT OVERPASS.

NOTE 2:
REMOVE CROSS HATCHED PORTION OF EXISTING 4X4 BOX CULVERT
AND REROUTE DRAINAGE AS SHOWN THROUGH NEW 54" PIPE
RETAIN REMAINING PORTION OF BOX CULVERT.
REPAIR/SEAL CRACKING PER VIDEO INSPECTION SUMMARY.

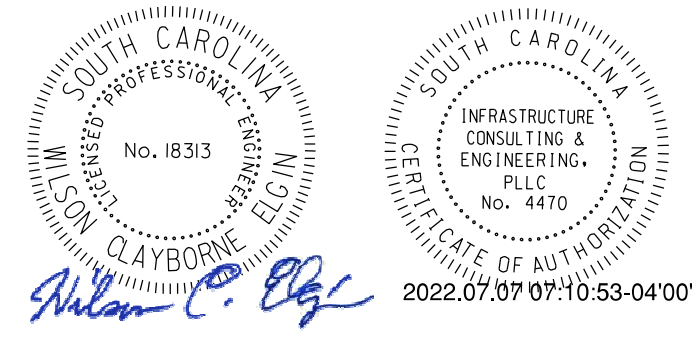
SEE REFERENCE DATA SHEET 5J
FOR BRIDGE 42B CROWN

NOTE:
RIGHT OF WAY SECURED UNDER PROJECT ID P027662

- ① EXCEPTION TO PROJECT
US 176 EB
STA. 412+09.22 TO
STA. 412+48.74
- ② EXCEPTION TO PROJECT
US 176 EB
STA. 418+49.99 TO
STA. 419+08.45

INFORMATION ONLY

ALIGNMENT CONTROL CAN BE FOUND ON
REFERENCE DATA SHEET



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REV. NO.	BY	DATE	DESCRIPTION OF REVISION

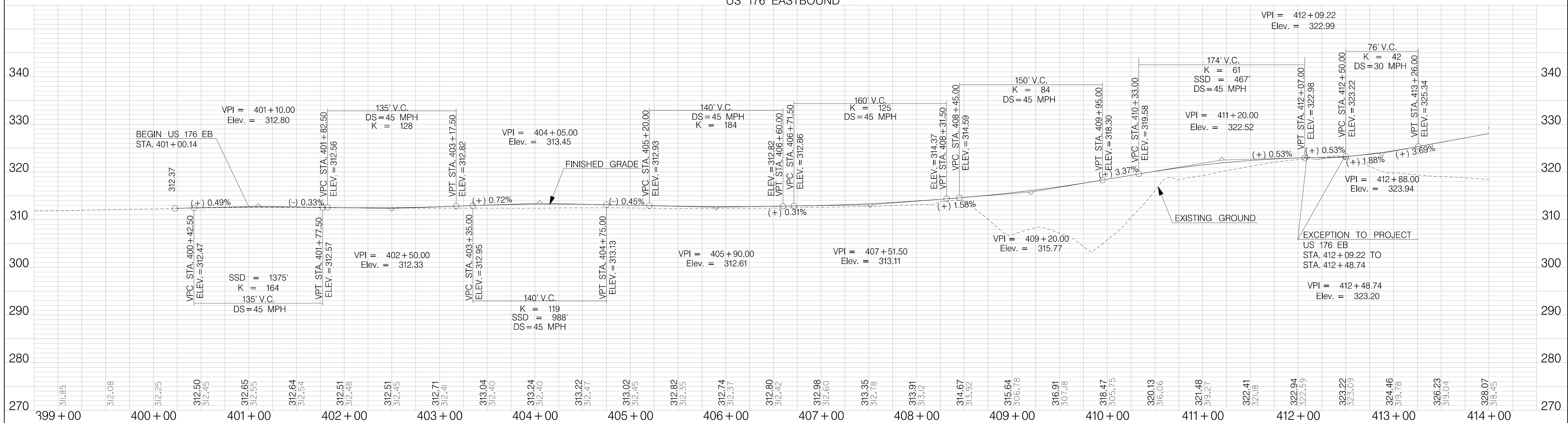
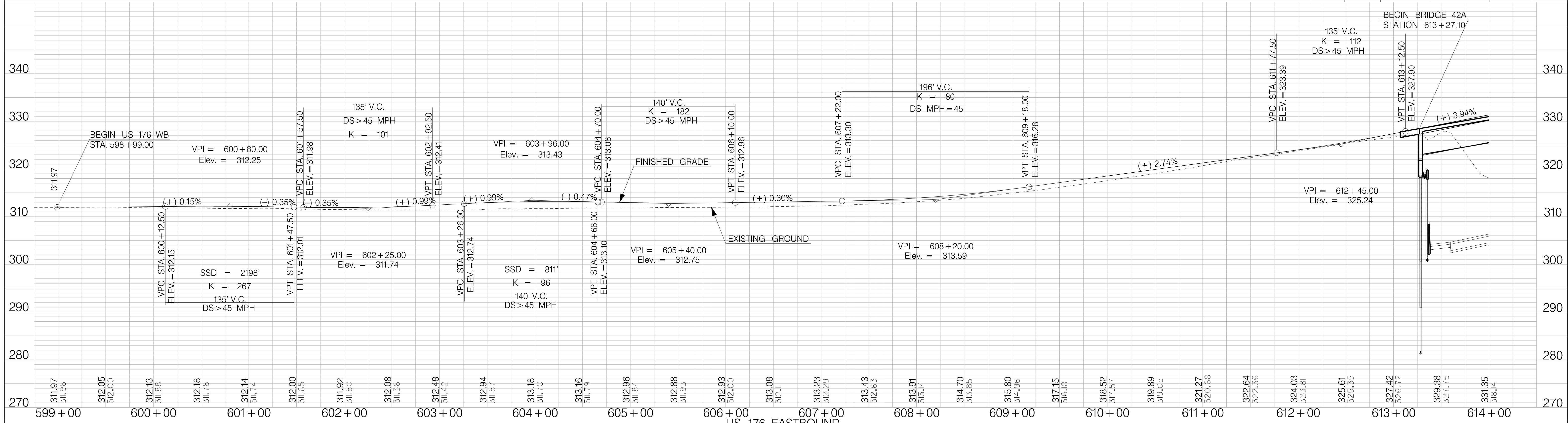
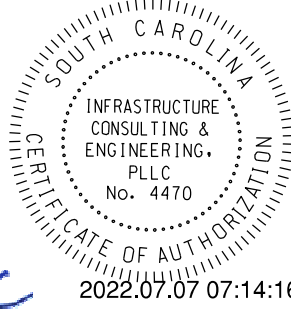
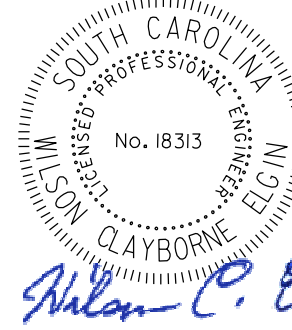
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

CAROLINA CROSSROADS PHASE 2

PLAN SHEET

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7/6/2022

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD / ROUTE NO.	SHEET NO.
3	SC	RICHLAND	P039719	I-20	8 16A

**INFORMATION ONLY**

SCALE: 1" = 50' HORIZONTAL 1" = 10' VERTICAL

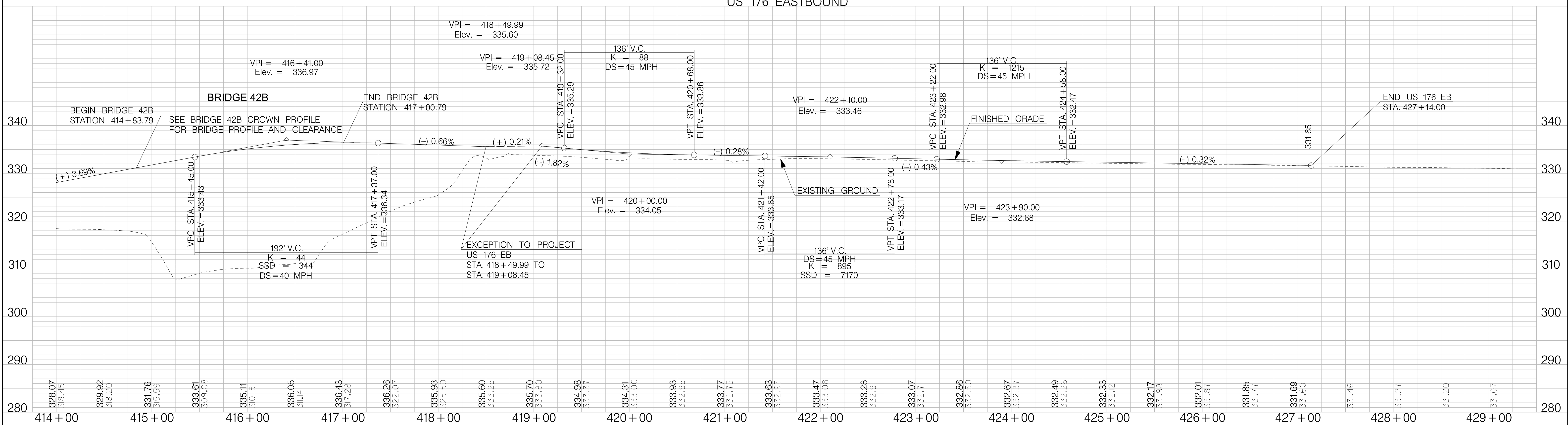
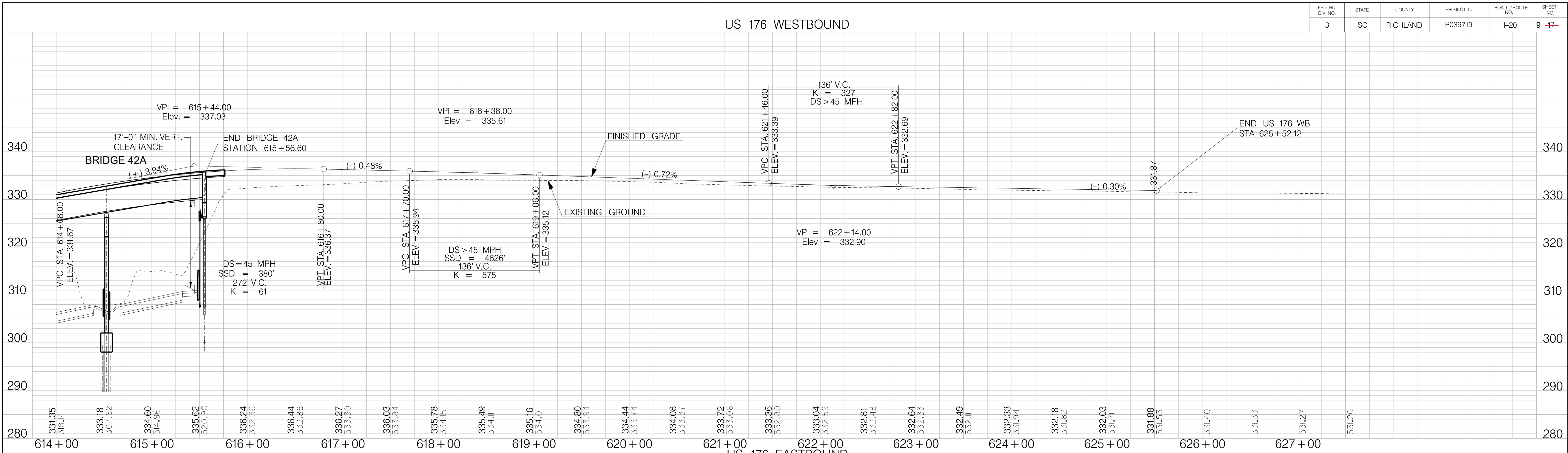
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REV. NO.	BY	DATE	DESCRIPTION OF REVISION

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

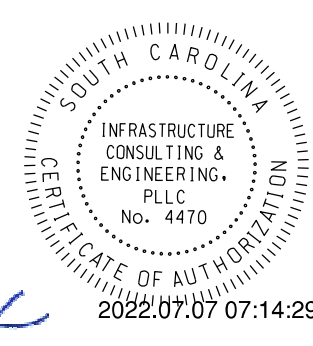
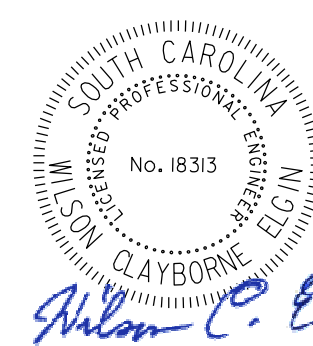
CAROLINA CROSSROADS PHASE 2

PROFILE SHEET

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7/6/2022



INFORMATION ONLY



SCALE: 1" = 50' HORIZONTAL 1" = 10' VERTICAL

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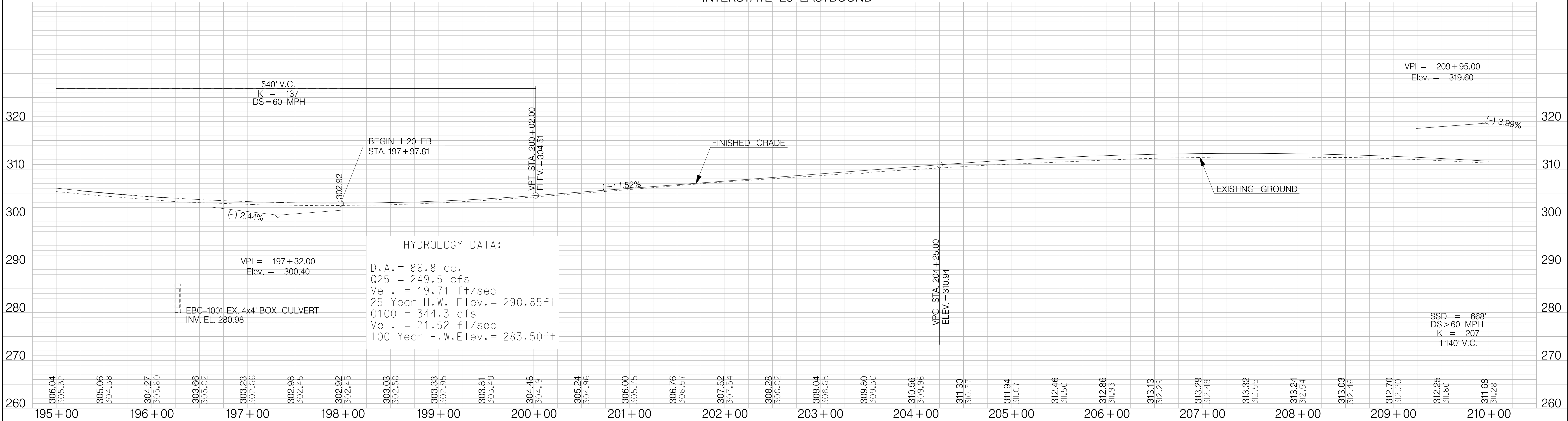
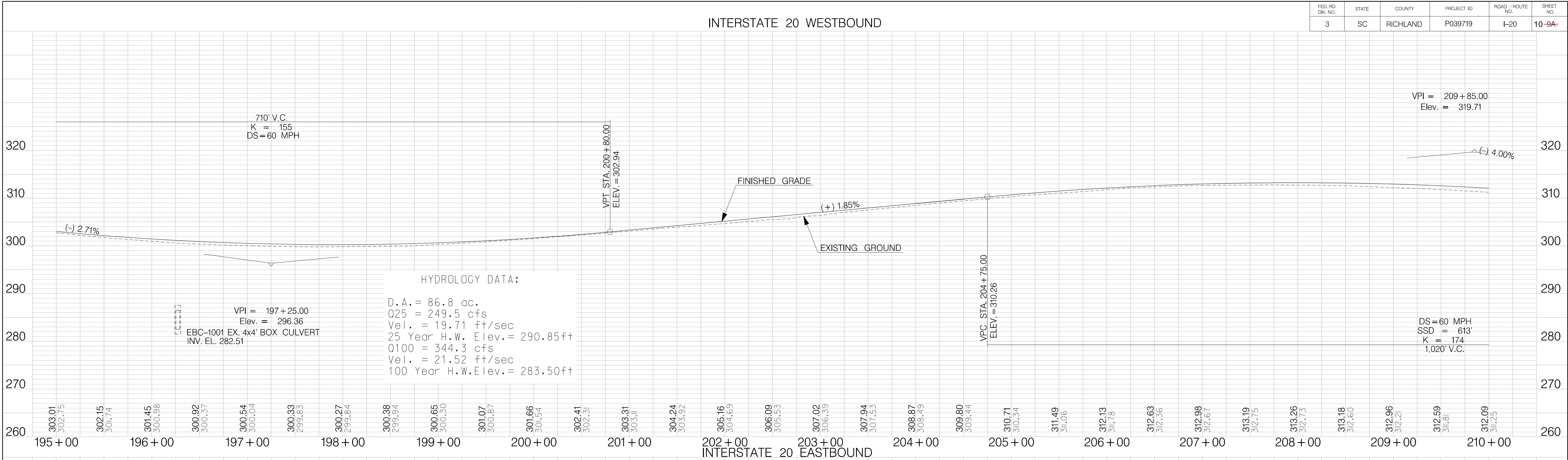
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

CAROLINA CROSSROADS PHASE 2

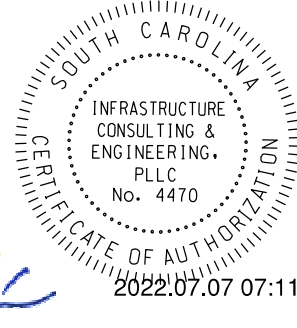
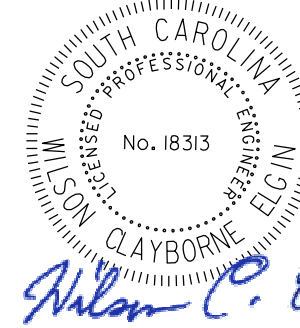
PROFILE SHEET

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7/6/2022

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD / ROUTE NO.	SHEET NO.
3	SC	RICHLAND	P039719	I-20	10-9A-



INFORMATION ONLY

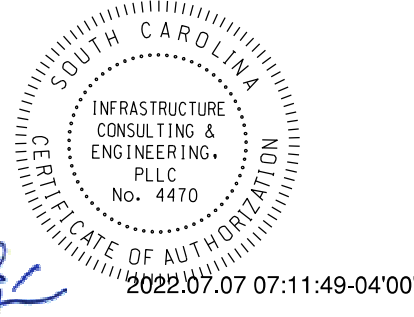
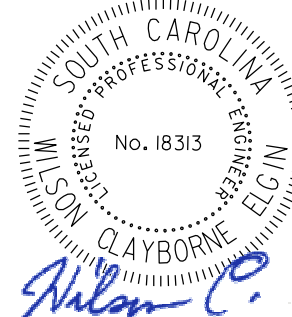
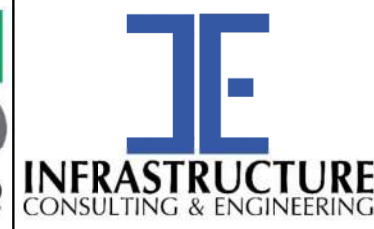
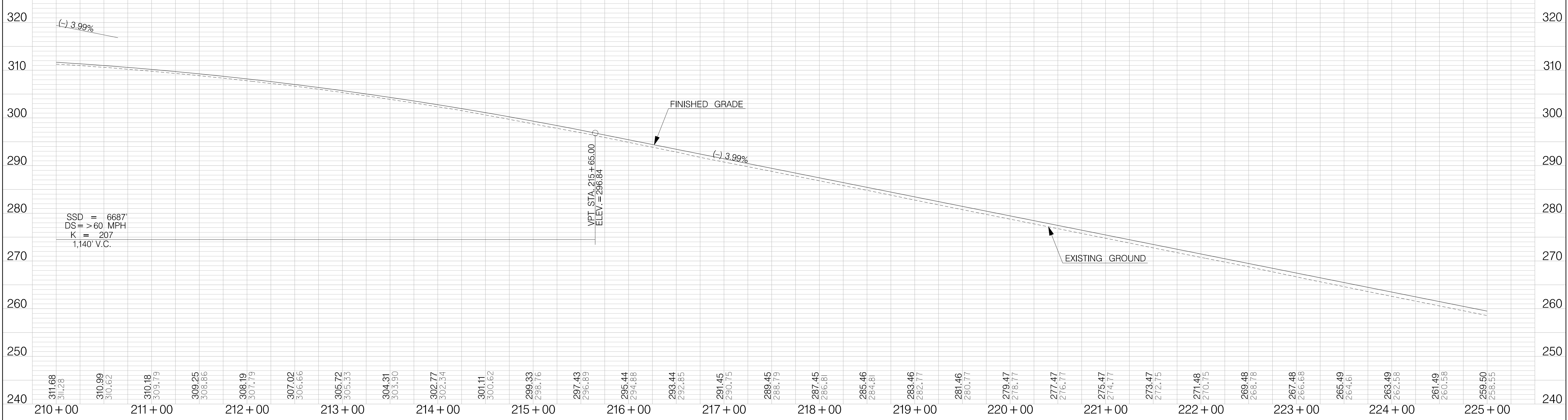
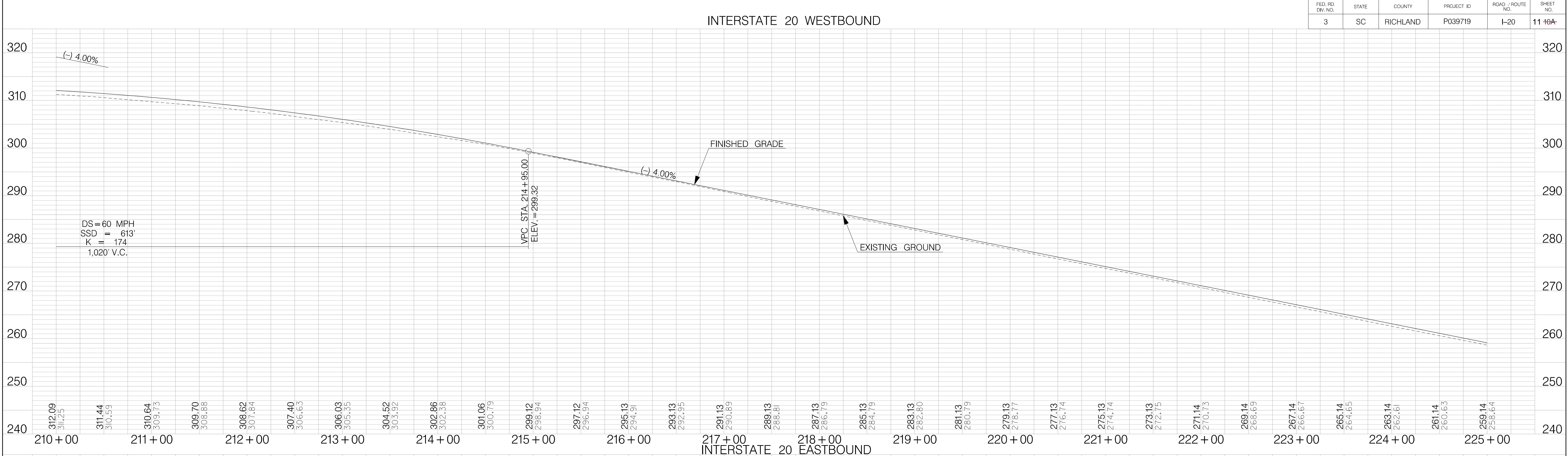


SCALE: 1" = 50' HORIZONTAL 1" = 10' VERTICAL

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SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
CAROLINA CROSSROADS PHASE 2
PROFILE SHEET

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7/6/2022



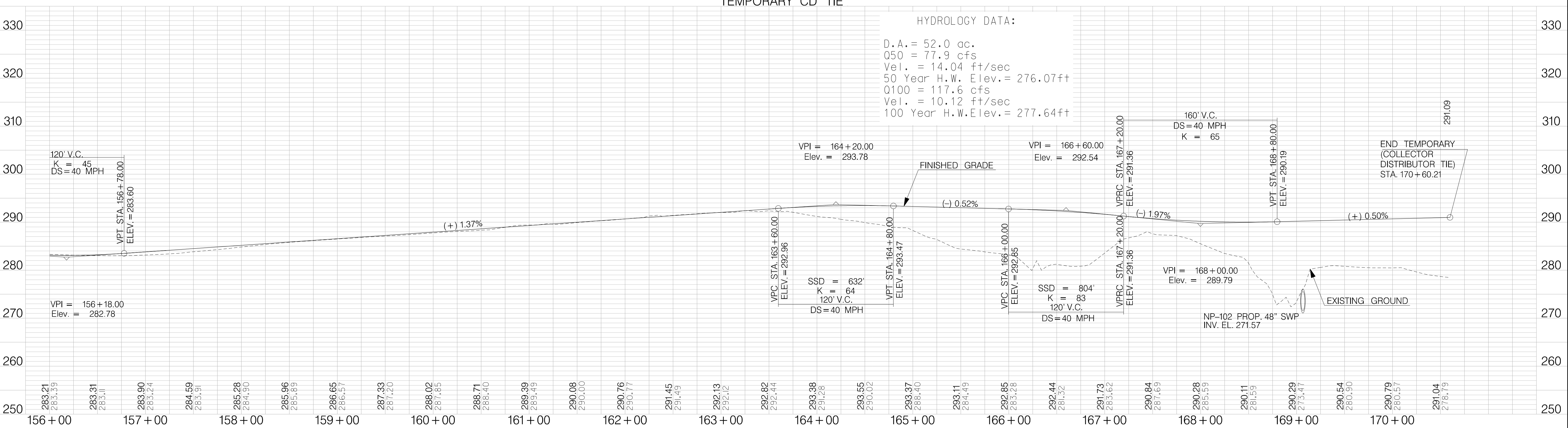
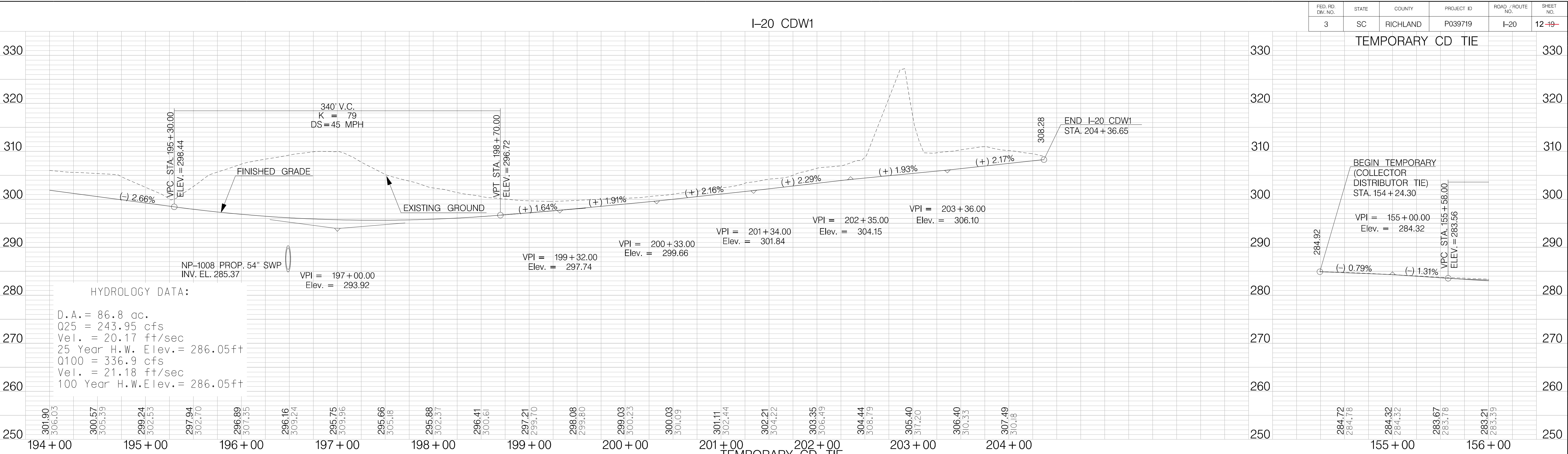
SCALE: 1" = 50' HORIZONTAL 1" = 10' VERTICAL

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REV. NO.	BY	DATE	DESCRIPTION OF REVISION

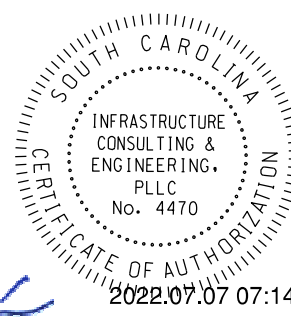
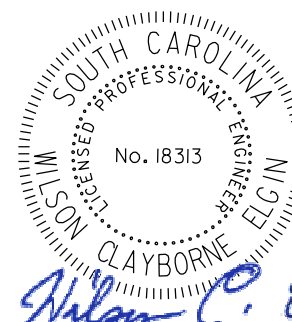
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	
CAROLINA CROSSROADS PHASE 2	
PROFILE SHEET	

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FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD / ROUTE NO.	SHEET NO.
3	SC	RICHLAND	P039719	I-20	12-19



INFORMATION ONLY

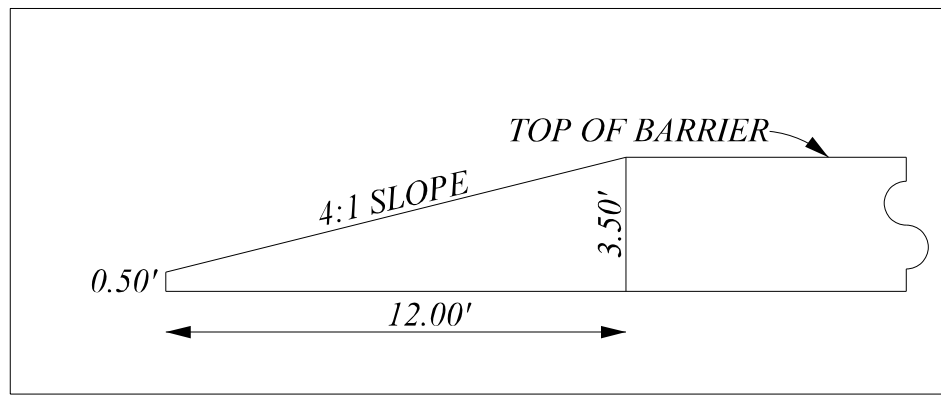


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REV. NO.	BY	DATE	DESCRIPTION OF REVISION

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
CAROLINA CROSSROADS PHASE 2
PROFILE SHEET

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



** DETAIL OF BARRIER TRANSITION AT DDI
SEE PLAN SHEETS FOR LOCATIONS
SEE ROADWAY STRUCTURE SHEETS
FOR DETAILS AND REINFORCING

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD / ROUTE NO.	SHEET NO.
3	SC	RICHLAND	P039719	I-20	13-9B

NOTE:
CURB RAMP ARE TO BE CONSTRUCTED IN ACCORDANCE WITH THE SCDOT STANDARD DRAWINGS.
■ USE 6:1 SLOPE (0' - 5')
4:1 SLOPE (5' - 10')
2:1 SLOPE (10' - OVER)
2:1 SLOPE (WETLAND AREAS)

• ADD 3.25' WHERE GUARDRAIL IS ERECTED EXCEPT IN AREAS WITH COMPRESSED SHOULDER

USE THIS TYPICAL SECTION
BROAD RIVER ROAD (US 176)

STA. 598+99.00 WB TO STA. 600+50.29 WB
STA. 399+00.05 EB TO STA. 400+22.54 EB

USE THIS TYPICAL SECTION
BROAD RIVER ROAD (US 176)

STA. 400+22.54 EB TO STA. 400+46.45 EB

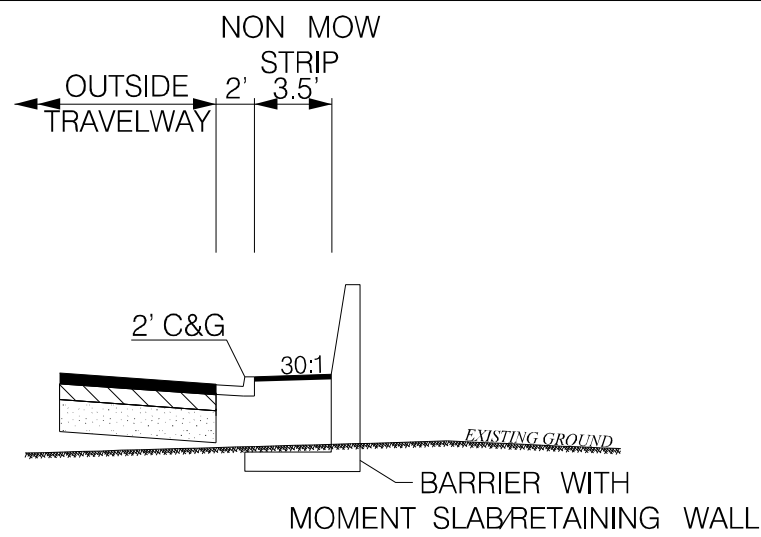
USE THIS TYPICAL SECTION
BROAD RIVER ROAD (US 176)

STA. 600+50.29 WB TO STA. 611+62.77 WB
STA. 400+46.45 EB TO STA. 412+09.20 EB
STA. 617+15.53 WB TO STA. 620+09.12 WB
STA. 418+52.46 EB TO STA. 421+79.69 EB

USE THIS TYPICAL SECTION
BROAD RIVER ROAD (US 176)

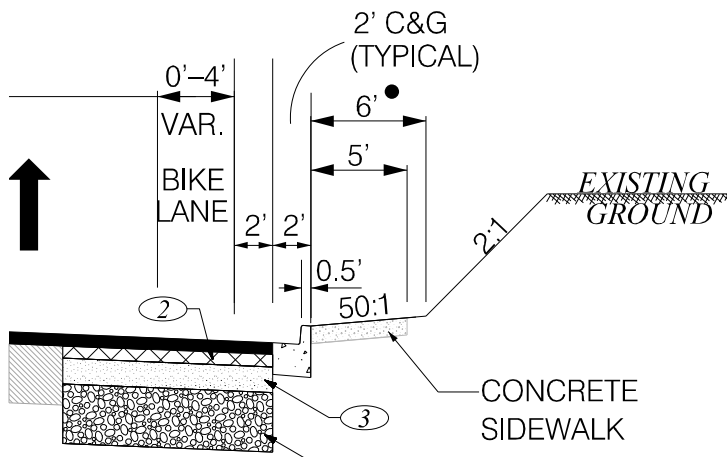
STA. 620+09.12 WB TO STA. 625+52.12 WB
STA. 421+79.69 EB TO STA. 427+14.00 EB

WALL NO. 9 INSET



USE THIS TYPICAL SECTION
RAMP F STA. 400+62.74 TO 401+06.85
US 176 EB STA. 408+53.87 TO 408+88.92

INSET "A"



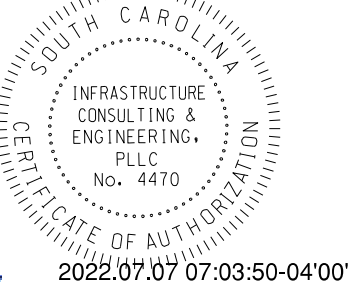
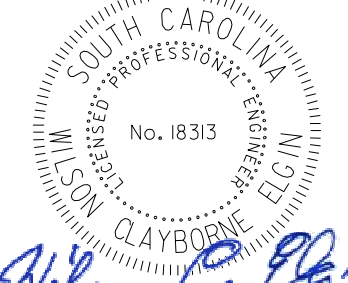
USE INSET "A"
BROAD RIVER ROAD (US 176)
FOR ADDITIONAL 2' PAVING
BEYOND BIKE LANE
STA. 422+62.11 EB TO
STA. 424+61.57 EB

RTE. US 176 WB DESIGN SPEED

MPH	FROM STA.	TO STA.
45	598+99.00	625+52.12
US 176 EB		
45	398+99.00	427+14.00

EXCEPTIONS TO DESIGN SPEED

INFORMATION ONLY



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REV. NO.	BY	DATE	DESCRIPTION OF REVISION	

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

CAROLINA CROSSROADS PHASE 2

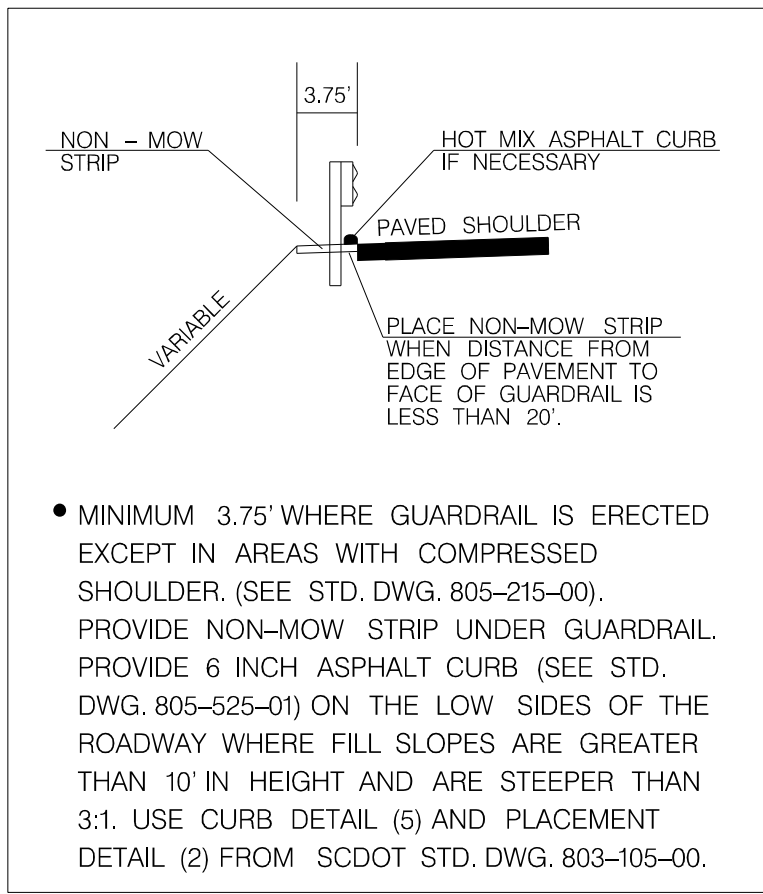
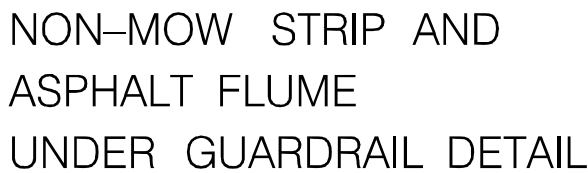
TYPICAL SECTION
SHEET

FUNCTIONAL CLASSIFICATION:
URBAN PRINCIPAL ARTERIAL

SEE TABLES ON SHEET 3G FOR
PAVEMENT DESIGN OPTIONS

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FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD / ROUTE NO.	SHEET NO.
3	SC	RICHLAND	P039719	I-20	14 9



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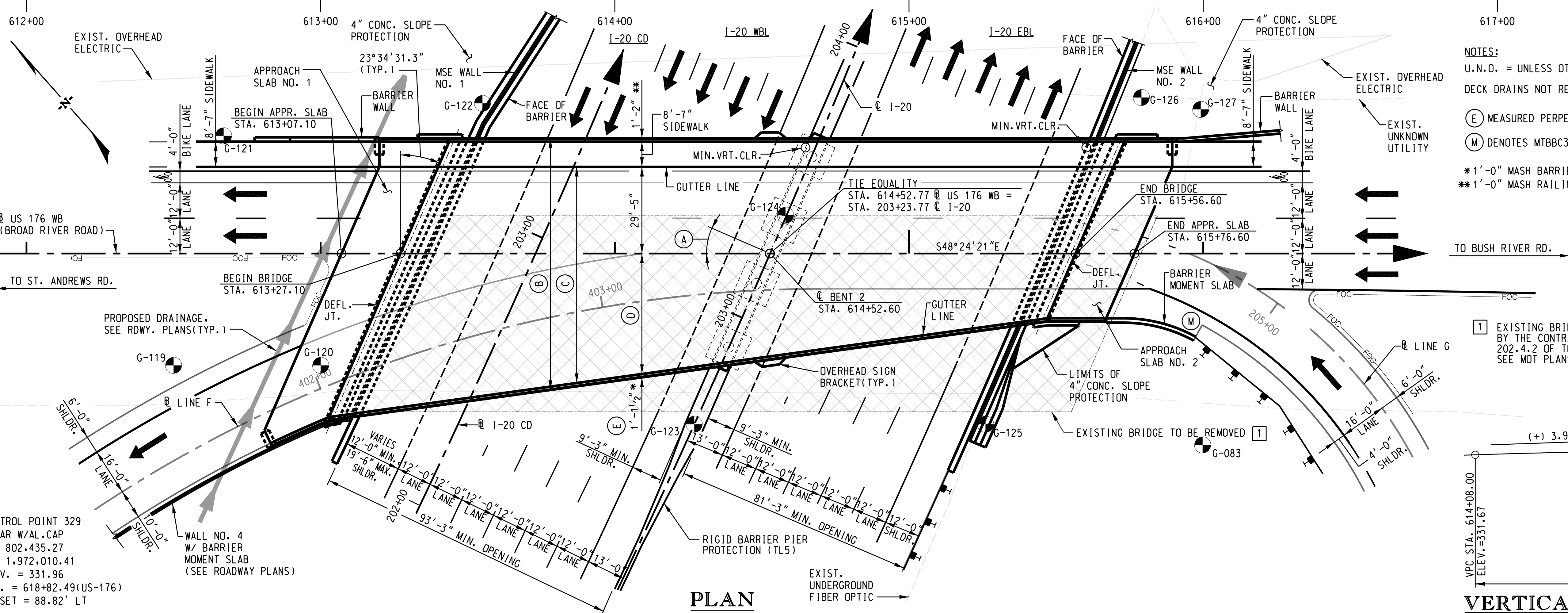
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DIMENSIONS MEASURED
PERPENDICULAR TO US 176 WB
(BROAD RIVER ROAD)

- (A) 23°27'29.8"
(RADIAL TO C 1-20)
- (B) OUT-TO-OUT VARIES
62'-3 1/2" MIN.,
95'-9 1/8" MAX.
- (C) CLEAR ROADWAY VARIES
51'-5" MIN.,
84'-11 3/4" MAX.
- (D) VARIES 22'-0" MIN.,
55'-6 3/4" MAX.

CONTROL POINT 123
GEOMON "HOLT"
N = 802,539.06
E = 1,971,685.23
ELEV. = 332.83
STA. = 615+74.91(US-176)
OFFSET = 57.41 RT

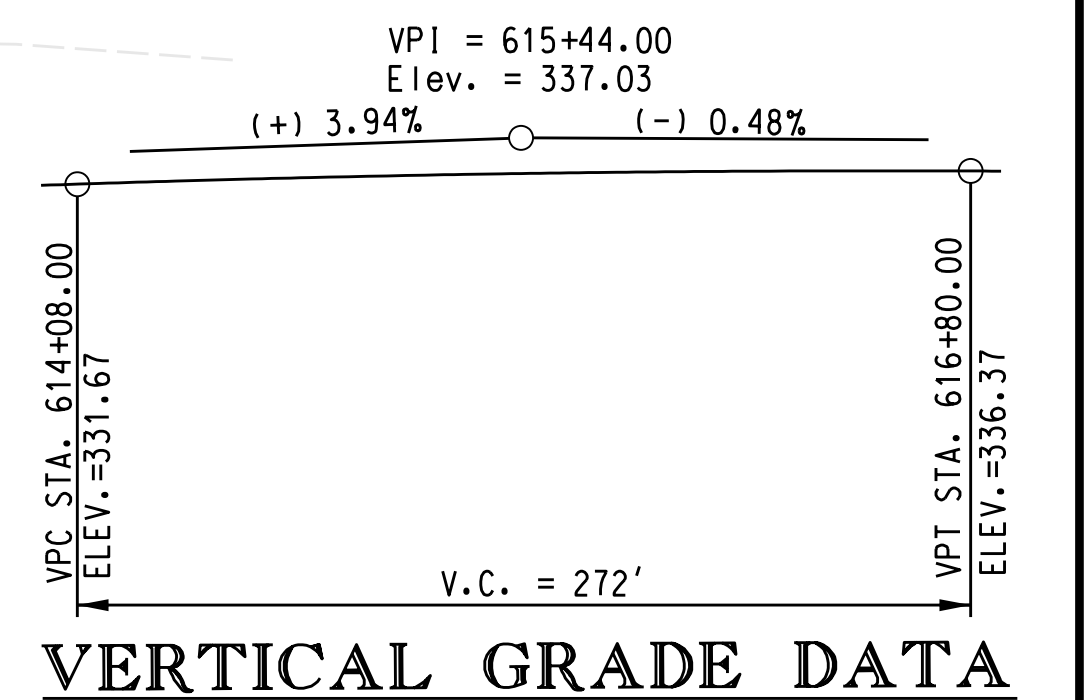
CONTROL POINT 329
REBAR W/AL.CAP
N = 802,435.27
E = 1,972,010.41
ELEV. = 331.96
STA. = 618+82.49(US-176)
OFFSET = 88.82' LT



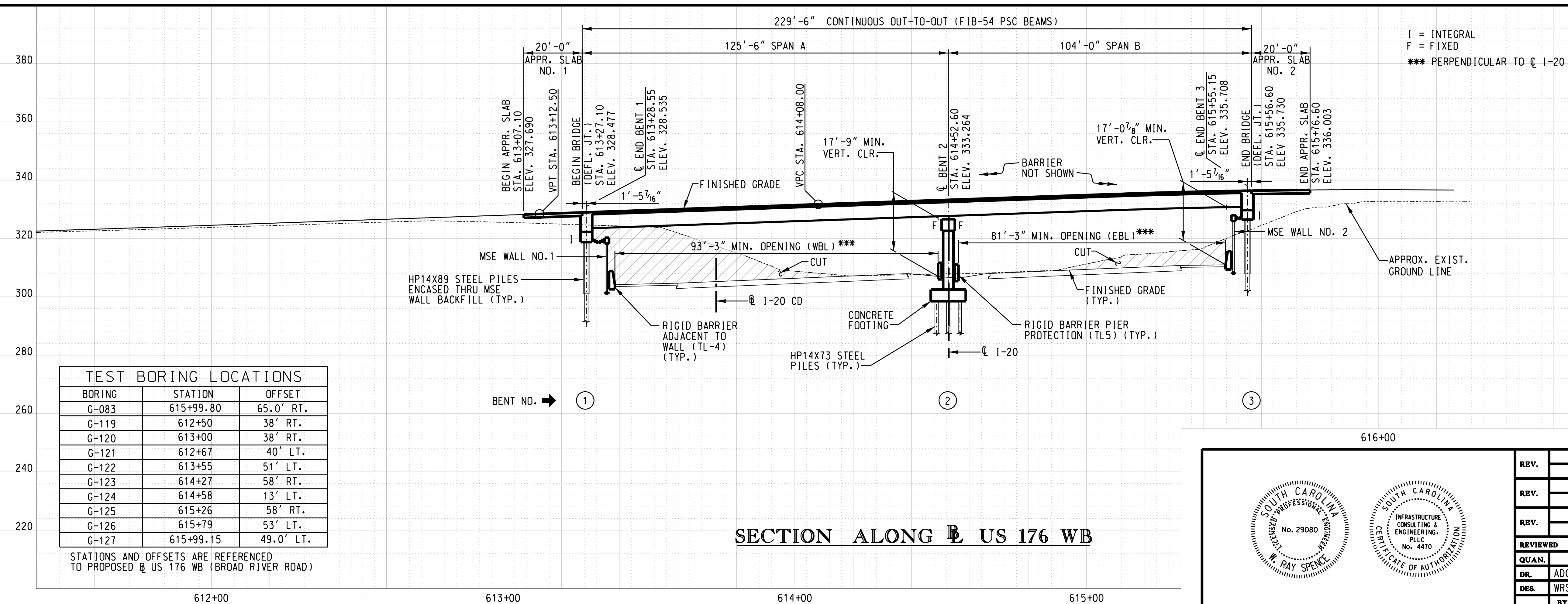
PLAN

- NOTES:
- U.N.O. = UNLESS OTHERWISE NOTED.
- DECK DRAINS NOT REQUIRED.
- (E) MEASURED PERPENDICULAR TO GUTTER LINE.
- (M) DENOTES MTBBC3 GUARDRAIL ATTACHMENT
- *1'-0" MASH BARRIER PARAPET WITH 1 1/2" SLAB EXTENSION
- **1'-0" MASH RAILING WALL WITH 2" SLAB EXTENSION

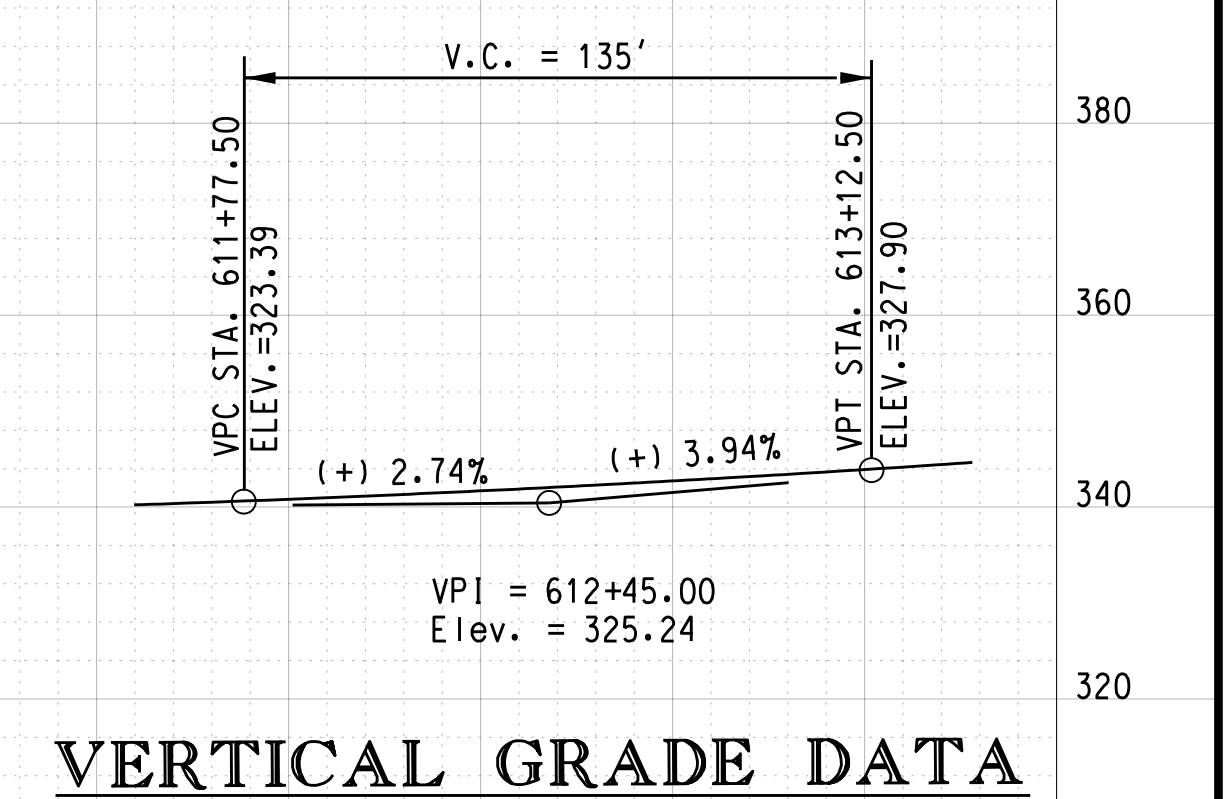
1 EXISTING BRIDGE TO BE REMOVED AND DISPOSED OF
BY THE CONTRACTOR IN ACCORDANCE WITH SECTION
202.4.2 OF THE STANDARD SPECIFICATIONS.
SEE MOT PLANS FOR ADDITIONAL INFORMATION.



VERTICAL GRADE DATA



SECTION ALONG US 176 WB

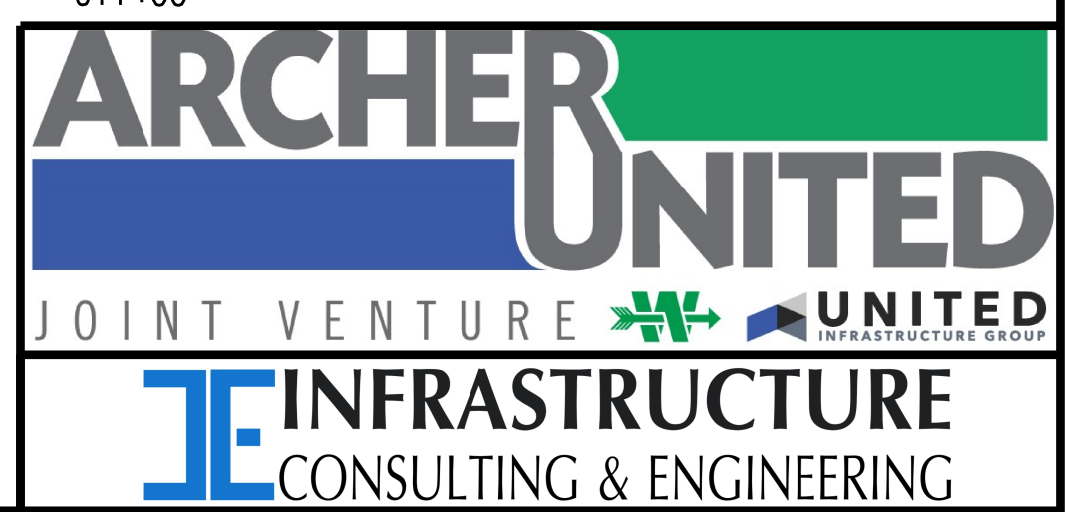


VERTICAL GRADE DATA

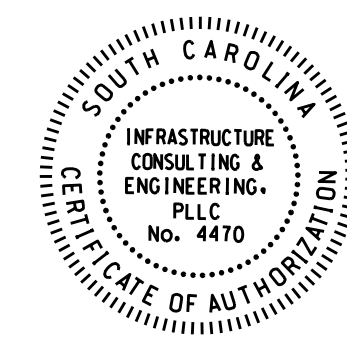
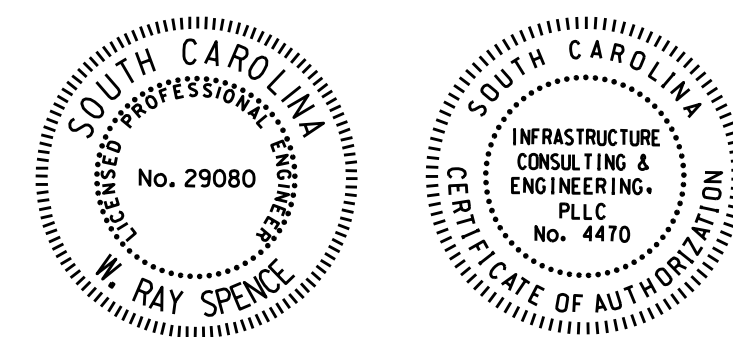
TEST BORING LOCATIONS		
BORING	STATION	OFFSET
G-083	615+99.80	65.0' RT.
G-119	612+50	38' RT.
G-120	613+00	38' RT.
G-121	612+67	40' LT.
G-122	613+55	51' LT.
G-123	614+27	58' RT.
G-124	614+58	13' LT.
G-125	615+26	58' RT.
G-126	615+79	53' LT.
G-127	615+99.15	49.0' LT.

STATIONS AND OFFSETS ARE REFERENCED
TO PROPOSED US 176 WB (BROAD RIVER ROAD)

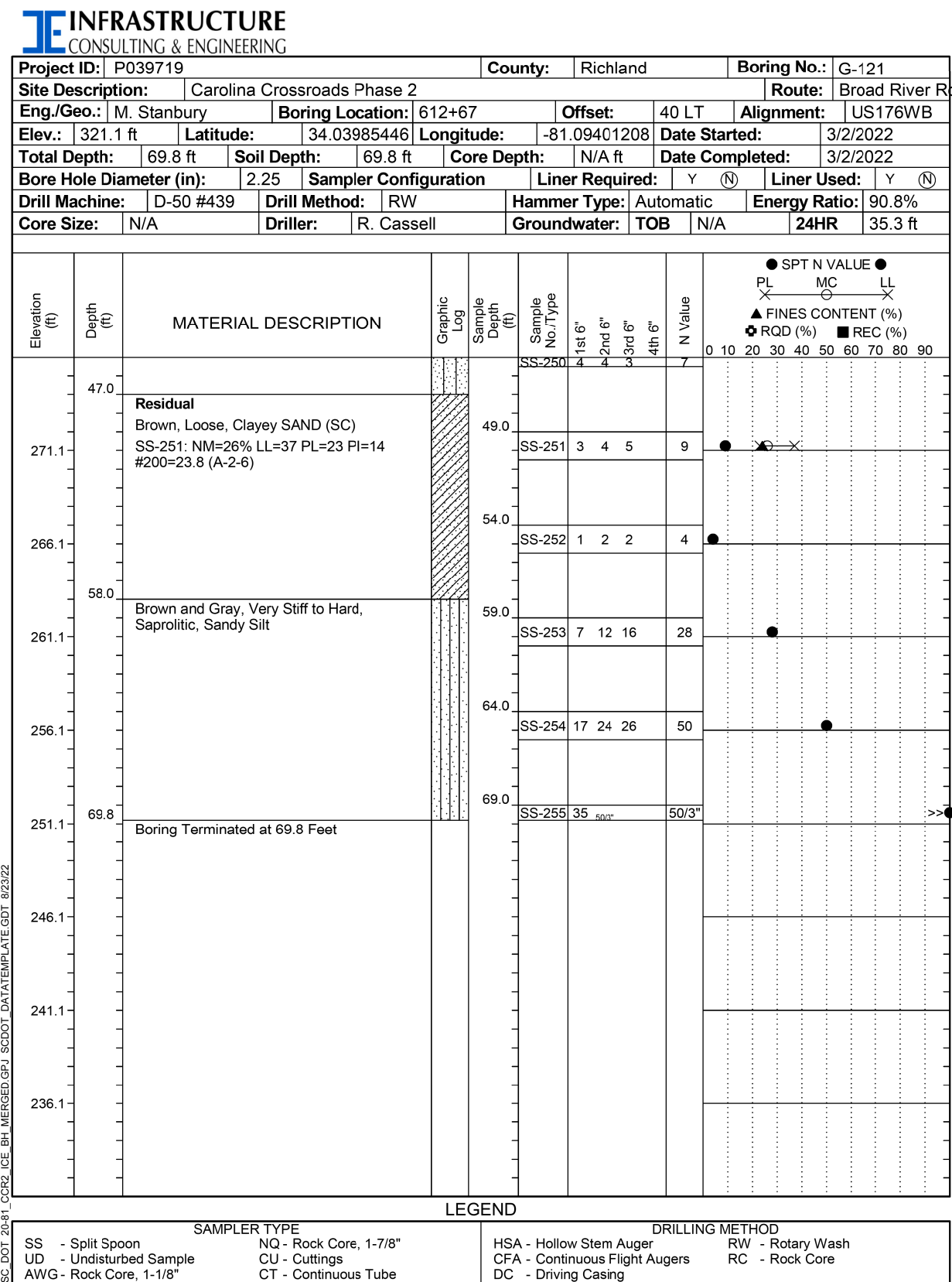
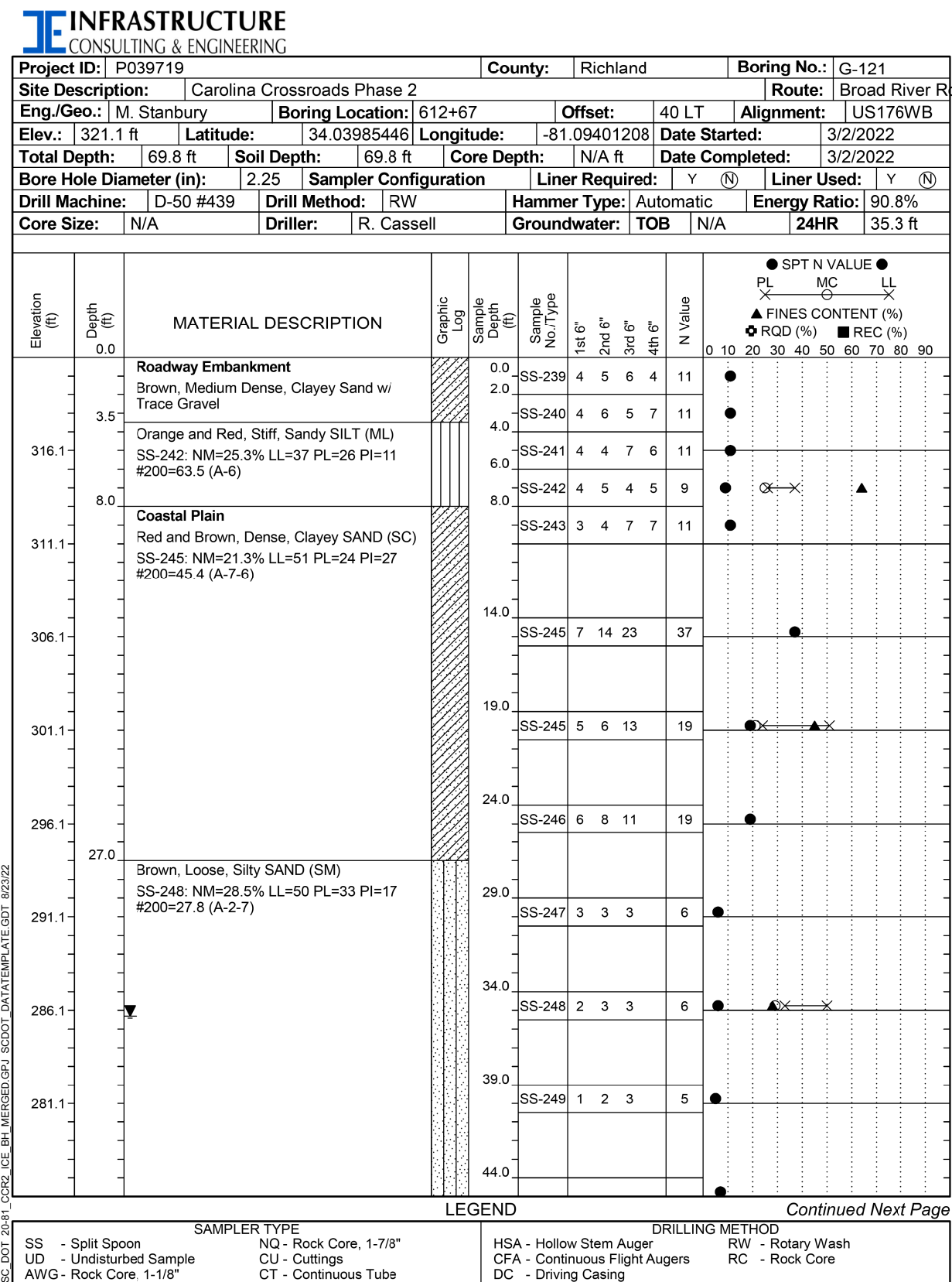
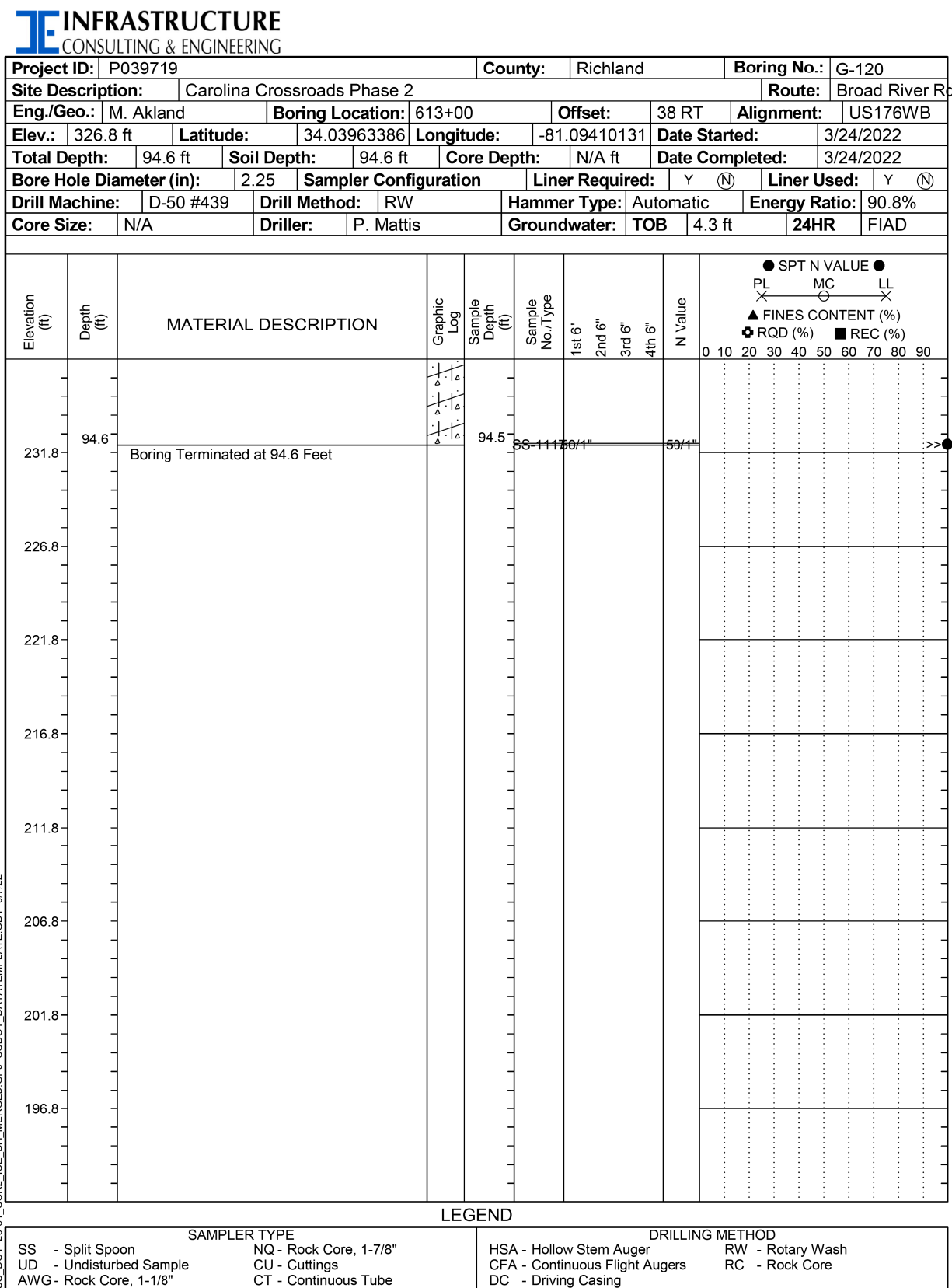
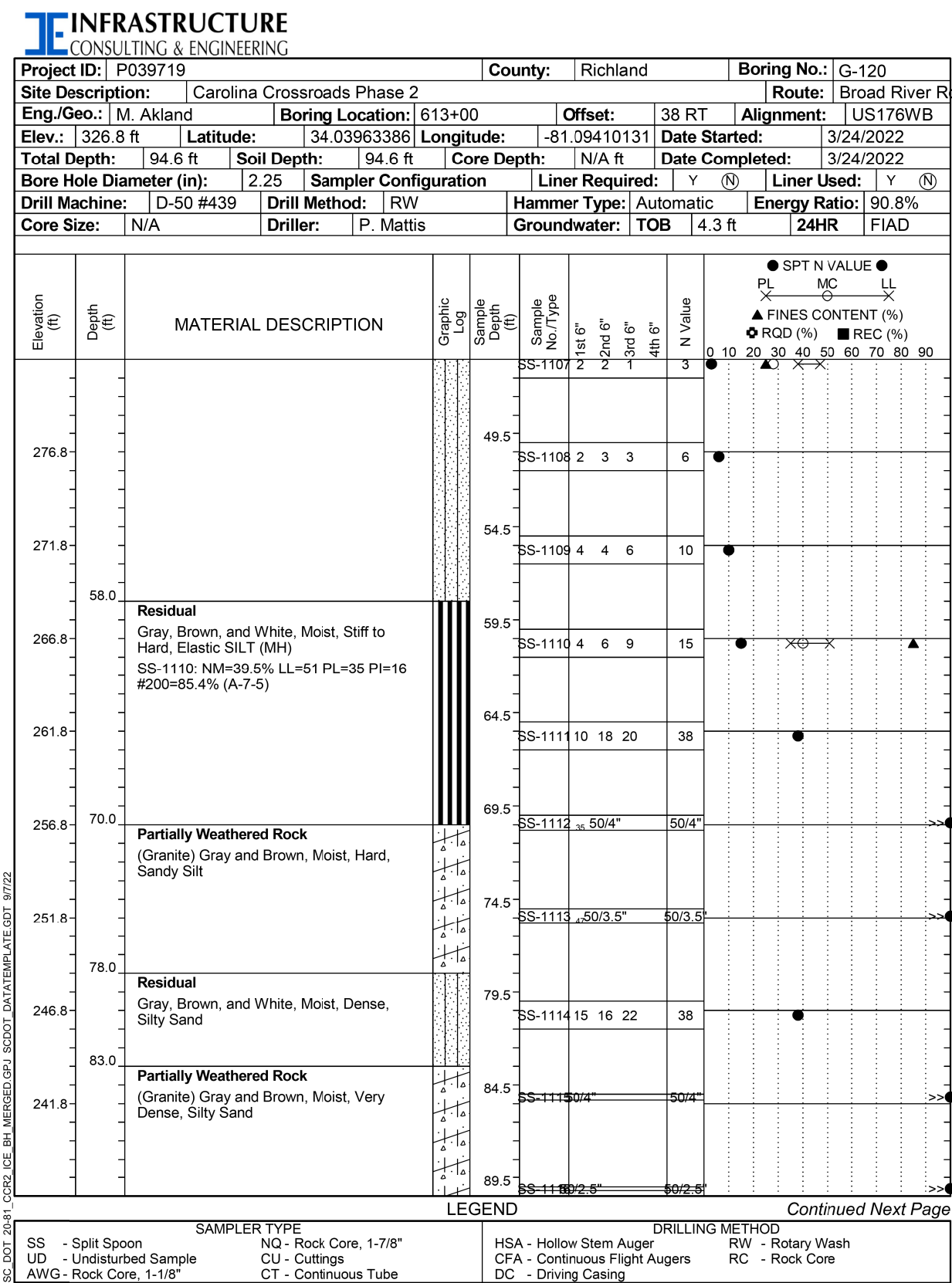
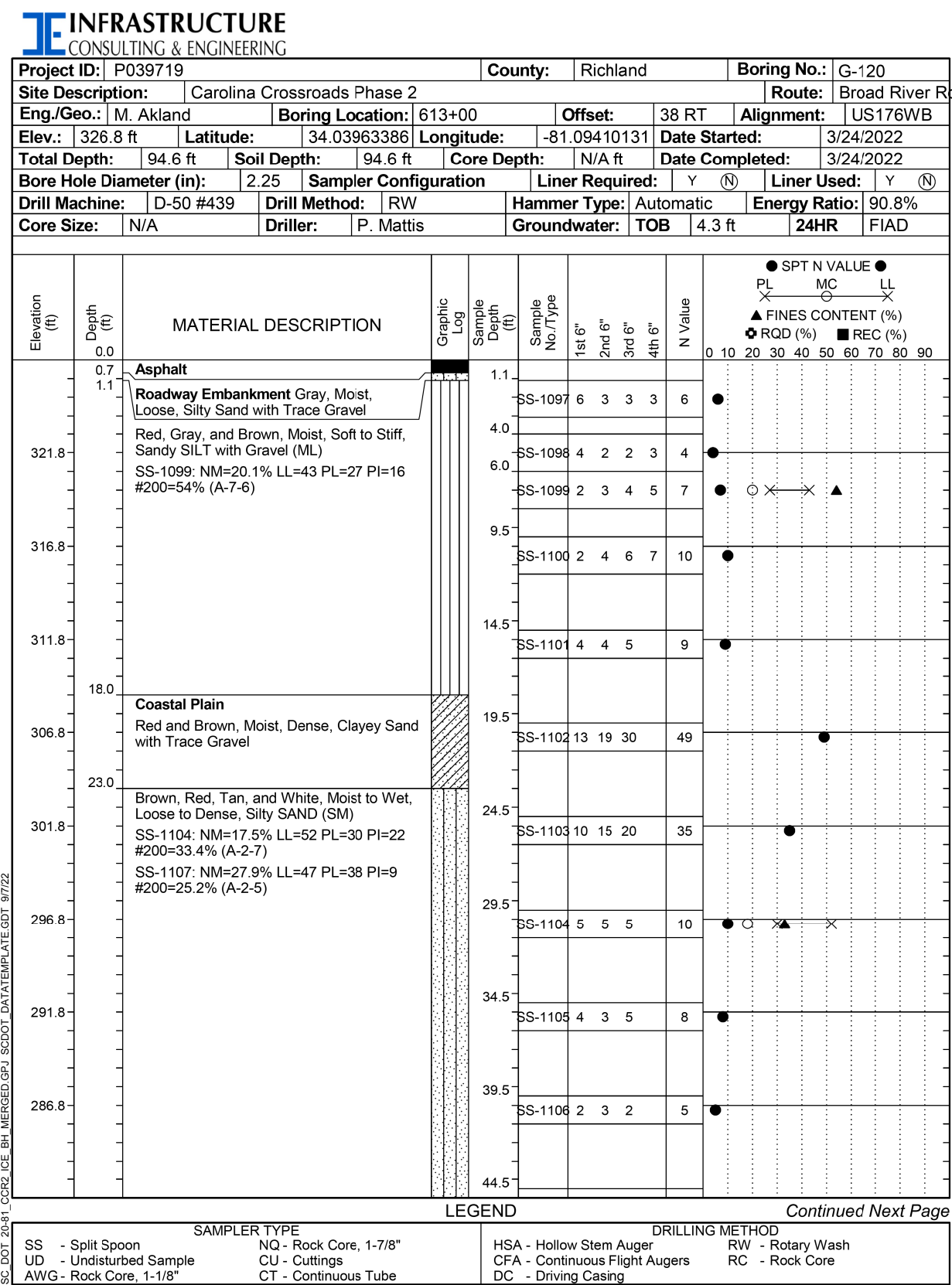
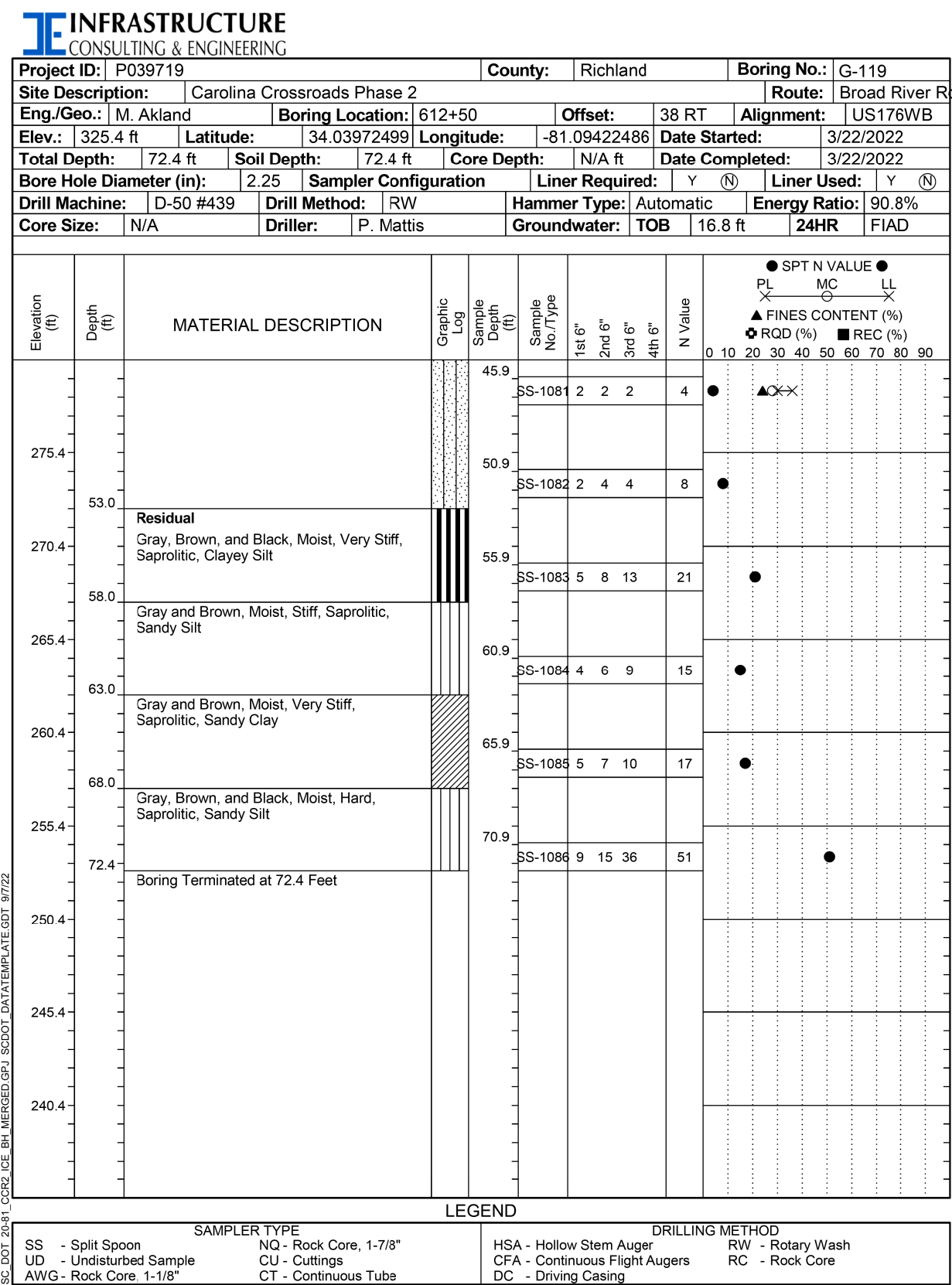
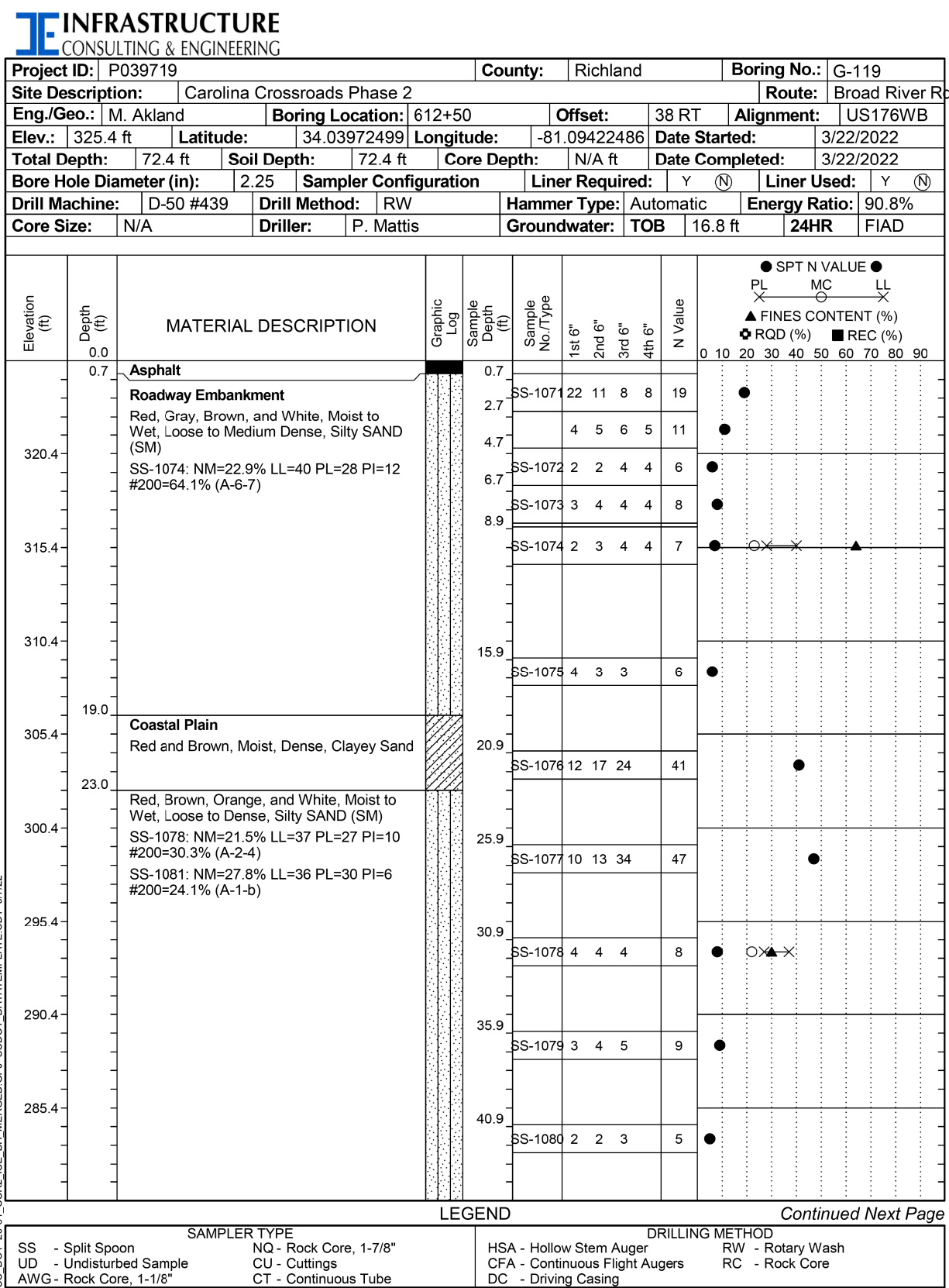
REV.	
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REVIEWED	JPF 09-22
QUAN.	
DR.	ADG WRS 05-22
DES.	WRS KLC 05-21
BY	CHK. DATE



SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	
BRIDGE PLAN AND PROFILE	
US 176 WB (BROAD RIVER RD.) BRIDGE OVER I-20	
COUNTY	RICHLAND
ROUTE	US 176



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FOR INFORMATION ONLY



JOINT VENTURE **INFRASTRUCTURE CONSULTING & ENGINEERING**

REV.		
REV.		
REV.		
REVIEWED	WRS	09-22
QUAN.		
DR.	ADG	WRS 05-22
DES.		
BY	CHK.	DATE
COUNTY		RICHLAND
ROUTE		US 176

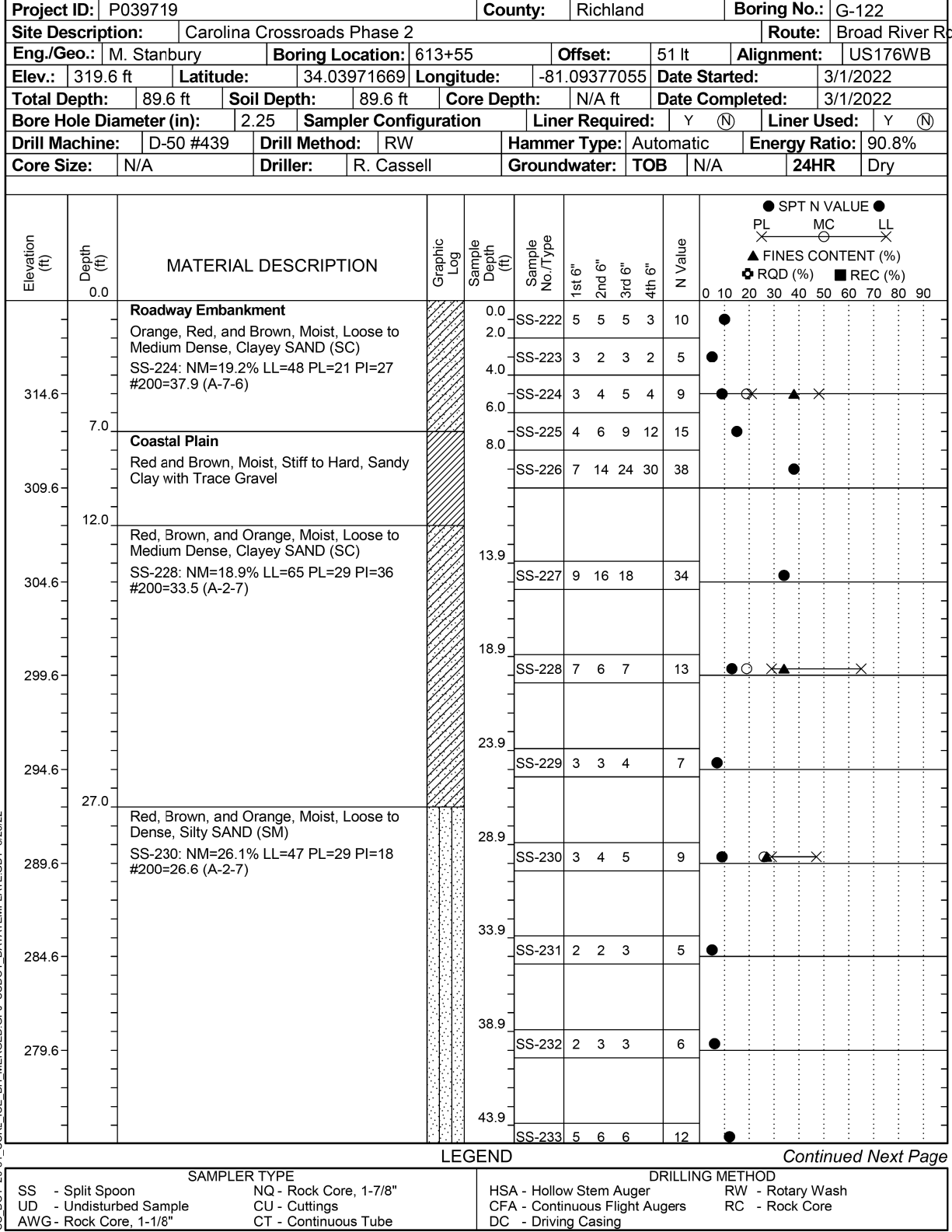
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

BORING LOGS (1)

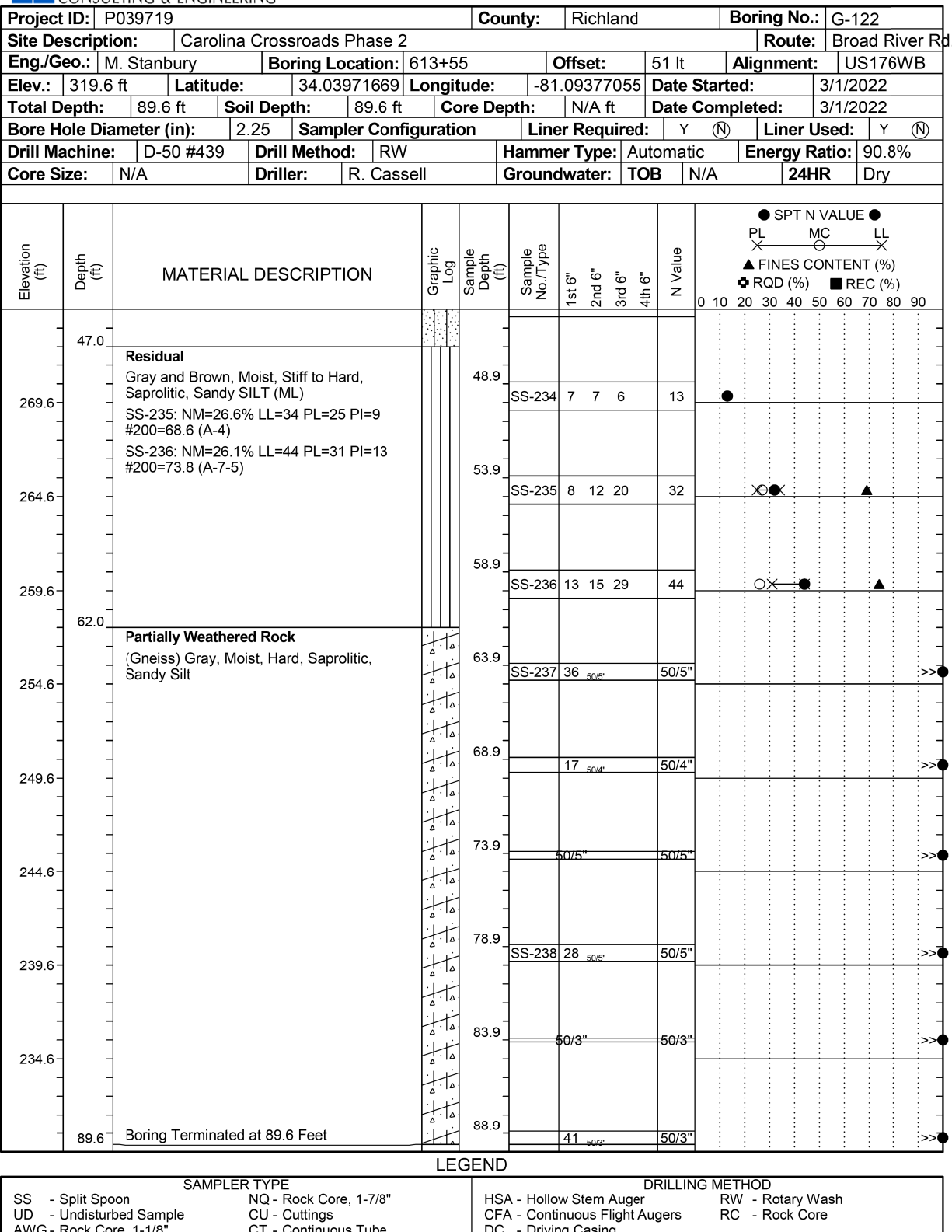
US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

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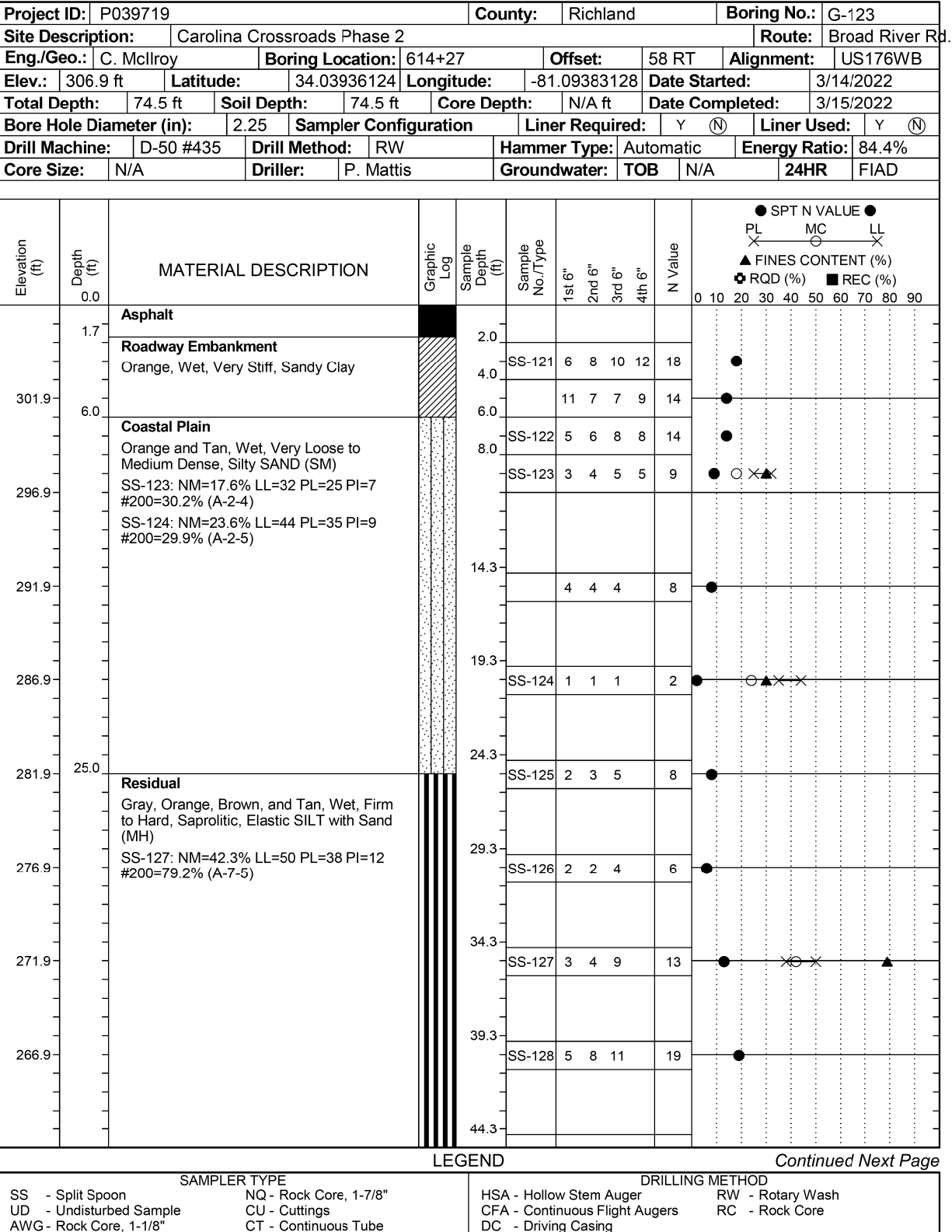
INFRASTRUCTURE
CONSULTING & ENGINEERING



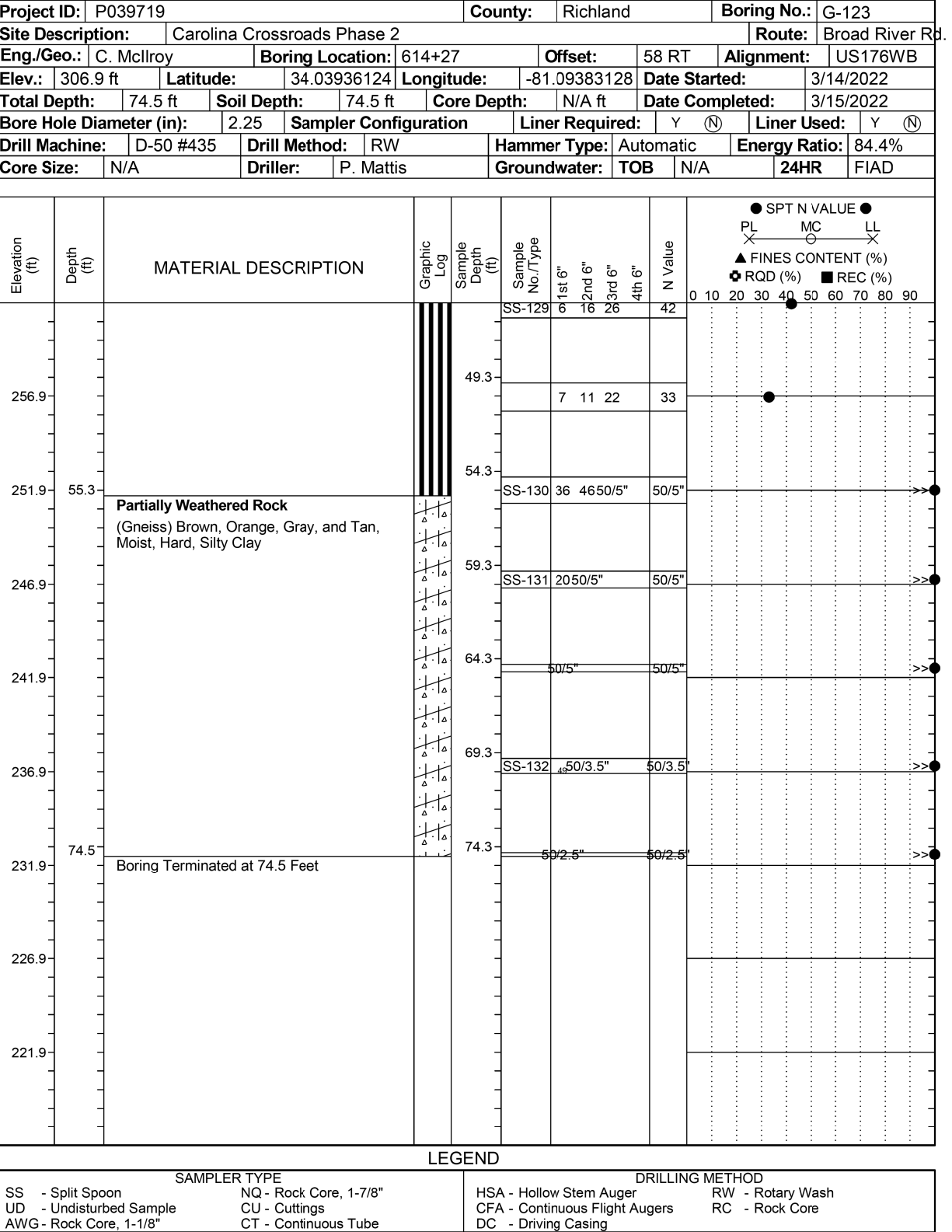
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CONSULTING & ENGINEERING



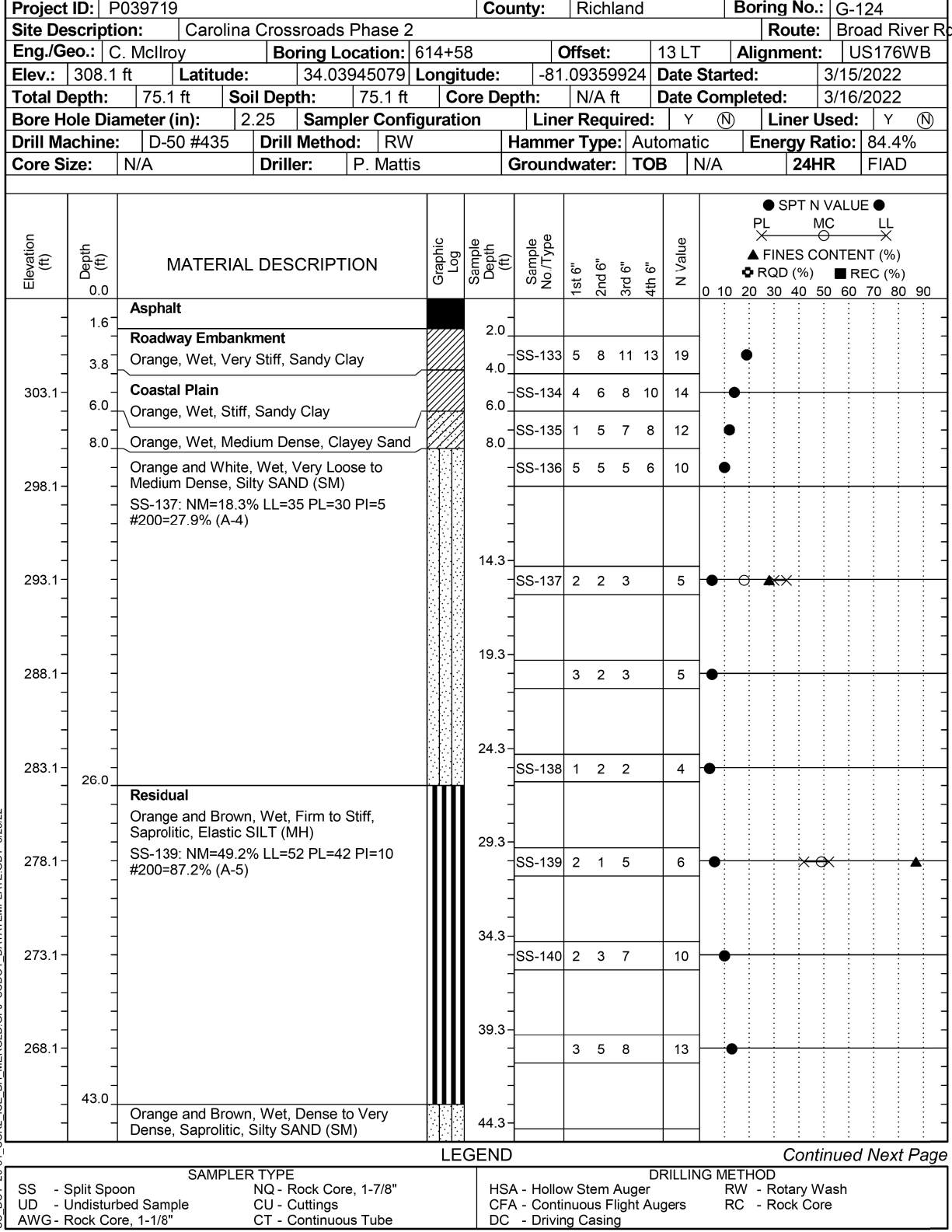
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CONSULTING & ENGINEERING



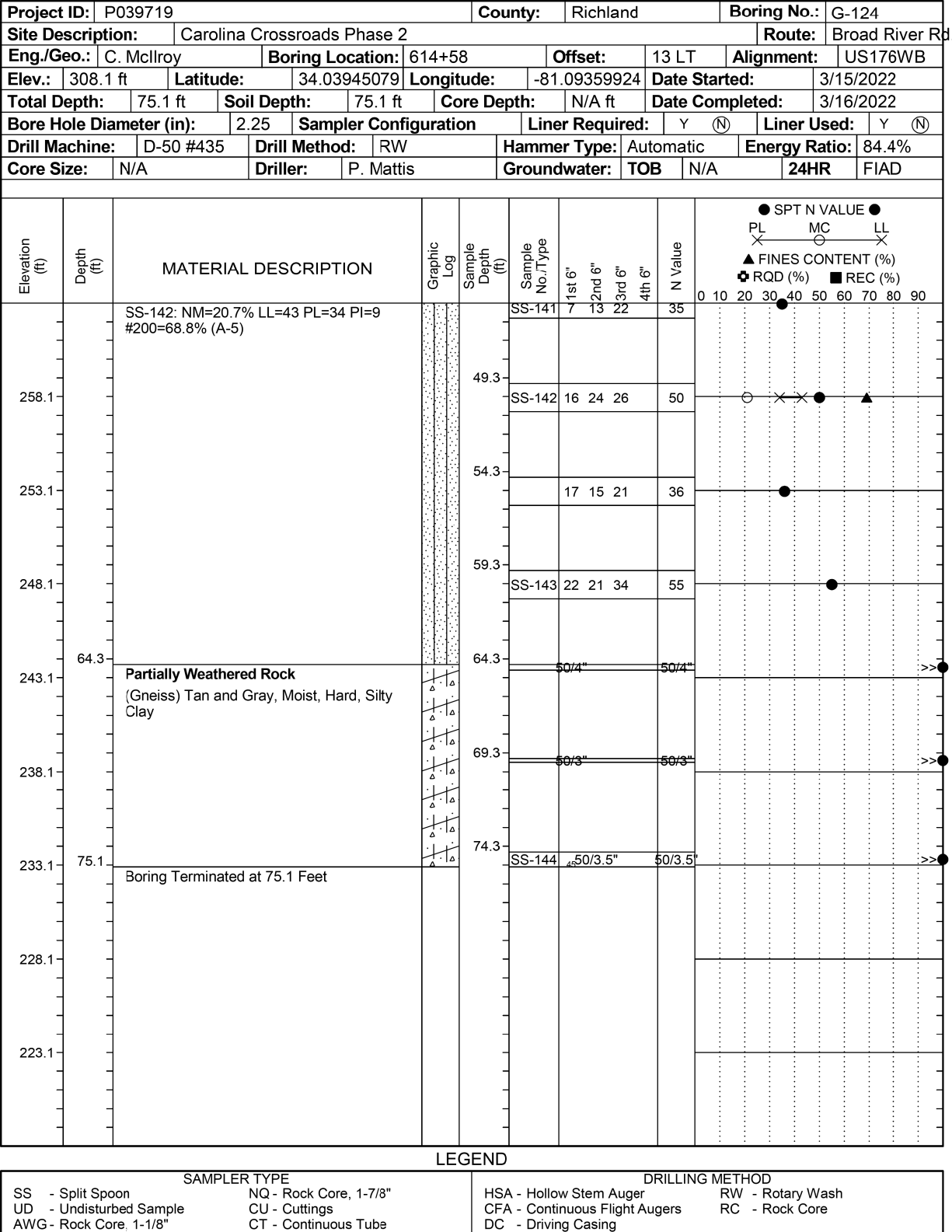
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CONSULTING & ENGINEERING



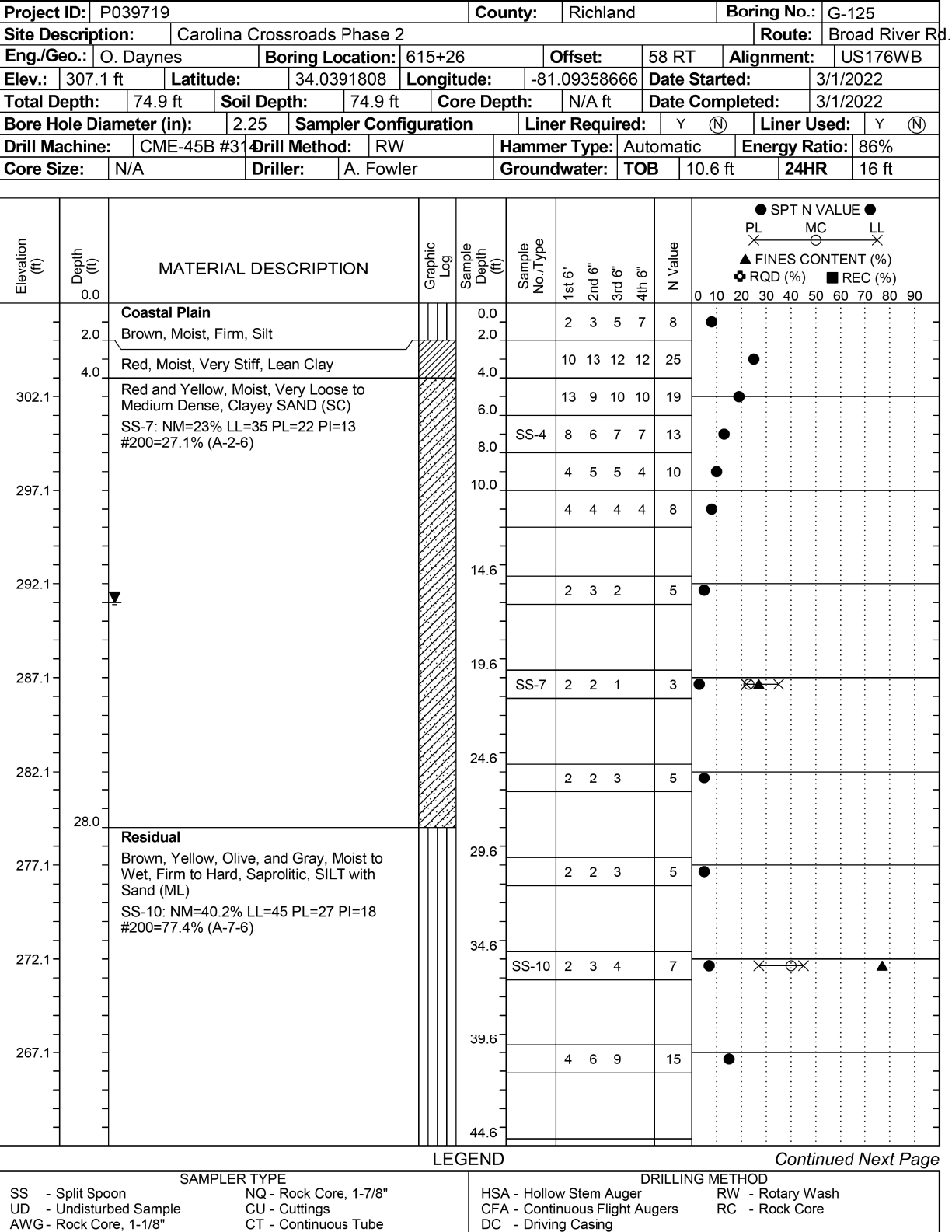
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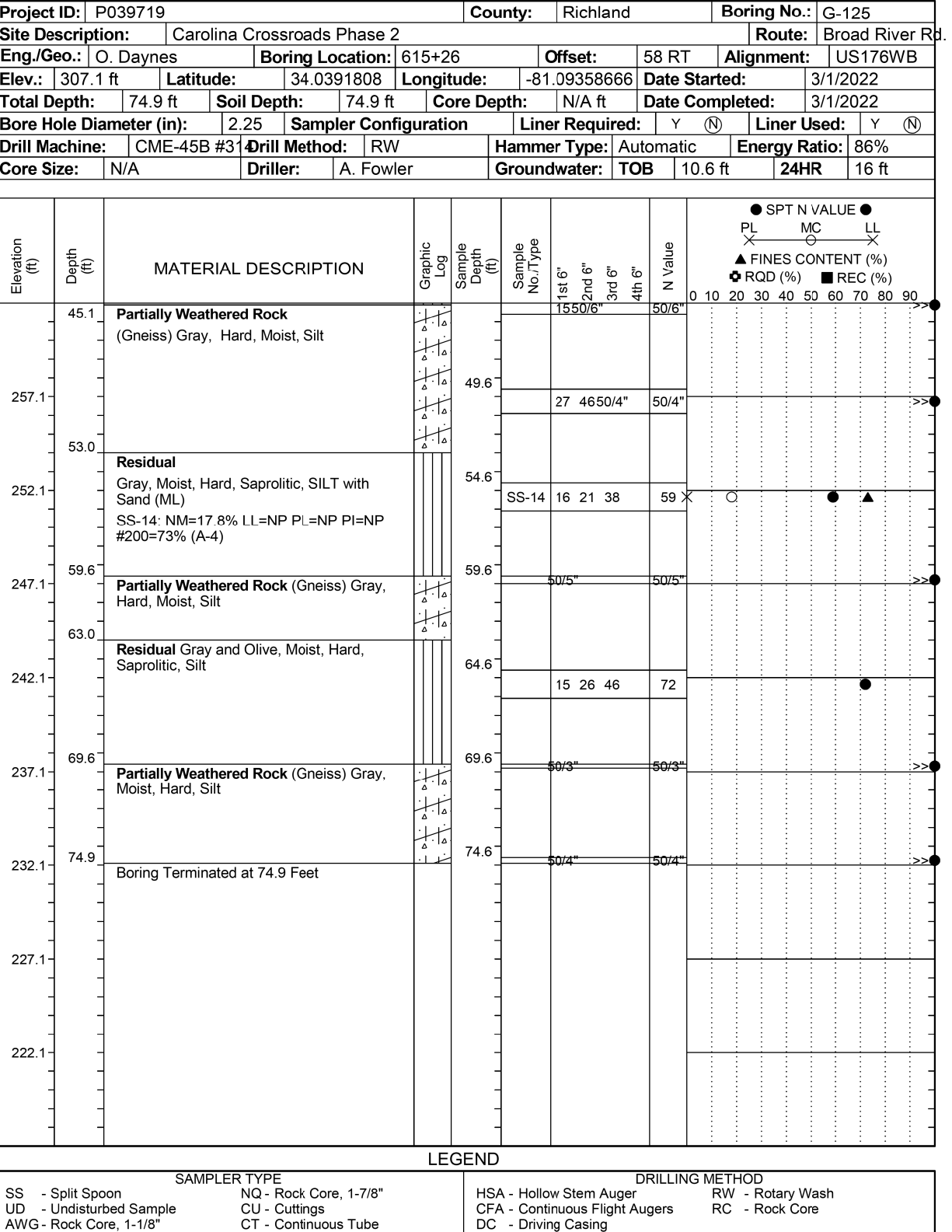
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SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BORING LOGS (2)

US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

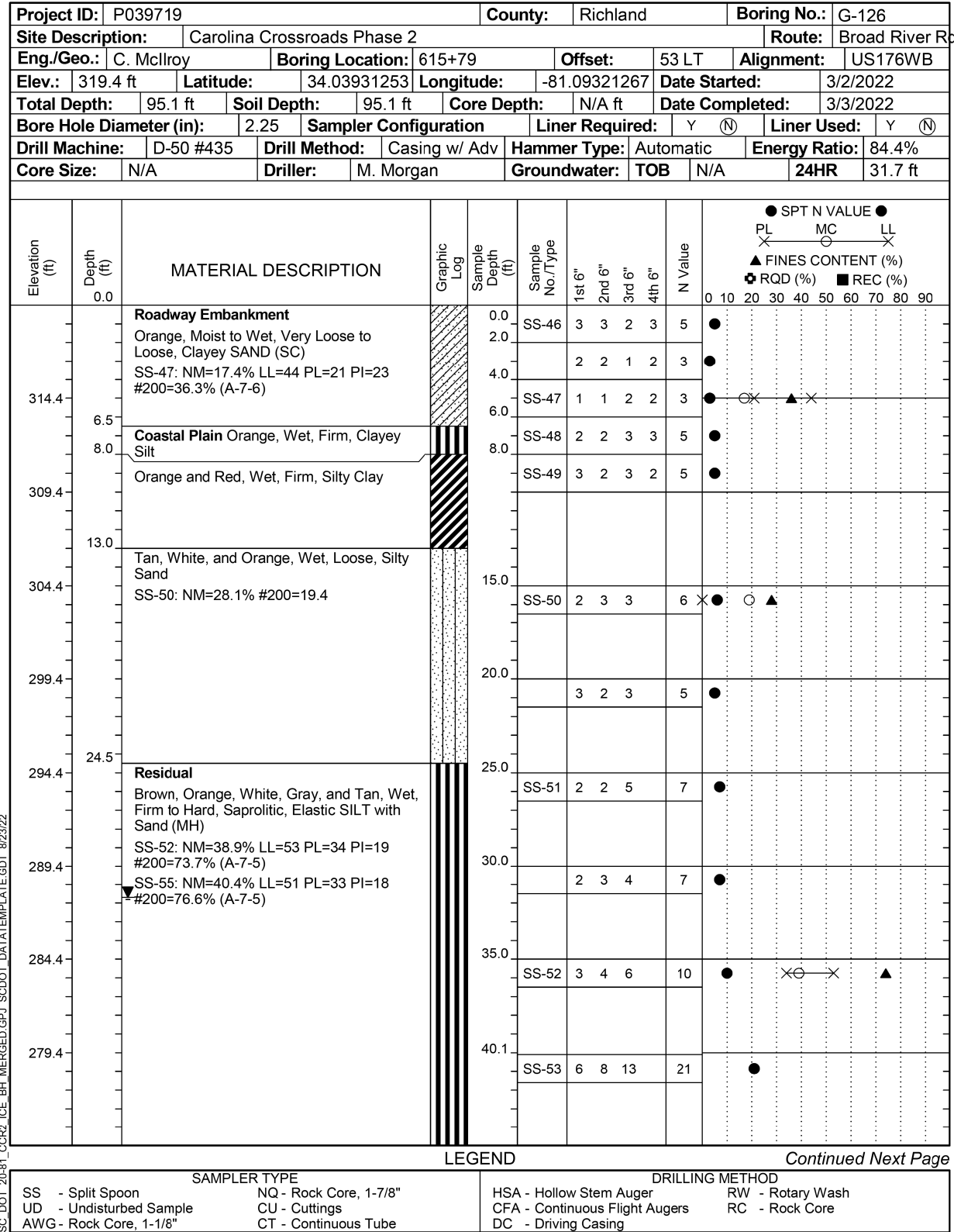
COUNTY: RICHLAND ROUTE: US 176

FOR INFORMATION ONLY

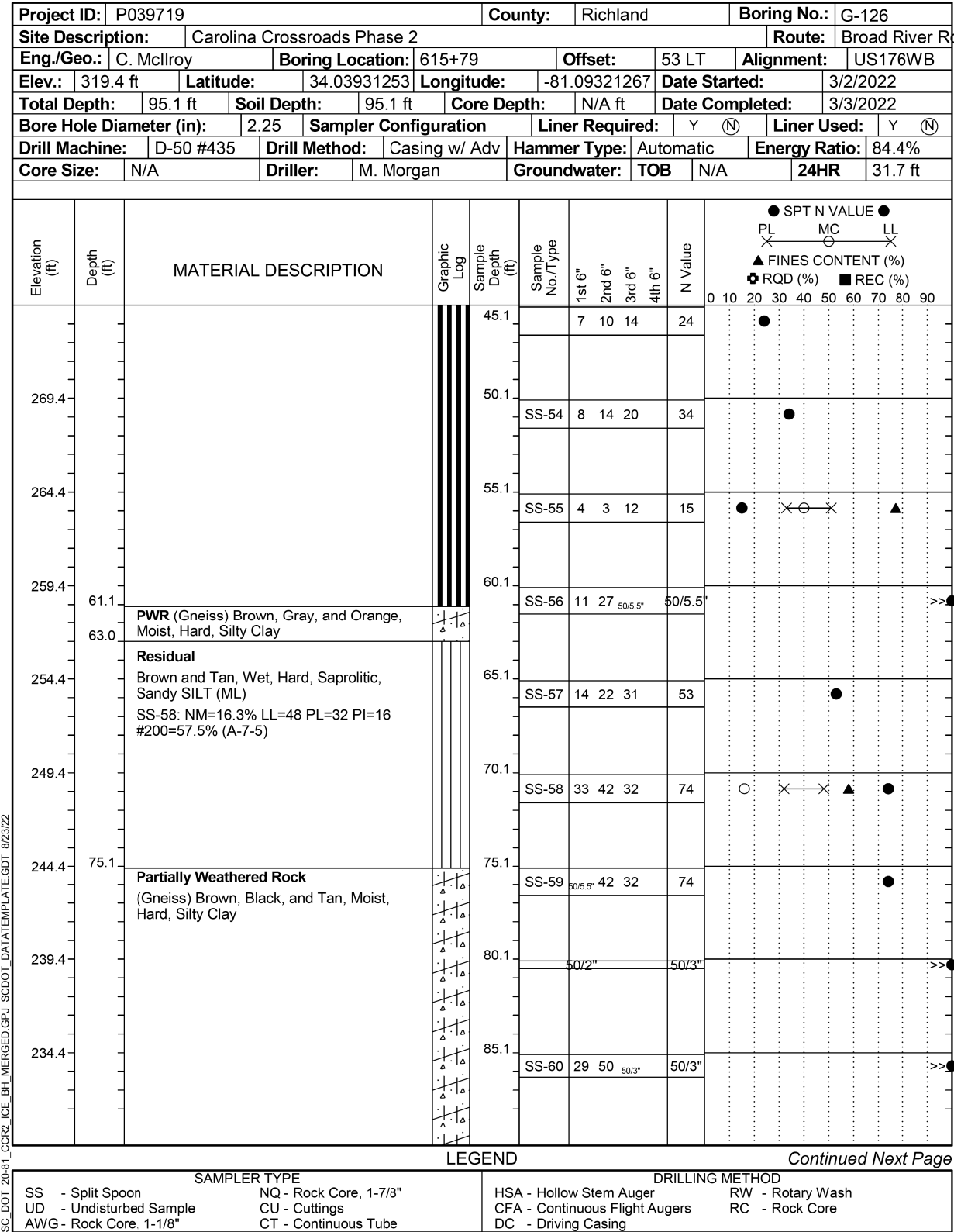
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REVIEWED	WRS 09-22
QUAN.	
DR.	ADG WRS 05-22
DES.	
BY	CHK. DATE

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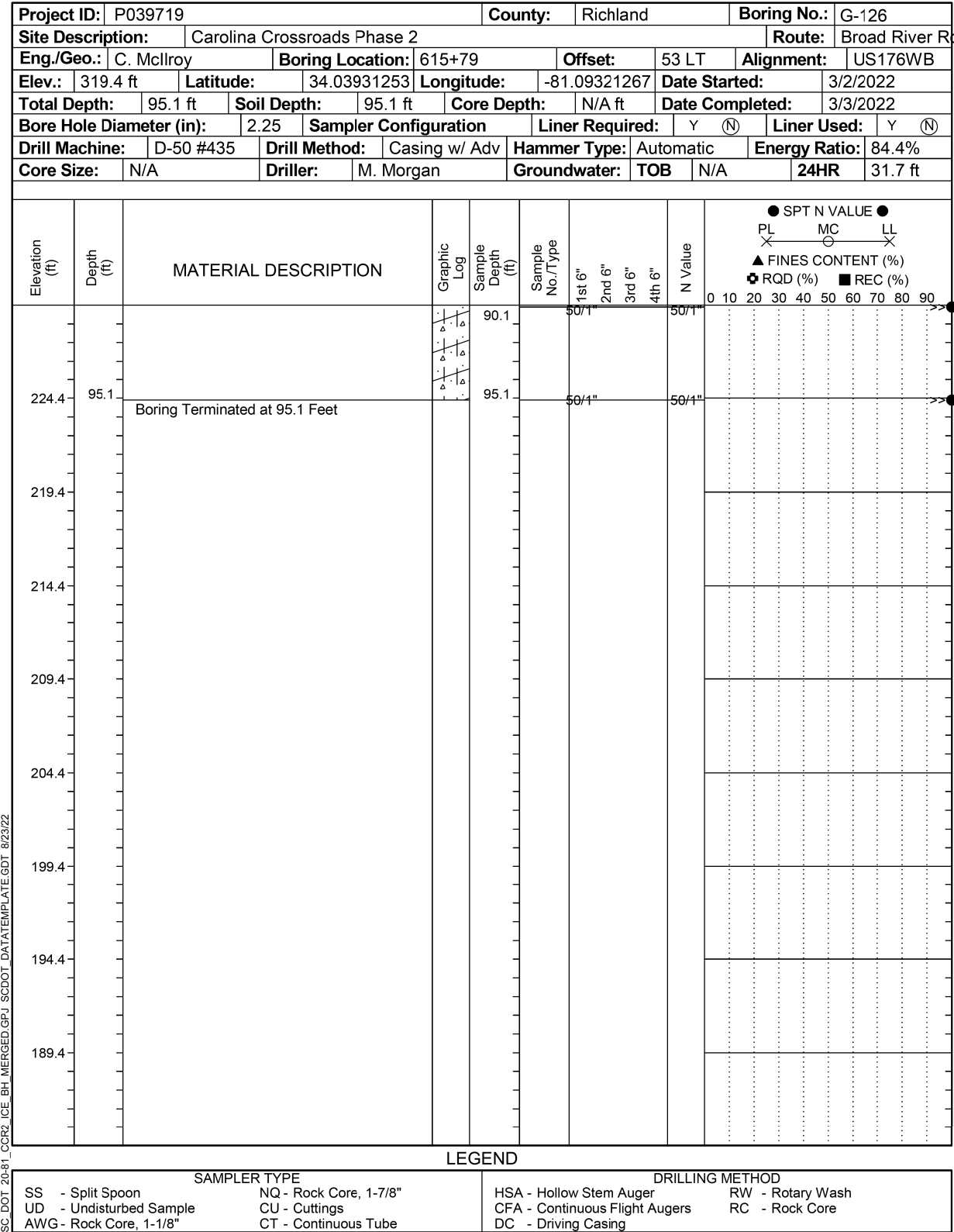
ICE INFRASTRUCTURE CONSULTING & ENGINEERING



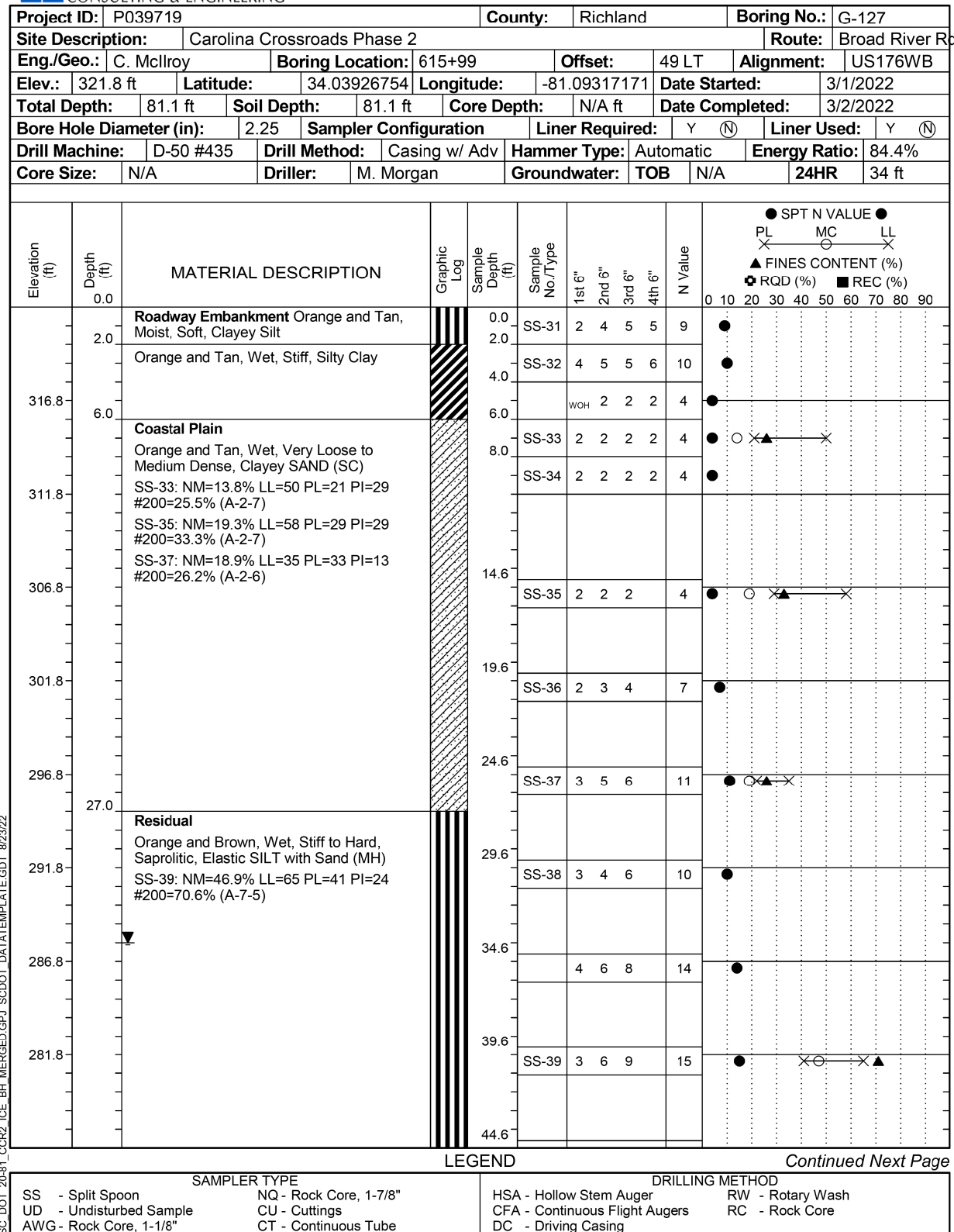
ICE INFRASTRUCTURE CONSULTING & ENGINEERING



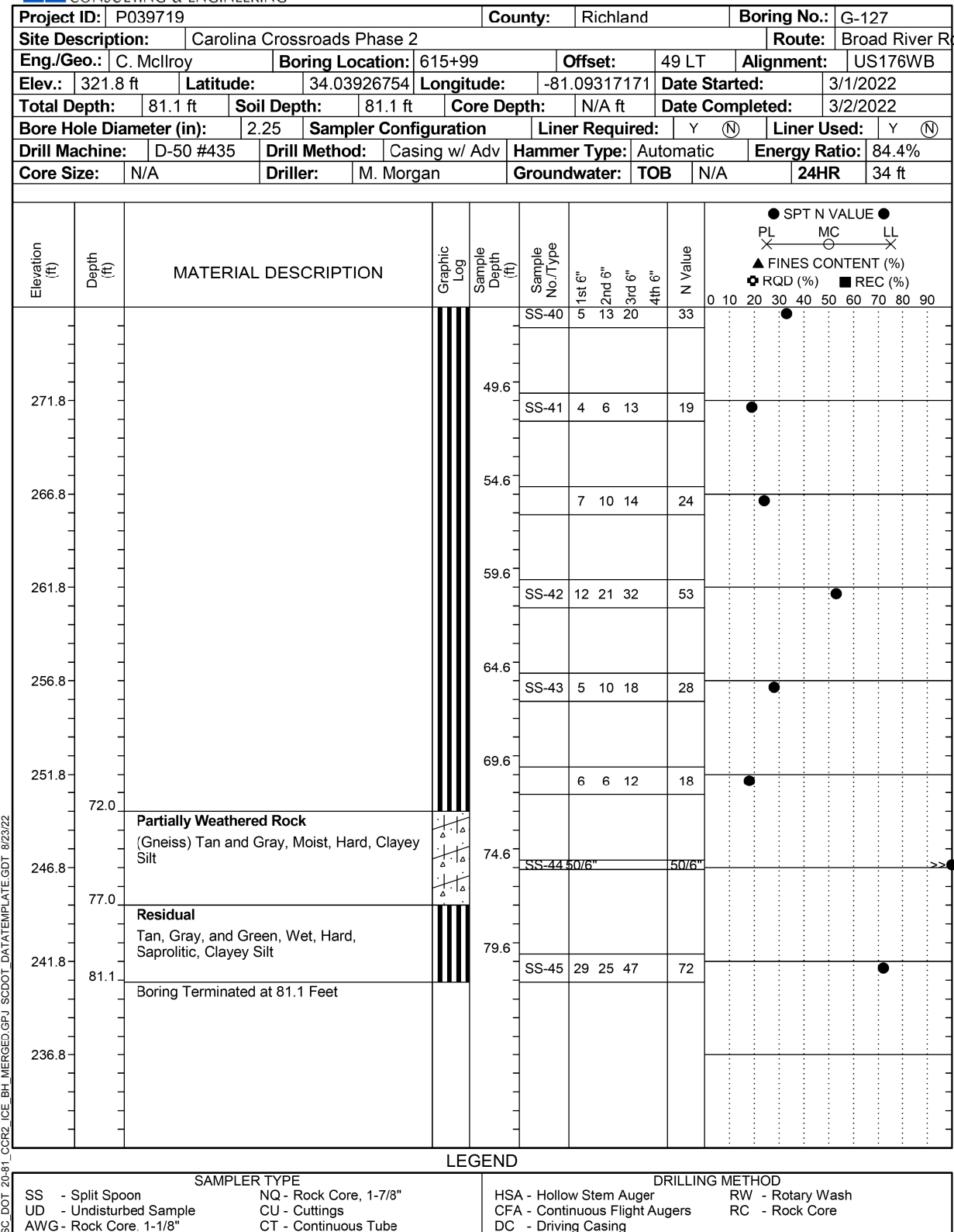
ICE INFRASTRUCTURE CONSULTING & ENGINEERING



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ICE INFRASTRUCTURE CONSULTING & ENGINEERING



ICE of Carolinas, PLLC
110 Midlands Court
Columbia, SC
www.ice-eng.com

Project: Carolina Crossroads Phase 2
Location: Richland County, SC

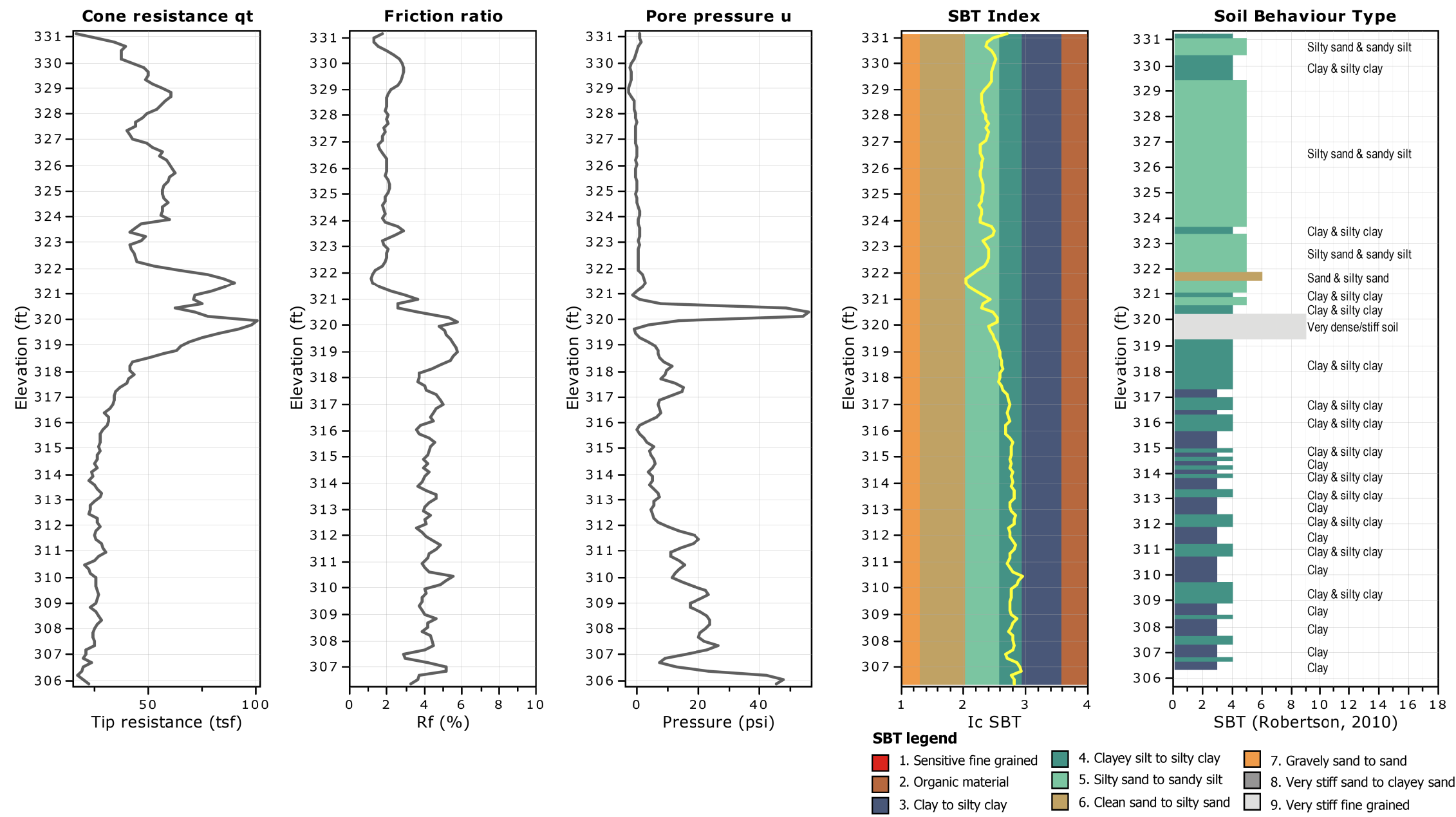
CPT: G-083

Total depth: 25.43 ft, Date: 2/24/2022

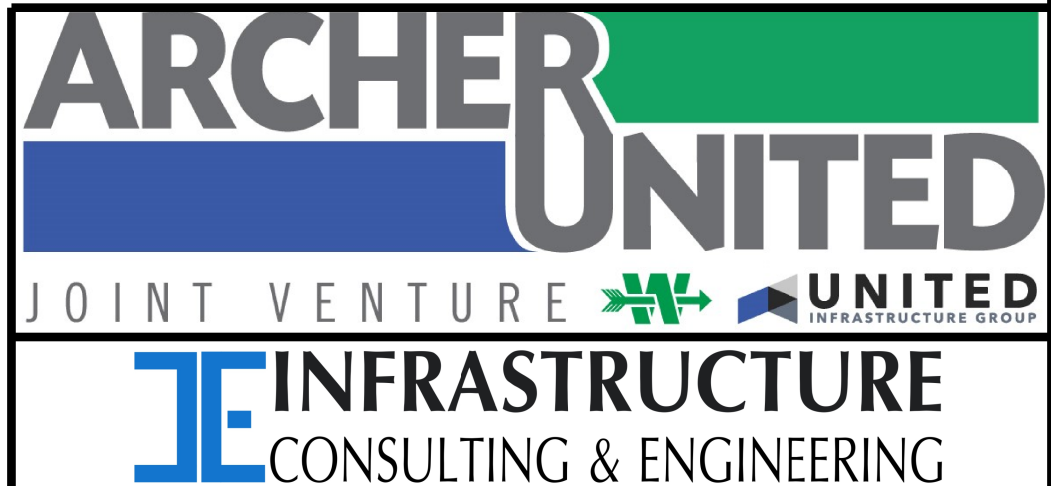
Surface Elevation: 331.30 ft

Coords: N 802516.8, E 1971698.8

Cone Operator: CATLIN



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Project file: R:\Projects\20-81 CCR Phase 2\WON_CADD\Investigation\Catlin CPTs\CCR2 CPTs_All.cpt



SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BORING LOGS (3)

US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

COUNTY RICHLAND

ROUTE US 176

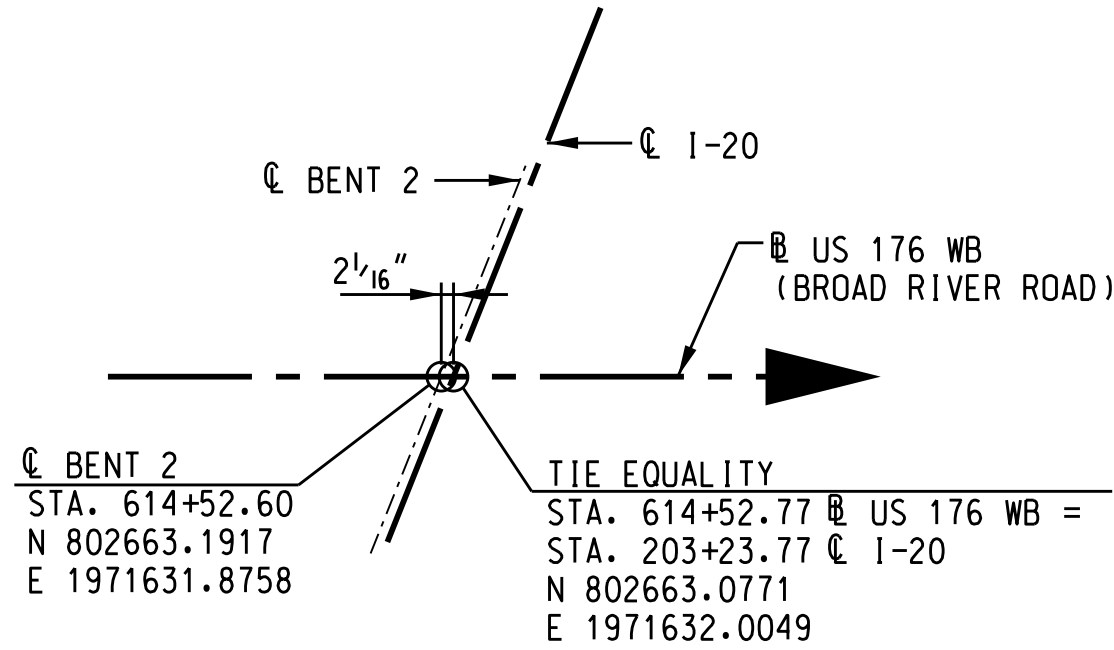
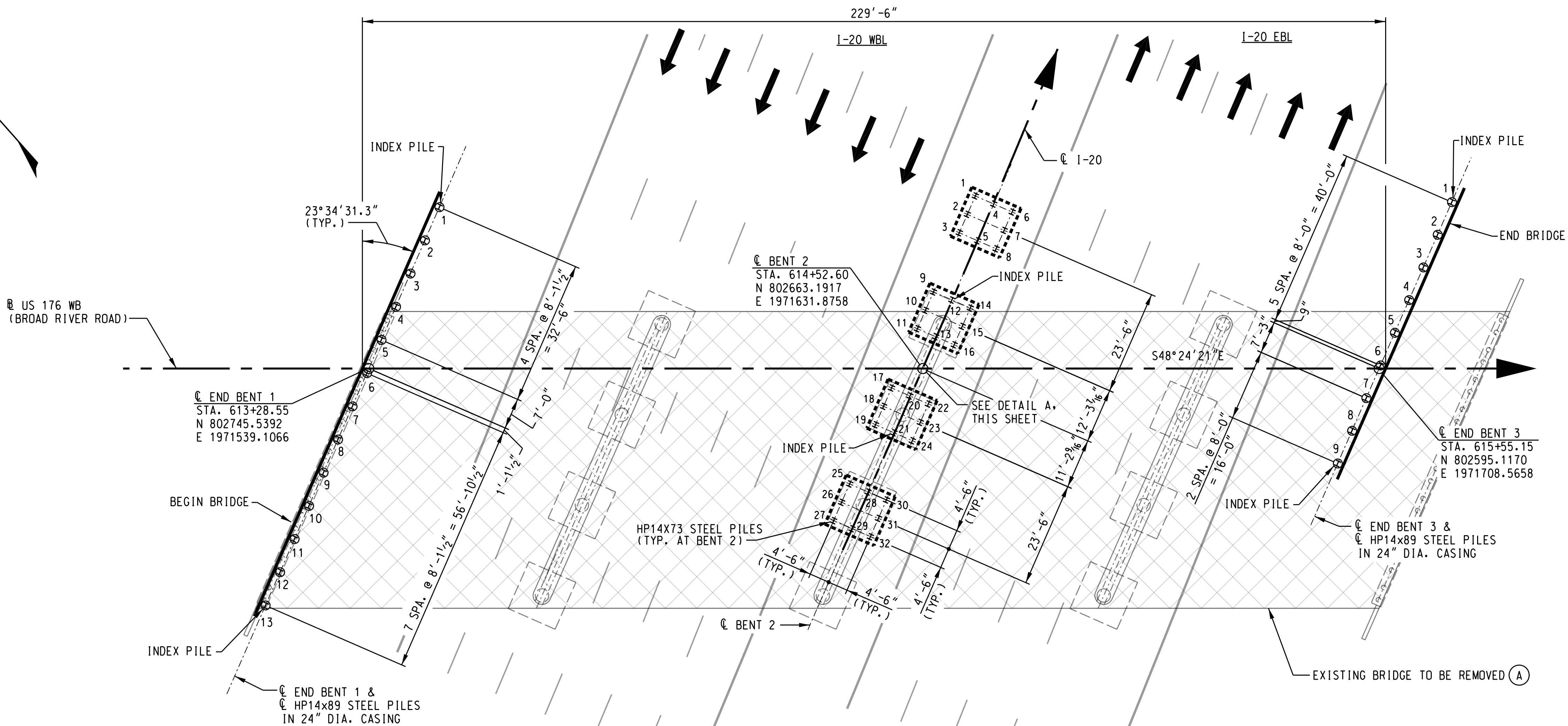
FOR INFORMATION ONLY

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REVIEWED	WRS	09-22
QUAN.		
DR.	ADG	WRS 05-22
DES.		
BY	CHK.	DATE

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BRIDGE PLANS ID	SHEET NO.
P039719-B42a	19

Ⓐ EXISTING BRIDGE TO BE REMOVED AND DISPOSED OF BY THE CONTRACTOR IN ACCORDANCE WITH SECTION 202.4.2 OF THE STANDARD SPECIFICATIONS. EXISTING TIMBER PILES AT END BENTS TO BE REMOVED DURING EMBANKMENT EXCAVATION FOR MSE WALL CONSTRUCTION. SEE MOT PLANS FOR ADDITIONAL INFORMATION.



DETAIL A

PILE BEARING TABLE			
BENT I.D.	E.B.1	I.B.2	E.B.3
PILE SECTION	HP 14X89	HP 14X73	HP 14X89
FACTORED DESIGN LOAD (TONS)	193	134	193
GEOTECHNICAL RESISTANCE FACTOR	0.65	0.65	0.65
NOMINAL RESISTANCE (TONS)	297	206	297
SETTLEMENT INDUCED UNFACTORED DOWNDRAW (TONS)	0	0	0
SETTLEMENT INDUCED FACTORED DOWNDRAW (TONS)	0	0	0
LIQUEFACTION INDUCED DOWNDRAW (TONS)	0	0	0
REQUIRED DRIVING RESISTANCE (TONS)	297	206	297
REQUIRED MINIMUM TIP ELEVATION TO ACHIEVE LATERAL STABILITY (FEET MSL)	280	270	280
ESTIMATED PILE TIP ELEVATION (FEET MSL)	240	245	245

Initially drive End Bent 1 and End Bent 3 piles to at least the required minimum tip elevation and no deeper than tip elevation 265 before MSE wall and bridge embankment construction.

Settlement monitoring is required at End Bent 1 and End Bent 3 during MSE wall and bridge embankment construction. Install and monitor one settlement plate in accordance with SCDOT supplemental technical specification SC-M-203-4 within each bridge abutment footprint. Contact the Geotechnical Engineer of Record for final coordination on settlement plate locations prior to installation of plates and construction of MSE Walls.

Final End Bent pile driving to the required driving resistance shall begin at the direction of the Geotechnical Engineer of Record after sufficient foundation soil settlement has completed.

Method of controlling installation of piles and verifying their capacity: Capacity will be verified by Pile Driving Analyzer and CAPWAP analysis of index piles. A Pile Installation Chart developed from the analysis will be used to verify the capacity of production piles.

FOUNDATION LAYOUT

Perform Pile Driving Analyzer (PDA) testing on six (6) index piles, two (2) per bent, after MSE wall settlement is complete per the Geotechnical Engineer of Record. Index piles shall be the first two production piles driven at each bent. Include an additional two feet of pile length in order to accommodate the initial PDA testing. If a CAPWAP analysis determines that capacity has not been achieved, restrike one of the production piles. Perform the restrike on the production pile exhibiting the least blows per foot. On initial drive, piles shall be stopped at the highest allowable finished grade on the plans to accommodate a restrike while remaining within an allowable plan finished grade elevation. Perform PDA testing during the restrike. The Geotechnical Engineer of Record will determine the time between initial driving and any required restrikes.

Each pile is to be installed in one continuous operation. Include details of any anticipated temporary driving discontinuances including anticipated time intervals in the Pile Installation Plan.

The top of partially weathered rock elevation may vary across each bent and result in varying pile lengths. Practical refusal of a pile is defined as 20 blows per inch.

Reference the Standard Specifications for Highway Construction for Driven Pile Foundations, Section 711. Notes included in these plans are in addition to the requirements of the Standard Specifications.

The following estimated parameters were used for performing a drivability analysis for End Bent 1, Interior Bent 2, & End Bent 3:

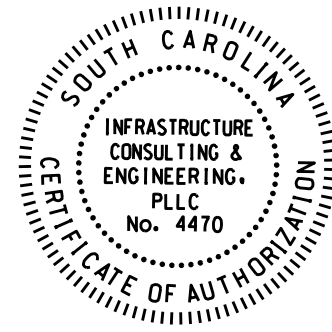
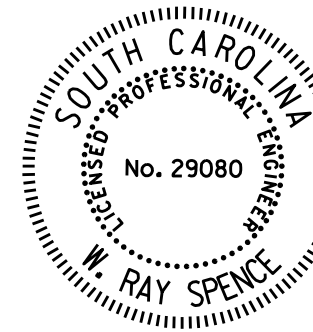
DRIVABILITY ANALYSIS			
BENT I.D.	E.B.1	I.B.2	E.B.3
Skin Quake (QS)	0.10 in	0.10 in	0.10 in
Toe Quake (QT)	0.10 in	0.10 in	0.10 in
Skin Damping (SD)	0.15 s/ft	0.15 s/ft	0.15 s/ft
Toe Damping (TD)	0.15 s/ft	0.15 s/ft	0.15 s/ft
% Skin Friction	30%	50%	30%
Distribution Shape Number	0	0	0
Pile Installation Chart	Proportional	Proportional	Proportional
Pile Penetration	60%	75%	60%
Hammer Energy Range	50-80 kip-ft	30-60 kip-ft	50-80 kip-ft

Note: GRLWEAP 2010-7 WAS USED TO PERFORM THE WAVE EQUATION ANALYSIS.

A pile hammer having the rated energy as indicated above is considered suitable for driven pile installation. However, final hammer approval is based on a wave equation analysis that accurately reflects the Contractor's proposed driving system.

The Contractor shall retain a geotechnical engineering firm to perform the pre-construction condition assessment and Earth-borne Vibration Monitoring in accordance with the Request for Proposals.

SCDOT Supplemental Technical Specification SC-M-713 (01/19) shall apply to the project.



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REVIEWED	WRS 09-22
QUAN.	
DR.	RMH WRS 08-22
DES.	WRS ALP 07-22
BY	CHK. DATE

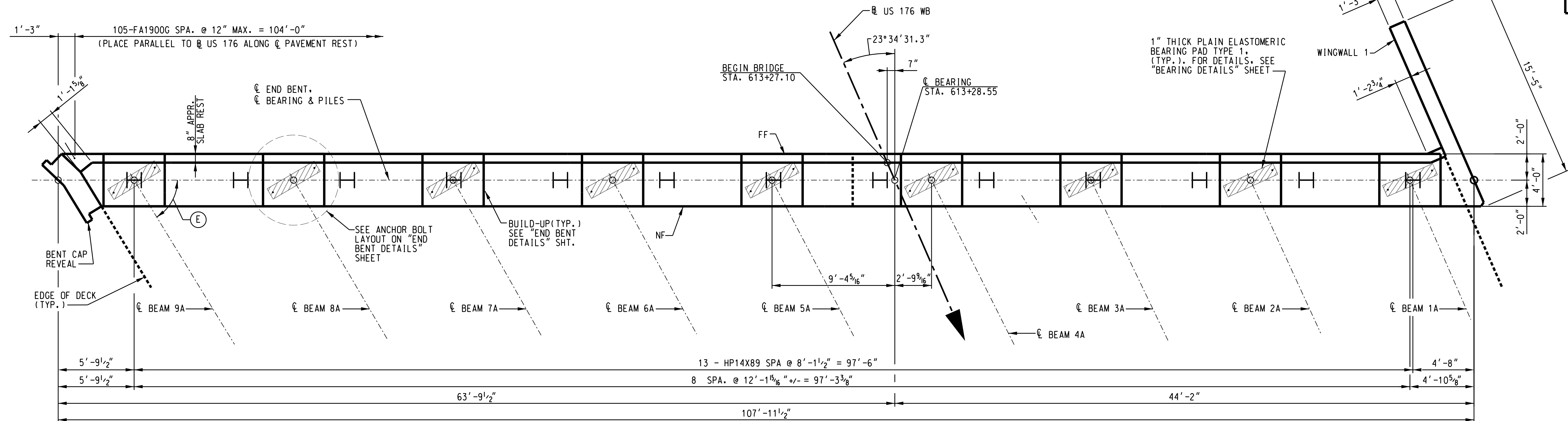


**SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION**

FOUNDATION LAYOUT

US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

COUNTY RICHLAND ROUTE US 176



PLAN

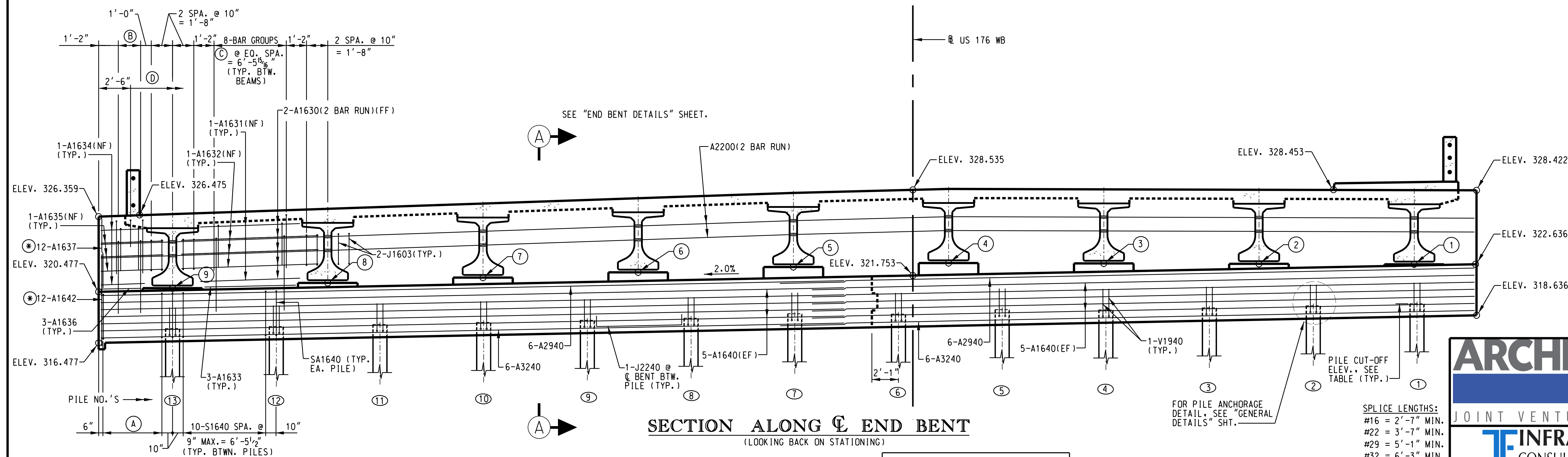


TABLE OF BEAM ANGLES	
BEAM	(E)
1A	66°25'28.7"
2A	65°23'08.6"
3A	64°21'49.1"
4A	63°21'31.5"
5A	62°22'16.5"
6A	61°24'04.5"
7A	60°26'55.8"
8A	59°30'50.5"
9A	58°35'48.6"

BUILD-UP ELEVATIONS	
LOCATION	ELEVATION
①	322.622
②	322.653
③	322.684
④	322.715
⑤	322.403
⑥	321.988
⑦	321.574
⑧	321.159
⑨	320.744

ARCHER UNITED
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INFRASTRUCTURE GROUP

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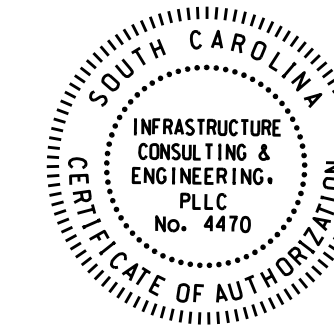
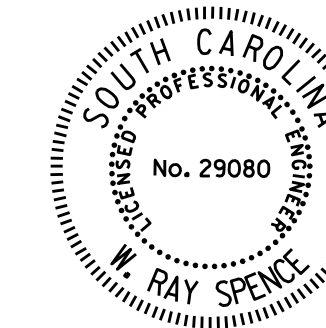
**SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION**

END BENT 1

US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

22	COUNTY	RICHLAND	ROUTE	US 176
F				

PILE CUT-OFF ELEVATIONS			
PILE	ELEVATION	PILE	ELEVATION
①	319.543	⑧	318.405
②	319.380	⑨	318.243
③	319.218	⑩	318.080
④	319.055	⑪	317.918
⑤	318.893	⑫	317.755
⑥	318.730	⑬	317.593
⑦	318.568		



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REVIEWED WRS 09-22			
QUAN.			
DR.	RMH	WRS	07-2
DES.	ALP	WRS	07-2
	BY	CHK	DAT

NOTES:

FOR PILE CAPACITY, PILE DRIVABILITY, AND PILE TIP ELEVATIONS, SEE "FOUNDATION LAYOUT" SHEET.

STEEL PILING SHALL HAVE MINIMUM YIELD STRENGTH OF 50 KSI.

ALL ELEVATIONS & DIMENSIONS ARE ALONG @ END BENT.

PILE CUT-OFF ELEVATION IS BASED ON 1'-0" PILE EMBEDMENT.

(FF) - DENOTES FAR FACE

(EF) - DENOTES EACH FACE

(NF) - DENOTES NEAR FACE

PLACE BAR GROUP (C), J1603 AND C1901G PARALLEL TO @ U1576 WB.

BAR GROUP (C) CONSISTS OF 3-B1640, 1-J1604 AND 1-N1600.

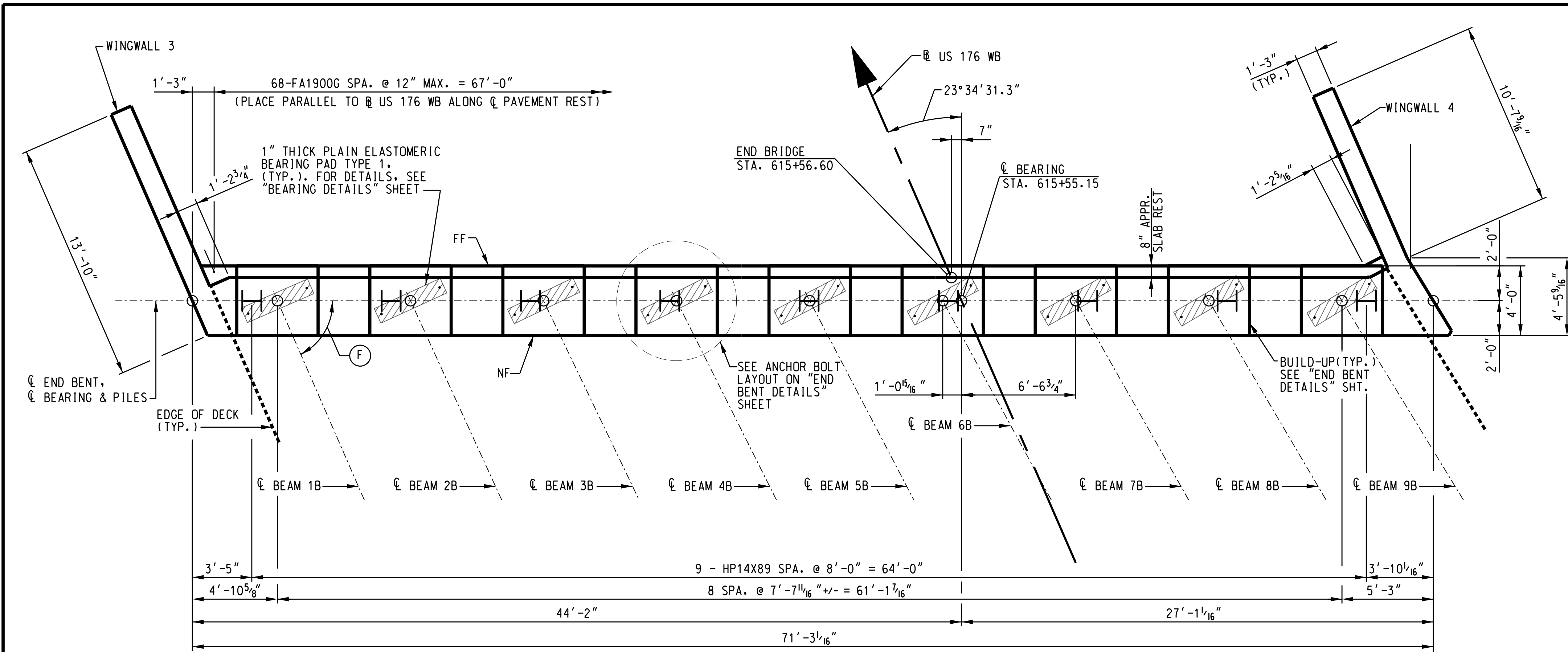
(A) 5-"S16" BARS @ WINGWALL 1.
7-"S16" BARS @ BT. CAP REVEAL. SEE CORNER
DETAILS ON "END BENT DETAILS" SHEET.

(B) 3-BAR GROUPS (C) @ EQ. SPA. (TYP. EA. OVERHANG)

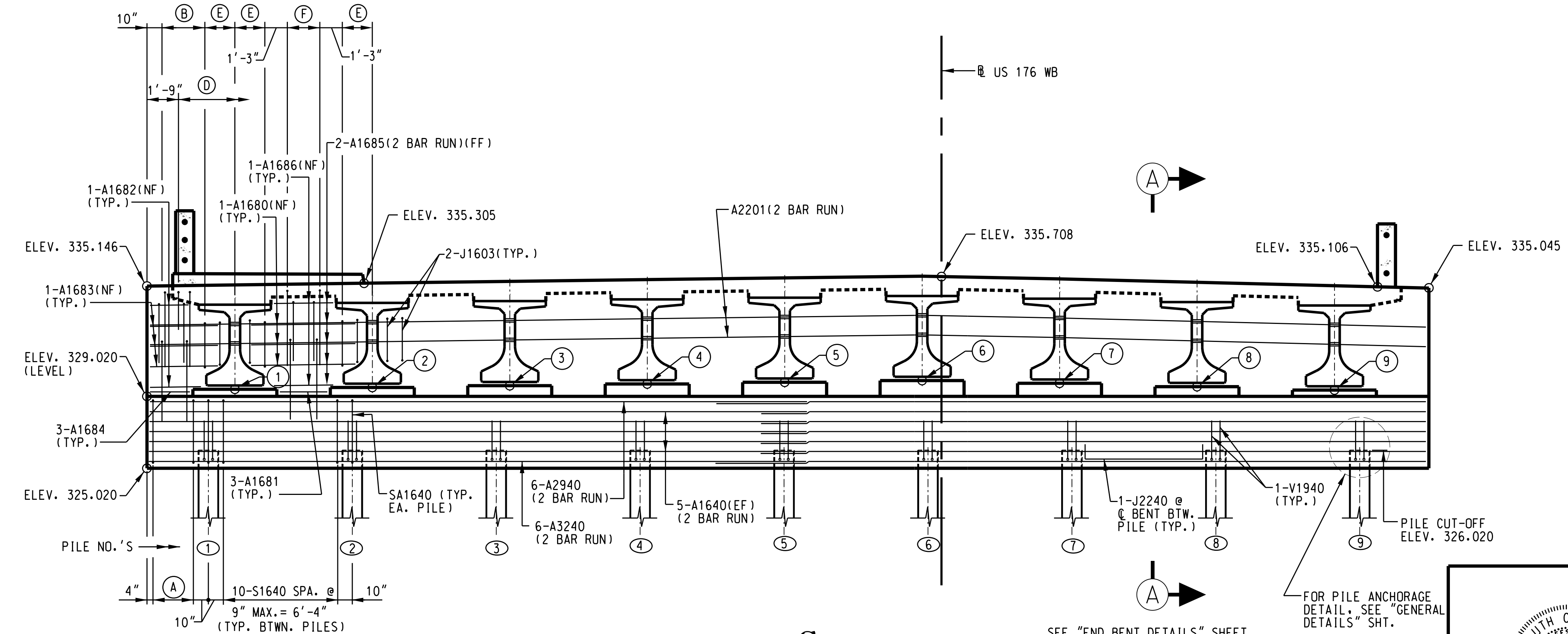
(D) 104-C1901G SPA. @ 12" MAX.
PILE CASING NOT SHOWN FOR CLARITY.

(*) SEE "BENT REVEAL DETAILS",
"WINGWALL DETAILS (1)" SHEET

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PLAN



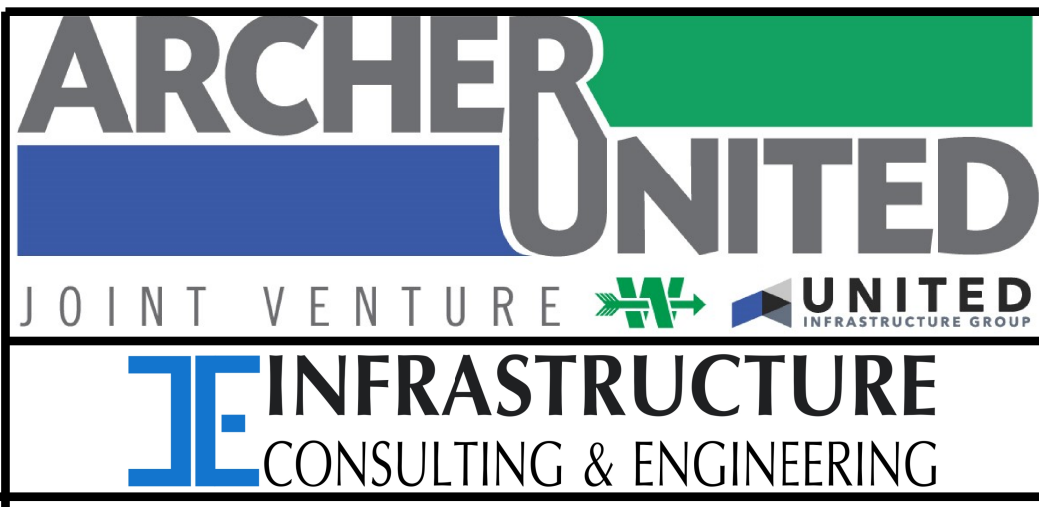
SECTION ALONG CL END BENT
(LOOKING IN DIRECTION OF STATIONING)

- NOTES:
- FOR PILE CAPACITY, PILE DRIVABILITY, AND PILE TIP ELEVATIONS, SEE "FOUNDATION LAYOUT" SHEET.
- STEEL PILING SHALL HAVE MINIMUM YIELD STRENGTH OF 50 KSI.
- ALL ELEVATIONS & DIMENSIONS ARE ALONG CL END BENT.
- PILE CUT-OFF ELEVATION IS BASED ON 1'-0" PILE EMBEDMENT.
- (FF) - DENOTES FAR FACE
- (EF) - DENOTES EACH FACE
- (NF) - DENOTES NEAR FACE
- PLACE BAR GROUP (C), J1603 AND C1901G PARALLEL TO US 176 WB.
- BAR GROUP (C) CONSISTS OF 3-B1640, 1-J1604 AND 1-N1600.
- (A) 5-"S16" BARS (TYP. EACH OVERHANG) SEE CORNER DETAILS ON "END BENT DETAILS" SHEET.
- (B) 3-BAR GROUPS (C) @ EQ. SPA. (TYP. EA. OVERHANG)
- (D) 68-C1901G SPA. @ 12" MAX.
- PILE CASING NOT SHOWN FOR CLARITY.
- (E) 2 SPA. @ 10" = 1'-8"
- (F) 3-BAR GROUPS (C) @ EQ. SPA. = 1'-9 1/16" (TYP. BTW.BMS.)

BUILD-UP ELEVATIONS	
LOCATION	ELEVATION
(1)	329.399
(2)	329.498
(3)	329.597
(4)	329.693
(5)	329.789
(6)	329.882
(7)	329.734
(8)	329.544
(9)	329.353

TABLE OF BEAM ANGLES	
BEAM	(F)
1B	66°25'28.7"
2B	65°23'08.6"
3B	64°21'49.1"
4B	63°21'31.5"
5B	62°22'16.5"
6B	61°24'04.5"
7B	60°26'55.8"
8B	59°30'50.5"
9B	58°35'48.6"

SPLICE LENGTHS:
#16 = 2'-7" MIN.
#22 = 3'-7" MIN.
#29 = 5'-1" MIN.
#32 = 6'-3" MIN.

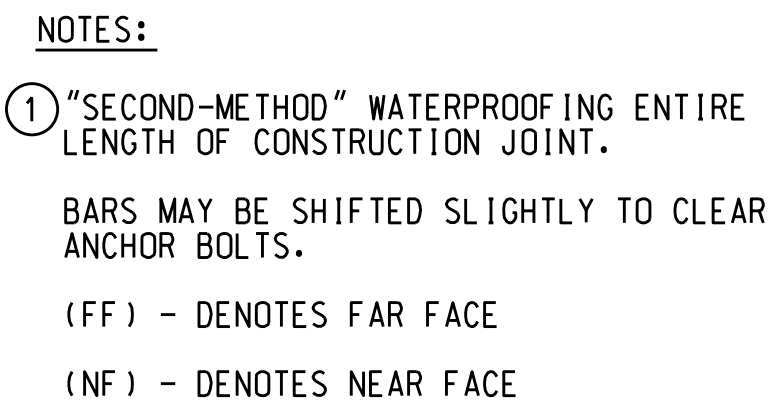


SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	
END BENT 3	
US 176 WB (BROAD RIVER RD.) BRIDGE OVER I-20	
COUNTY	RICHLAND
ROUTE	US 176

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QUAN.	
DR.	RMH WRS 07-22
DES.	ALP WRS 07-22
BY	CHK. DATE

SOUTH CAROLINA
REGISTERED PROFESSIONAL ENGINEER
No. 29080
W. RAY SPENCE

SOUTH CAROLINA
INFRASTRUCTURE CONSULTING & ENGINEERING, PLLC
No. 4470
CERTIFICATE OF AUTHORIZATION

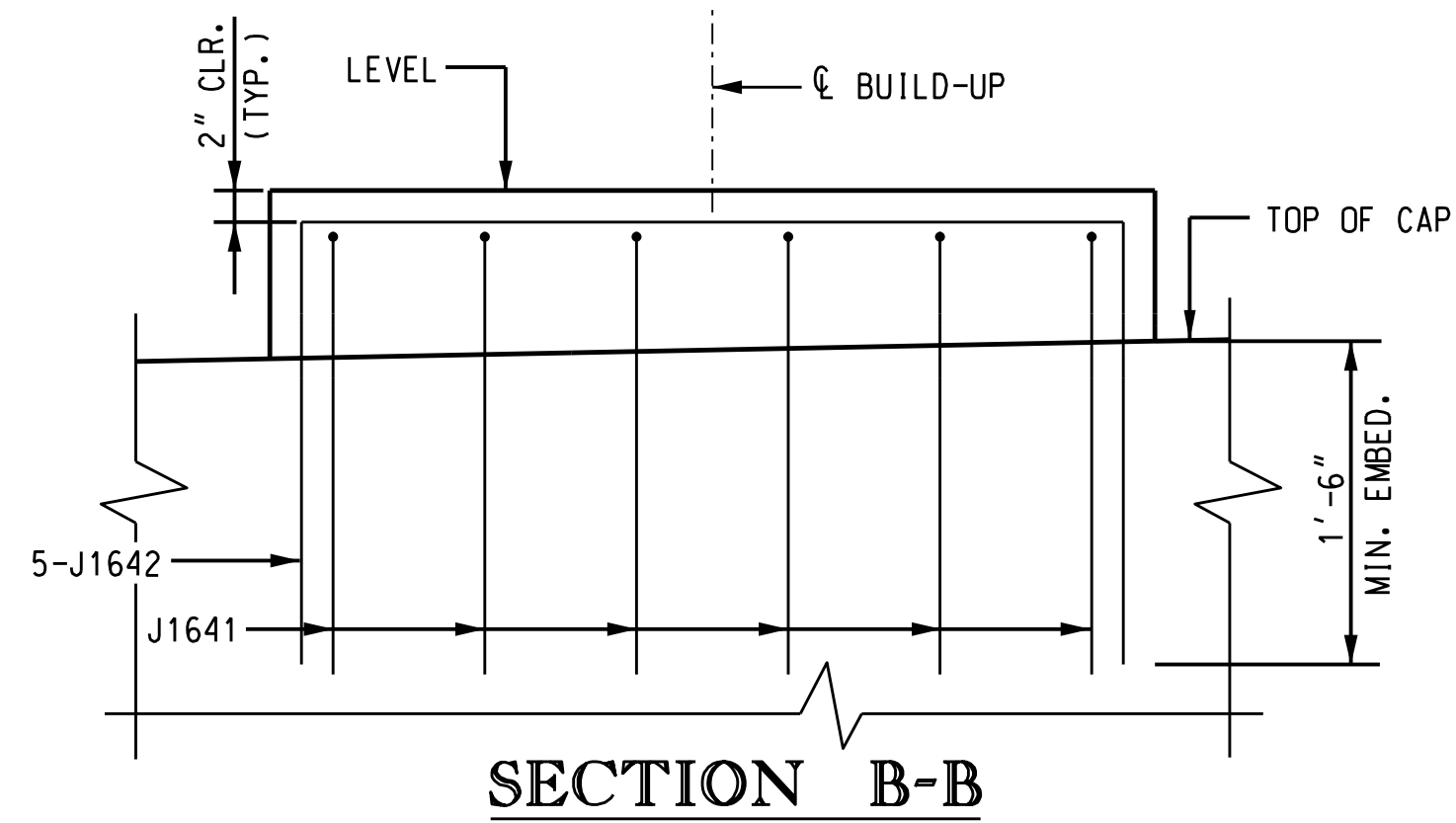
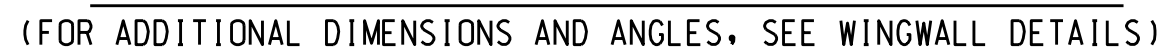


SECTION A-A

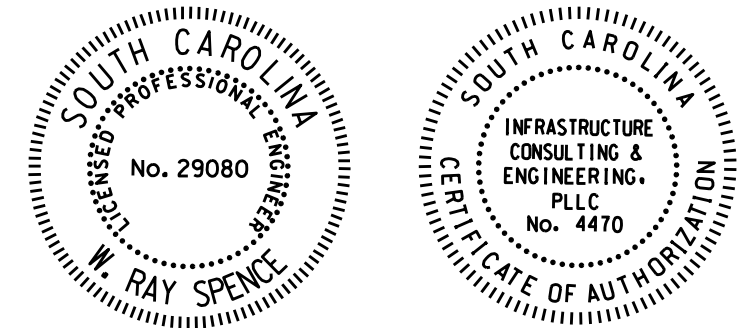
ANCHOR BOLT LAYOUT

PLAN OF BUILD-UP

(FOR ADDITIONAL DIMENSIONS AND ANGLES, SEE WINGWALL DETAILS)



SECTION B-B



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REVIEWED WRS 09-22			
QUAN.	RMH	WRS	07-22
DR.	RMH	WRS	07-22
DES.	ALP	WRS	07-22
	BY	CHK.	DATE

The image displays two corporate logos. The top logo is for Archer United, featuring the word "ARCHER" in a large, bold, grey sans-serif font, with a green rectangle to its right. Below "ARCHER" is a blue rectangle. To the right of the blue rectangle, the word "UNITED" is written in a large, bold, grey sans-serif font. Below this, the words "JOINT VENTURE" are in a smaller, grey sans-serif font, followed by a green stylized logo consisting of two arrows pointing towards each other, and then the word "UNITED" in a bold, grey sans-serif font, with "INFRASTRUCTURE GROUP" in a smaller, grey sans-serif font underneath it. The bottom logo is for JE Infrastructure Consulting & Engineering. It features a large, stylized "JE" logo in blue, followed by the word "INFRASTRUCTURE" in a large, bold, black sans-serif font. Below "INFRASTRUCTURE" are the words "CONSULTING & ENGINEERING" in a smaller, black sans-serif font.

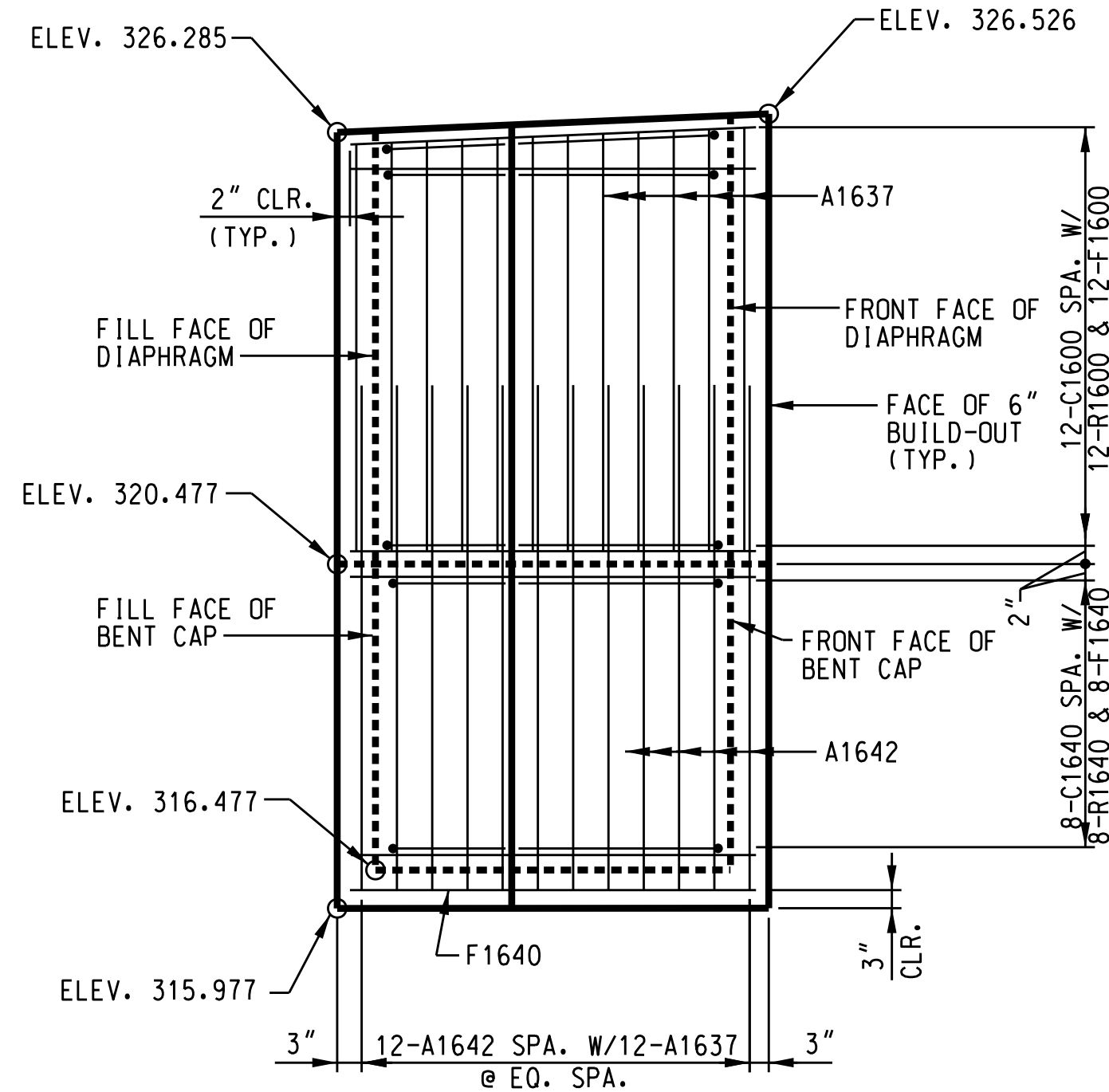
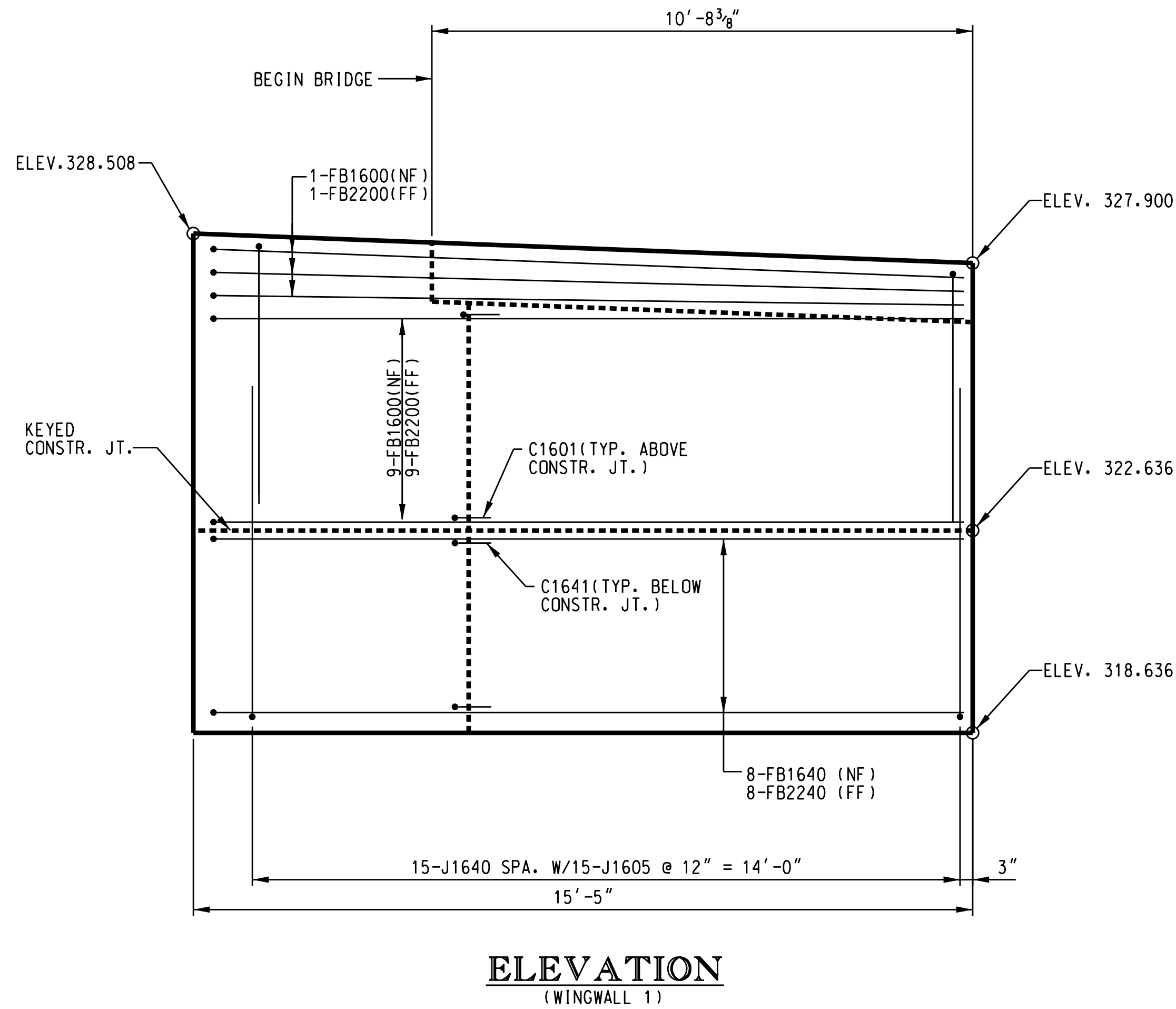
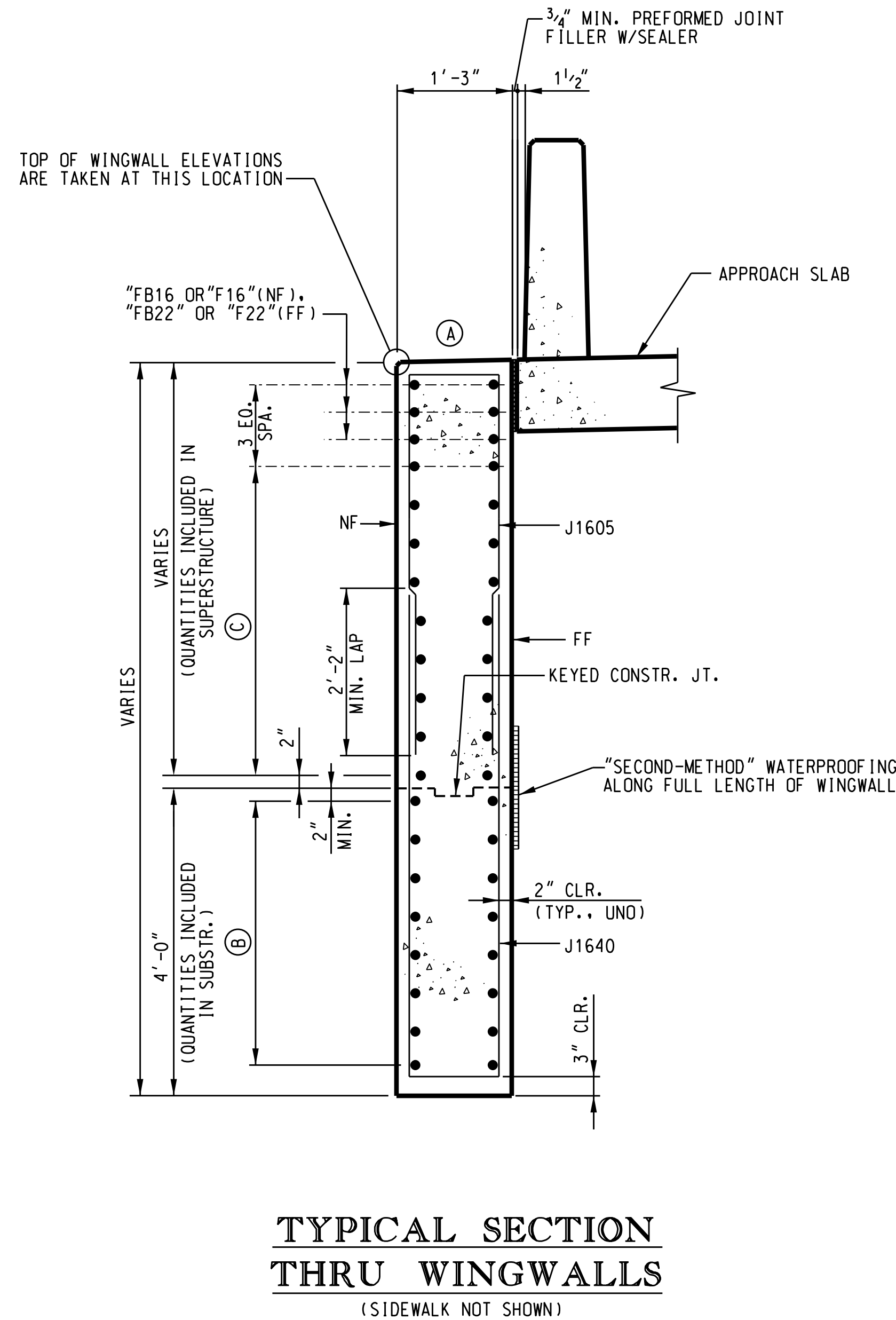
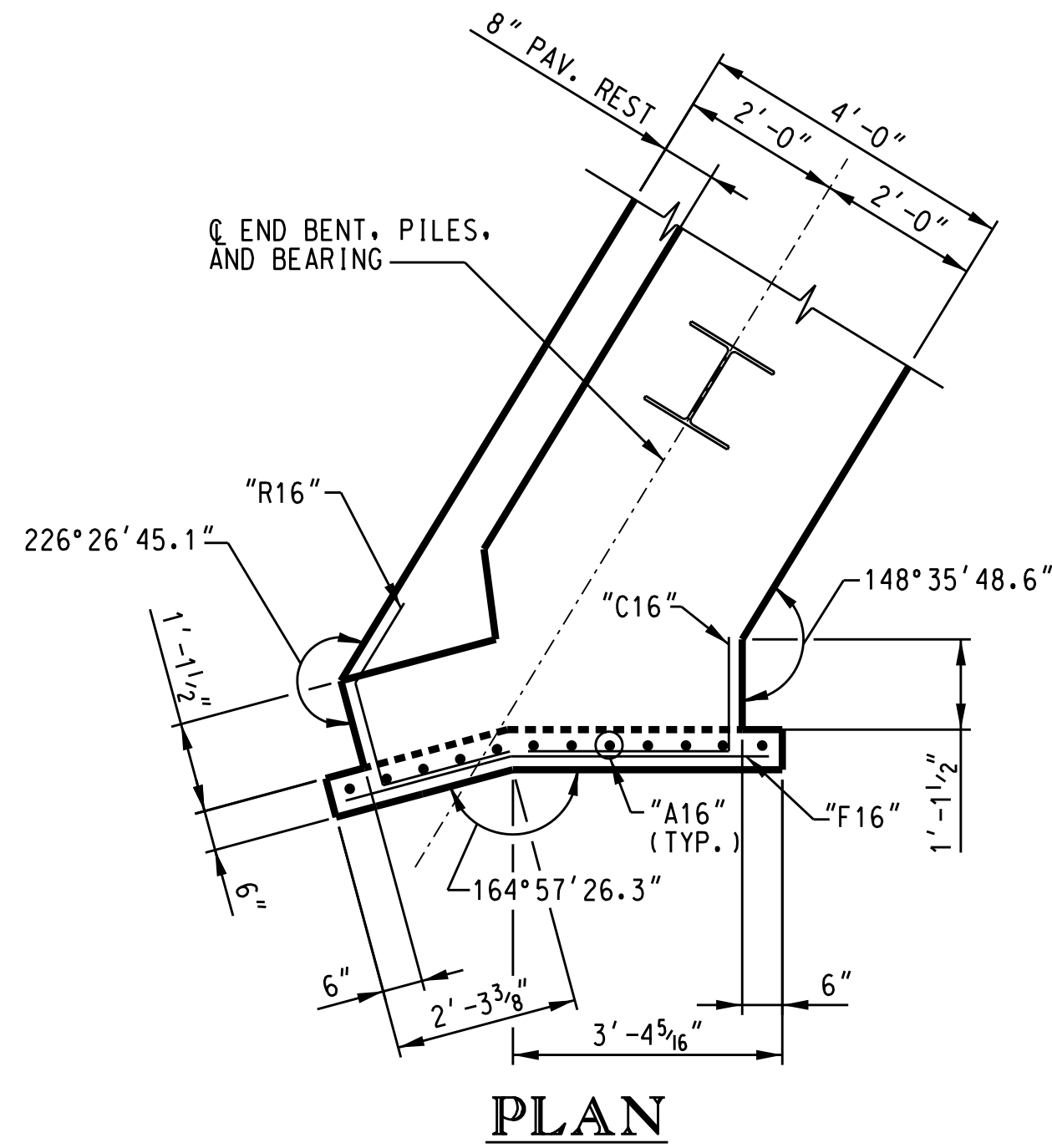
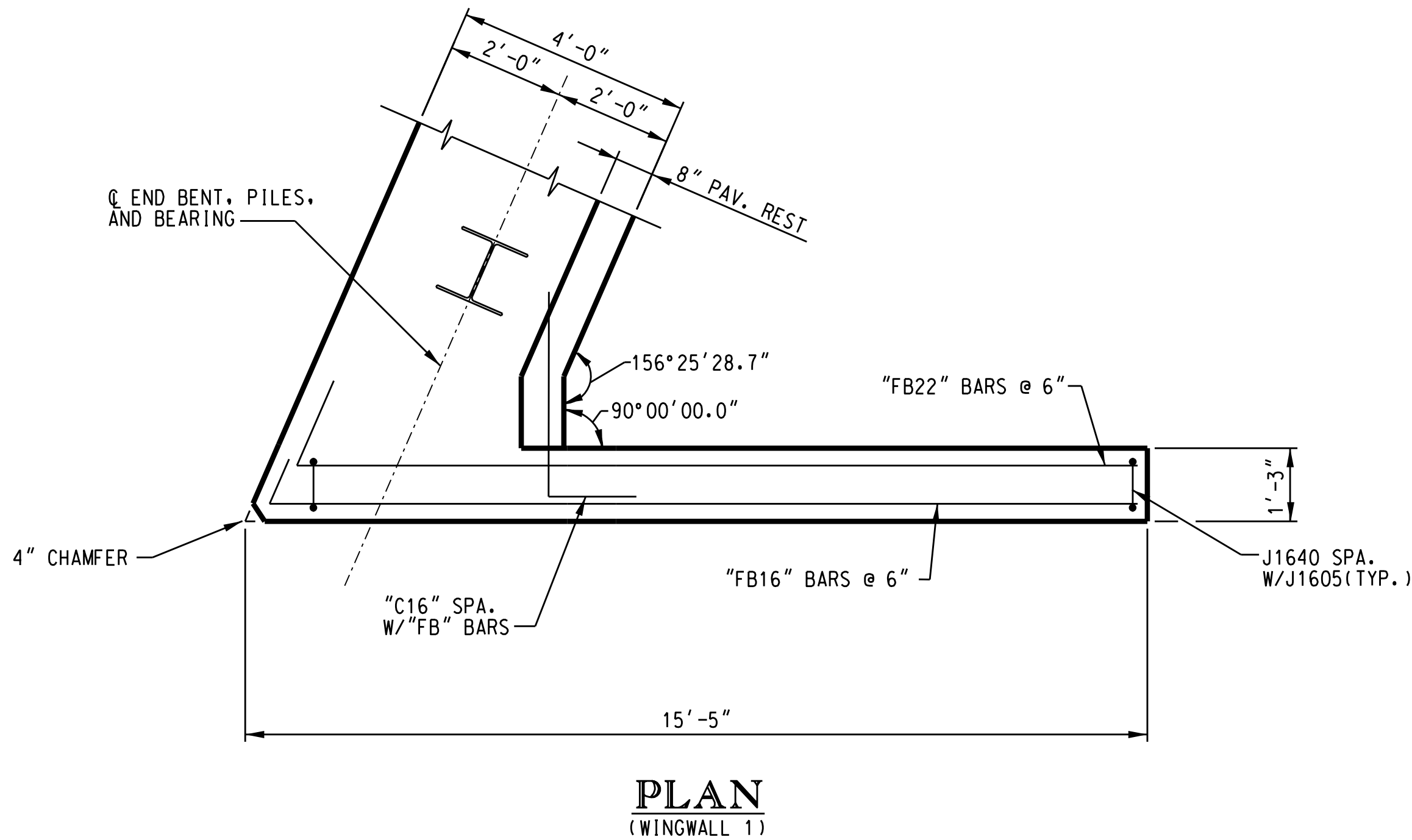
**SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION**

END BENT DETAILS

US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

COUNTY	RICHLAND	ROUTE	US 176
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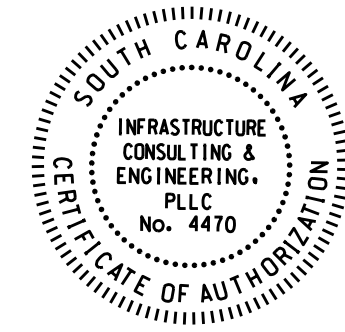
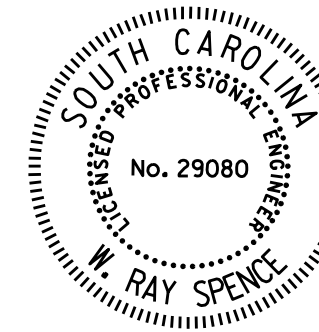
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DEVELOPED ELEVATION

BENT CAP REVEAL DETAILS

- ① SLOPE AT 2% AWAY FROM APPROACH SLAB.
- ② 8-FB1640(NF) AND 8-FB2240(FF) SPA. @ 6"(WW1)
8-F1641(NF) AND 8-F2241(FF) SPA. @ 6"(WW3)
8-F1640(NF) AND 8-F2240(FF) SPA. @ 6"(WW4)
- ③ 9-FB1600(NF) AND 9-FB2200(FF) SPA. @ 6" = 4'-0"(WW1)
10-F1601(NF) AND 10-F2201(FF) SPA. @ 6" = 4'-6"(WW3)
10-F1602(NF) AND 10-F2202(FF) SPA. @ 6" = 4'-6"(WW4)



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QUAN.	
DR.	RMH WRS 07-22
DES.	ALP WRS 07-22
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SOUTH CAROLINA
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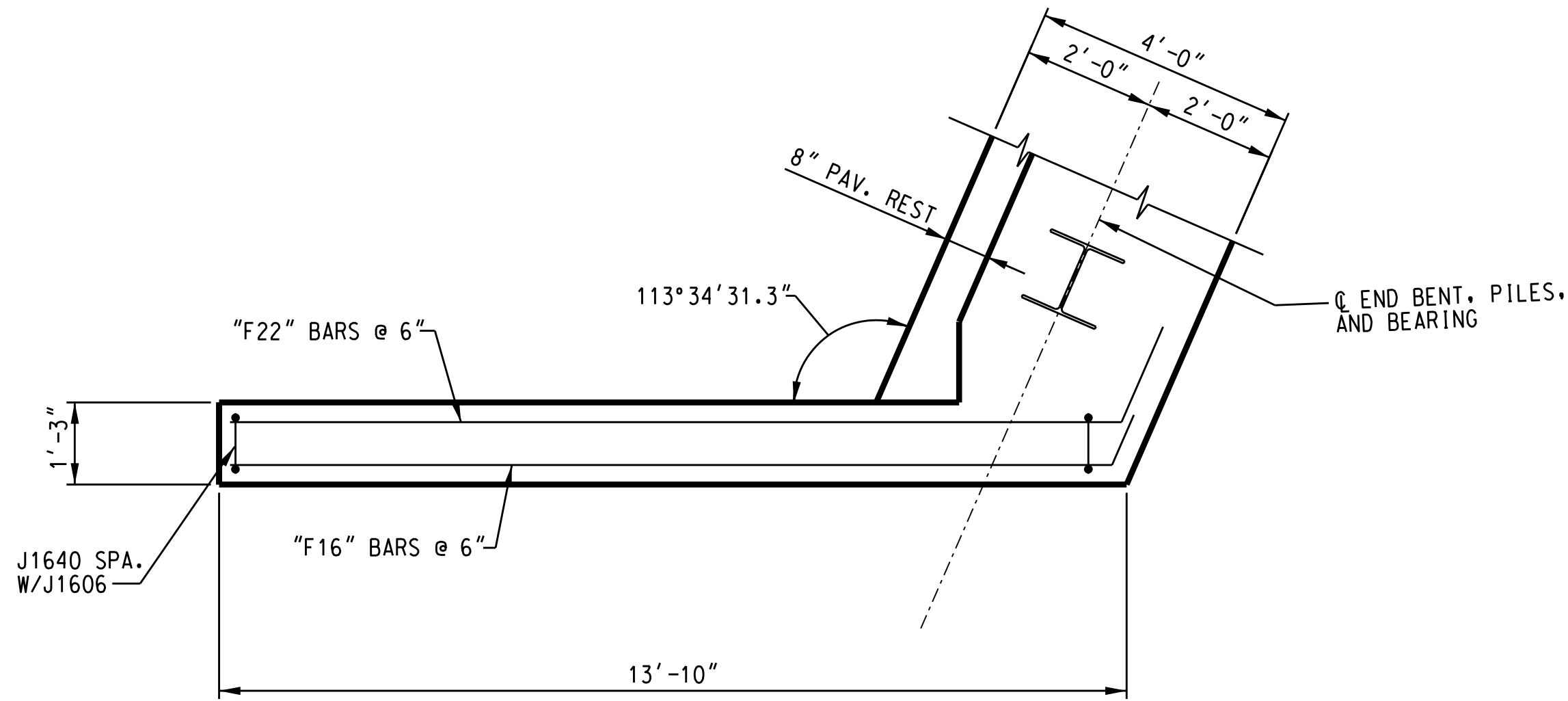
WINGWALL DETAILS (1)

US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

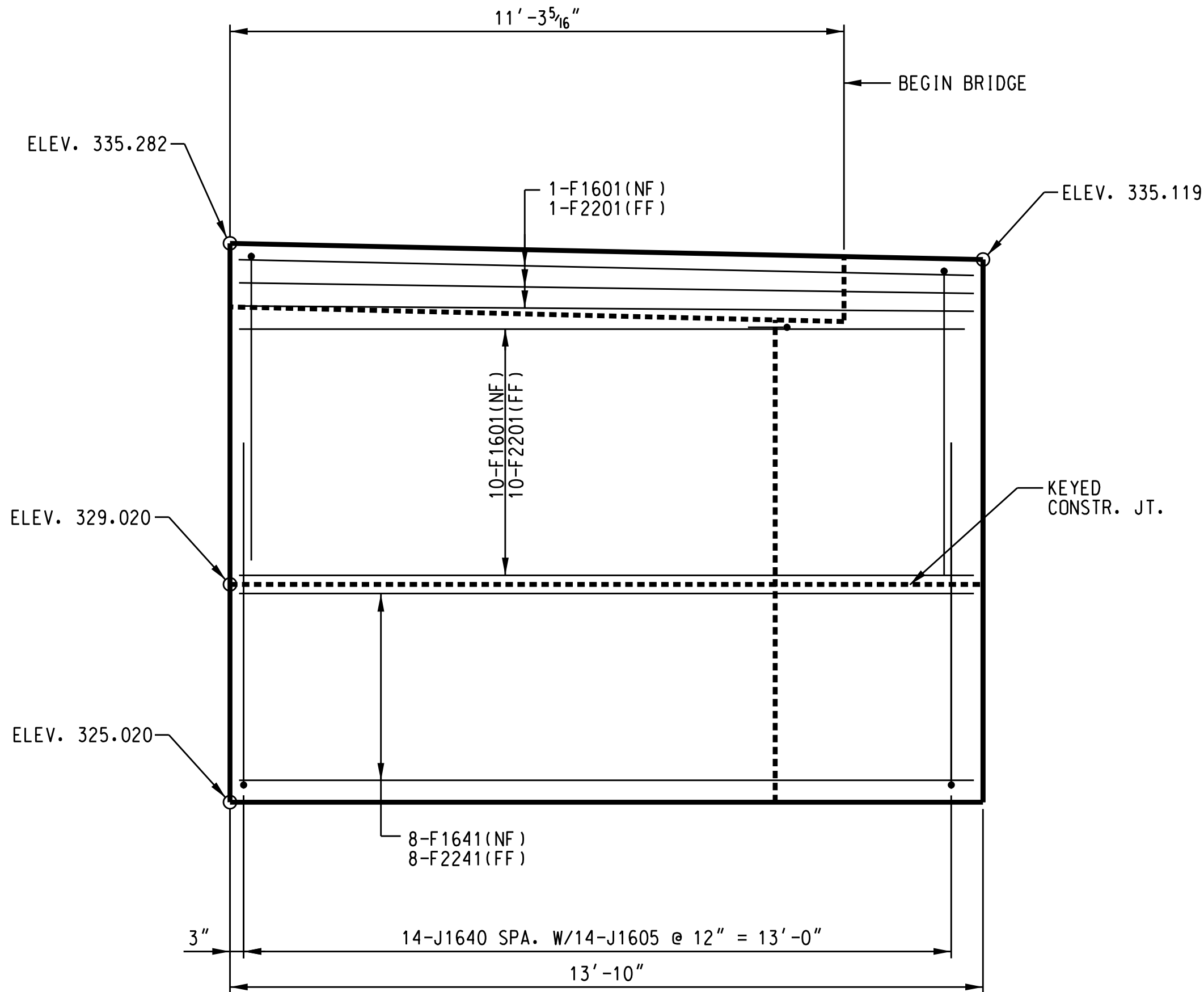
COUNTY RICHLAND ROUTE US 176

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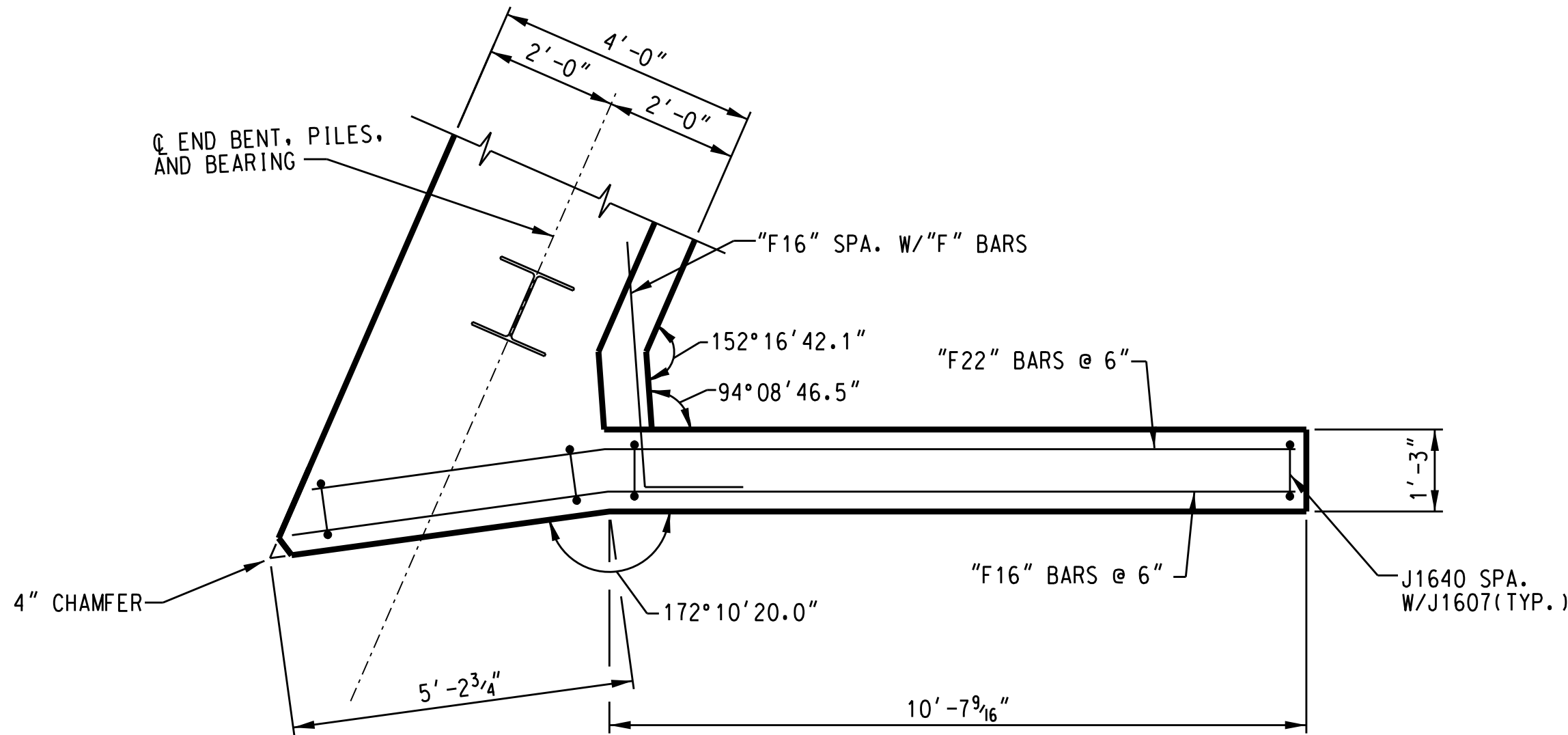
NOTES:
SEE "WINGWALL DETAILS (1)" FOR
TYPICAL SECTION THRU WINGWALLS.



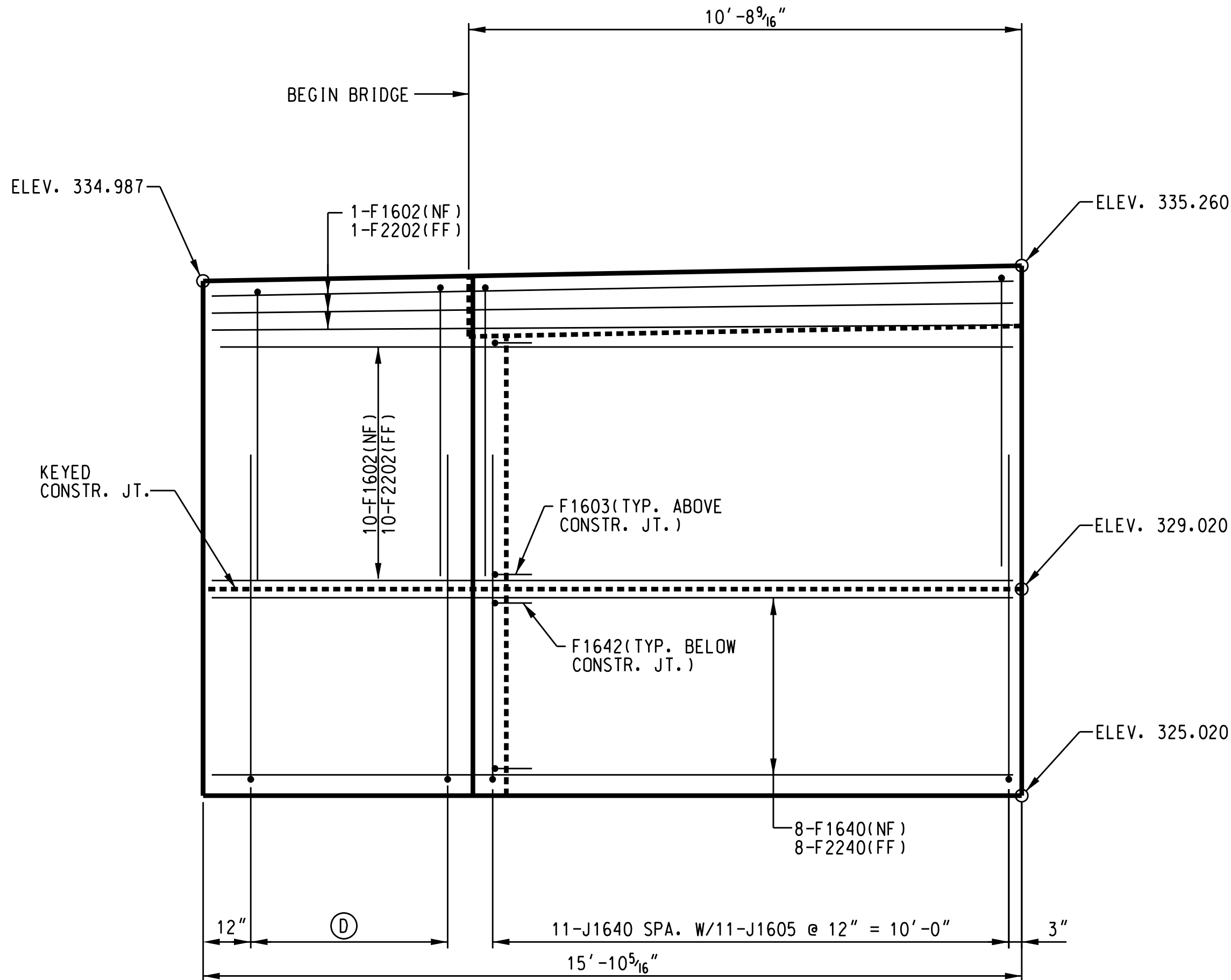
PLAN
(WINGWALL 3)



ELEVATION
(WINGWALL 3)

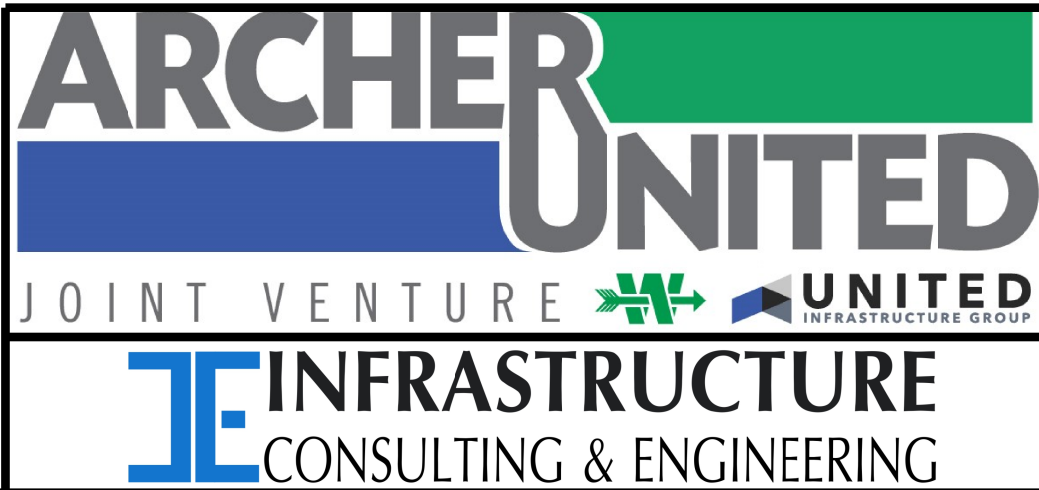


PLAN
(WINGWALL 4)



ELEVATION
(WINGWALL 4)

① 5-J1640 SPA. W/5-J1605 @ EQ. SPA.

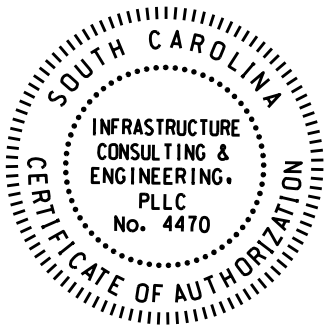
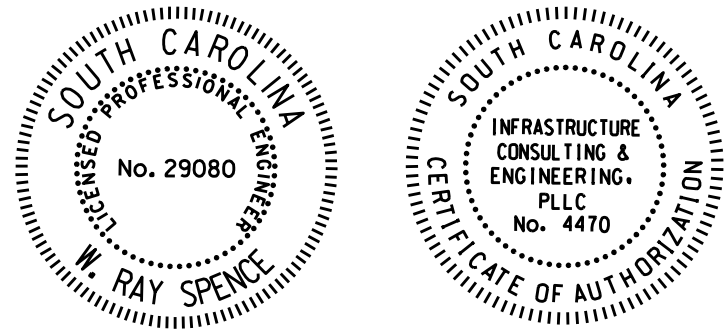


**SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION**

WINGWALL DETAILS (2)

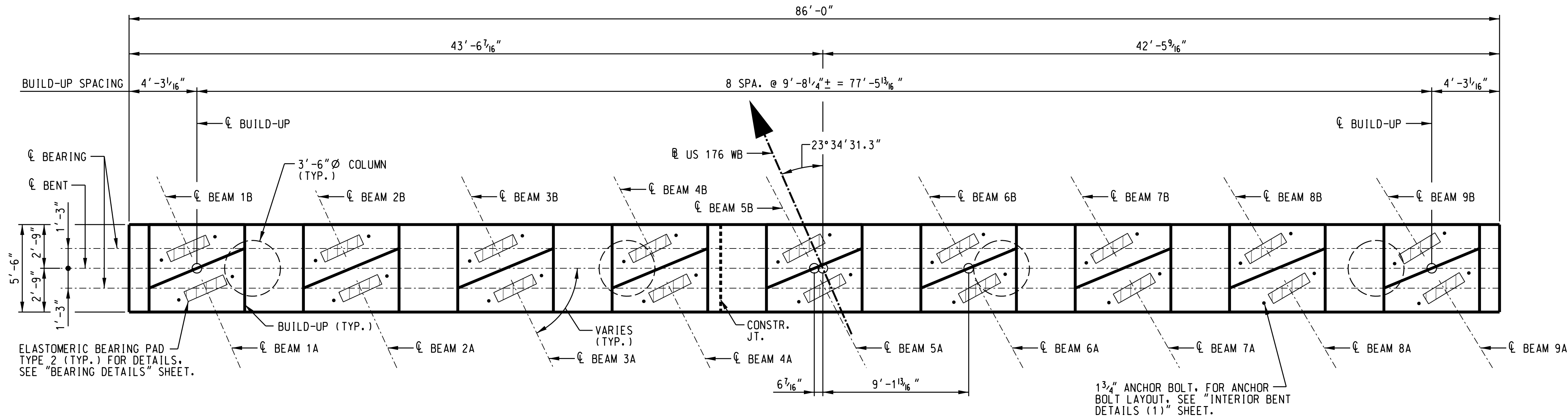
US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

COUNTY RICHLAND ROUTE US 176

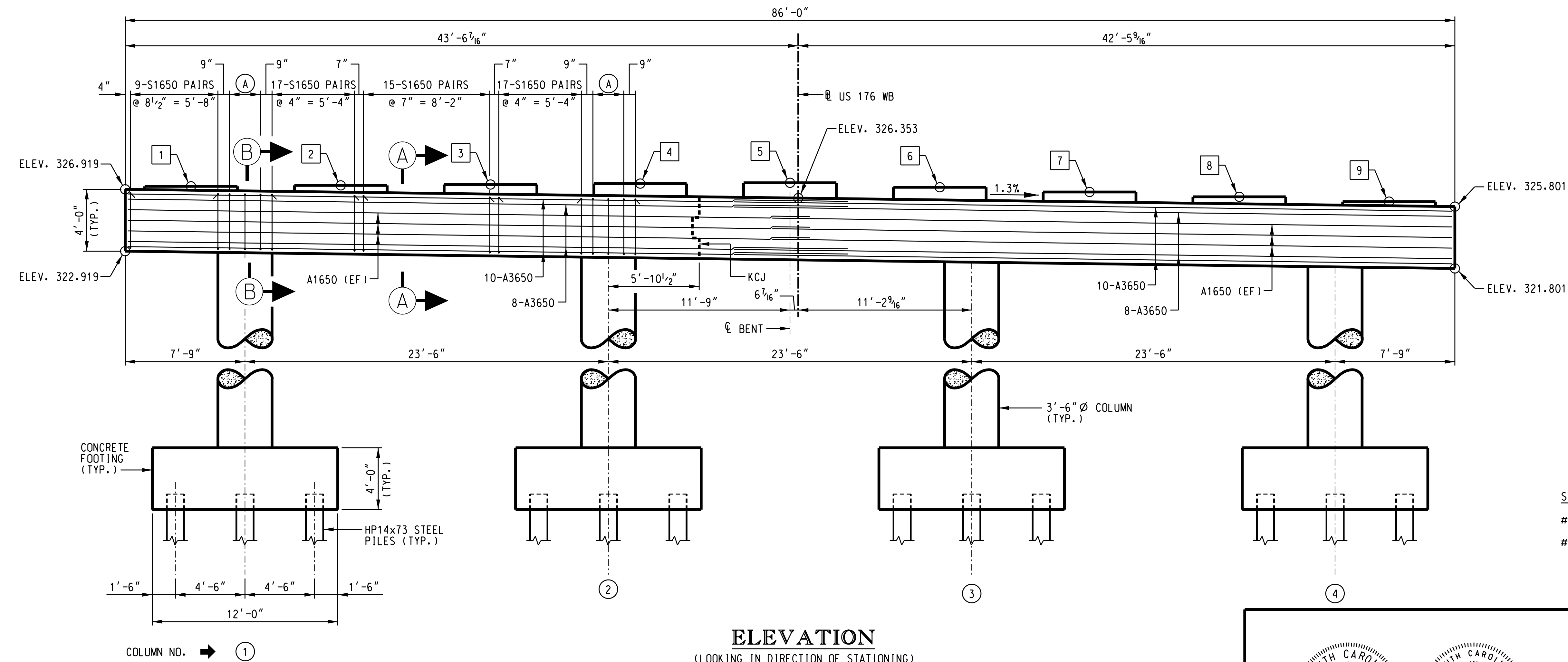


REV.		
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REVIEWED	WRS	09-22
QUAN.		
DR.	RMH	WRS 07-22
DES.	ALP	WRS 07-22
BY	CHK.	DATE

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PLAN



ELEVATION
(LOOKING IN DIRECTION OF STATIONING)

NOTES:

EF - DENOTES EACH FACE

KCJ - DENOTES KEYED CONSTRUCTION JOINT. SHIFT S1650 BARS AS NECESSARY TO PROVIDE 2" CLR. TO KCJ.

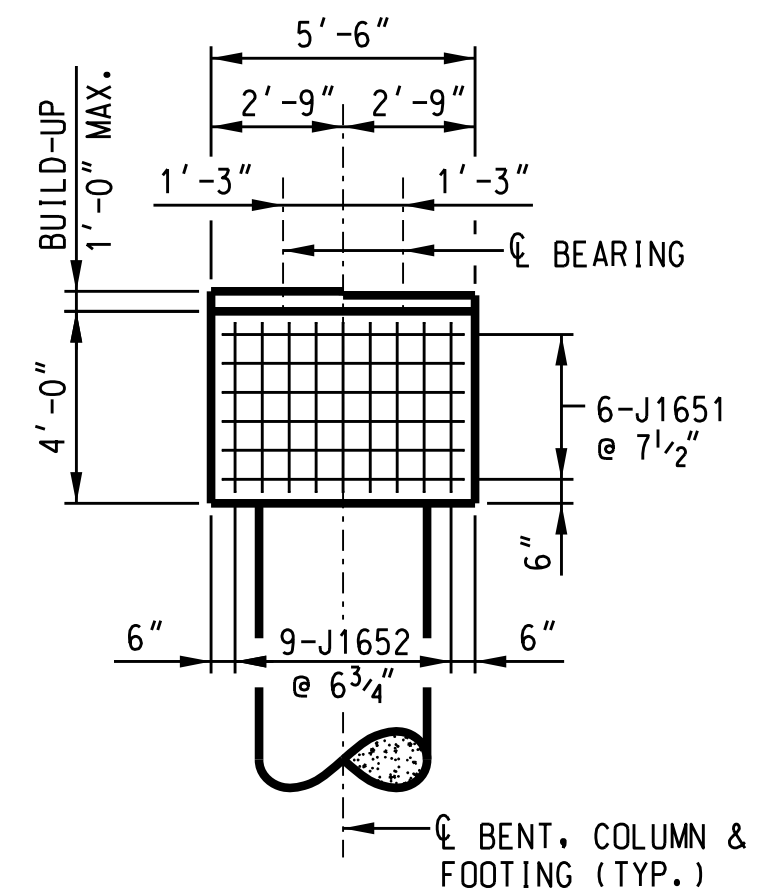
BARS MAY BE SHIFTED SLIGHTLY TO CLEAR COLUMN BARS.

FOR SECTIONS A-A AND B-B, SEE "INTERIOR BENT DETAILS (1)" SHEET.

FOR BUILD-UP DETAILS, SEE "INTERIOR BENT DETAILS (1)" SHEET.

A 3-J1650 PAIRS @ 12" = 2'-0"

BUILD-UP ELEVATIONS		
BEAM LINE	SPAN A	SPAN B
1	327.114	327.195
2	327.175	327.257
3	327.233	327.317
4	327.289	327.374
5	327.343	327.429
6	327.053	327.151
7	326.746	326.847
8	326.436	326.541
9	326.124	326.232



END ELEVATION

SPLICE LENGTHS:
#16 BARS = 2'-7"
#36 BARS = 7'-6"

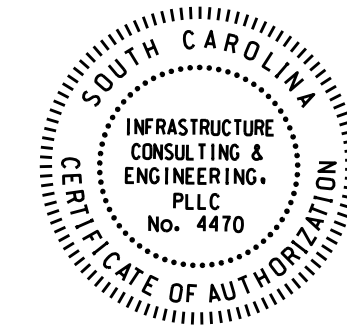
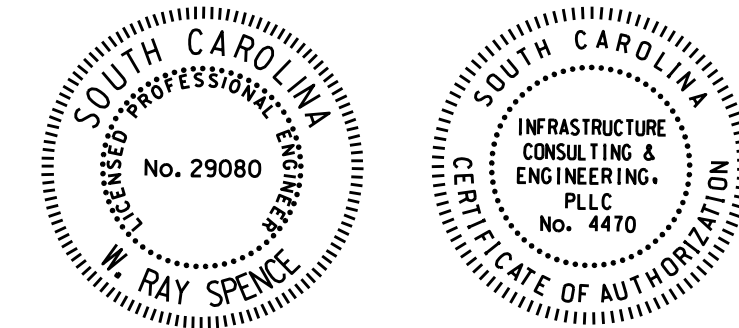


SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

INTERIOR BENT 2

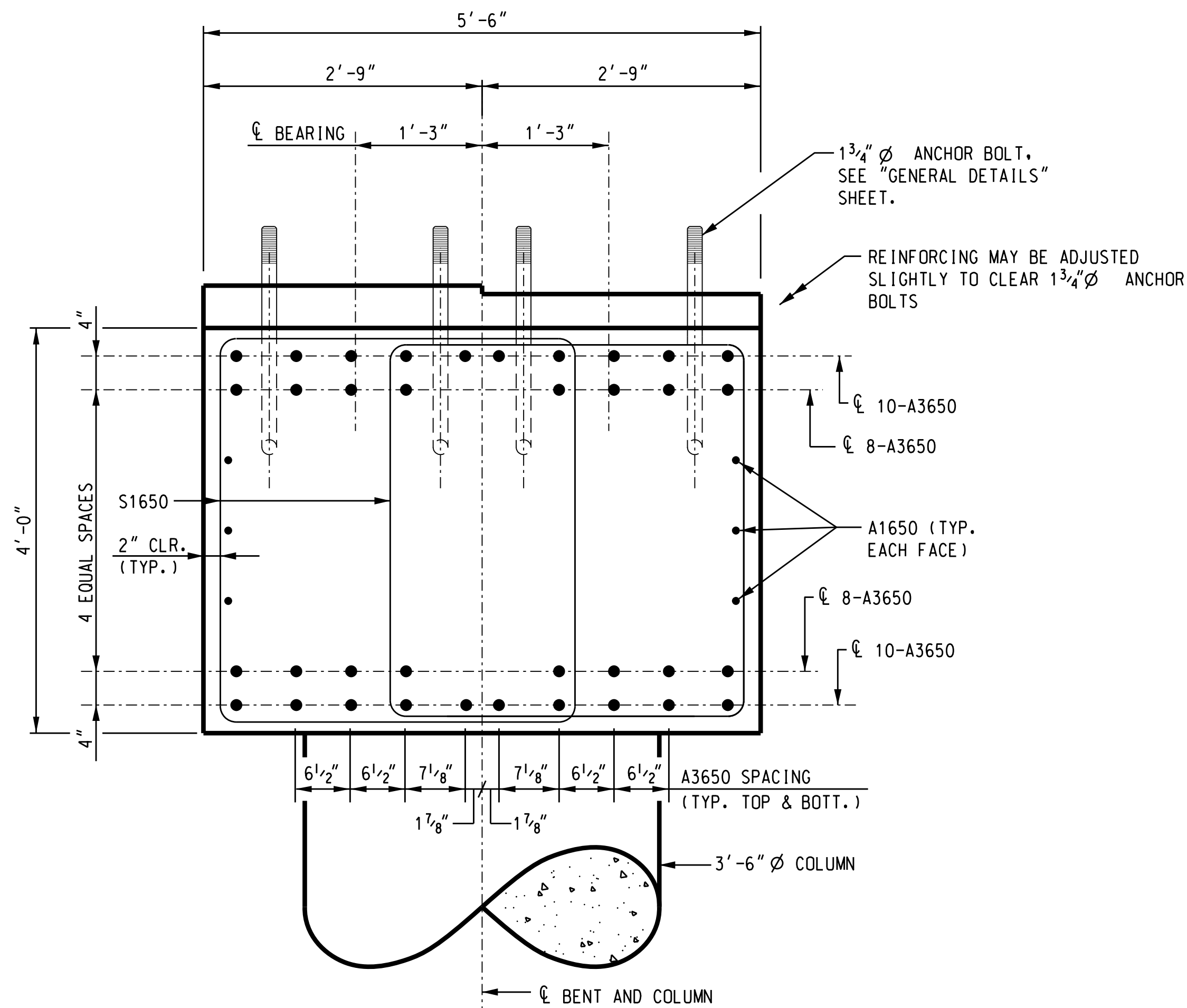
US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

COUNTY RICHLAND ROUTE US 176

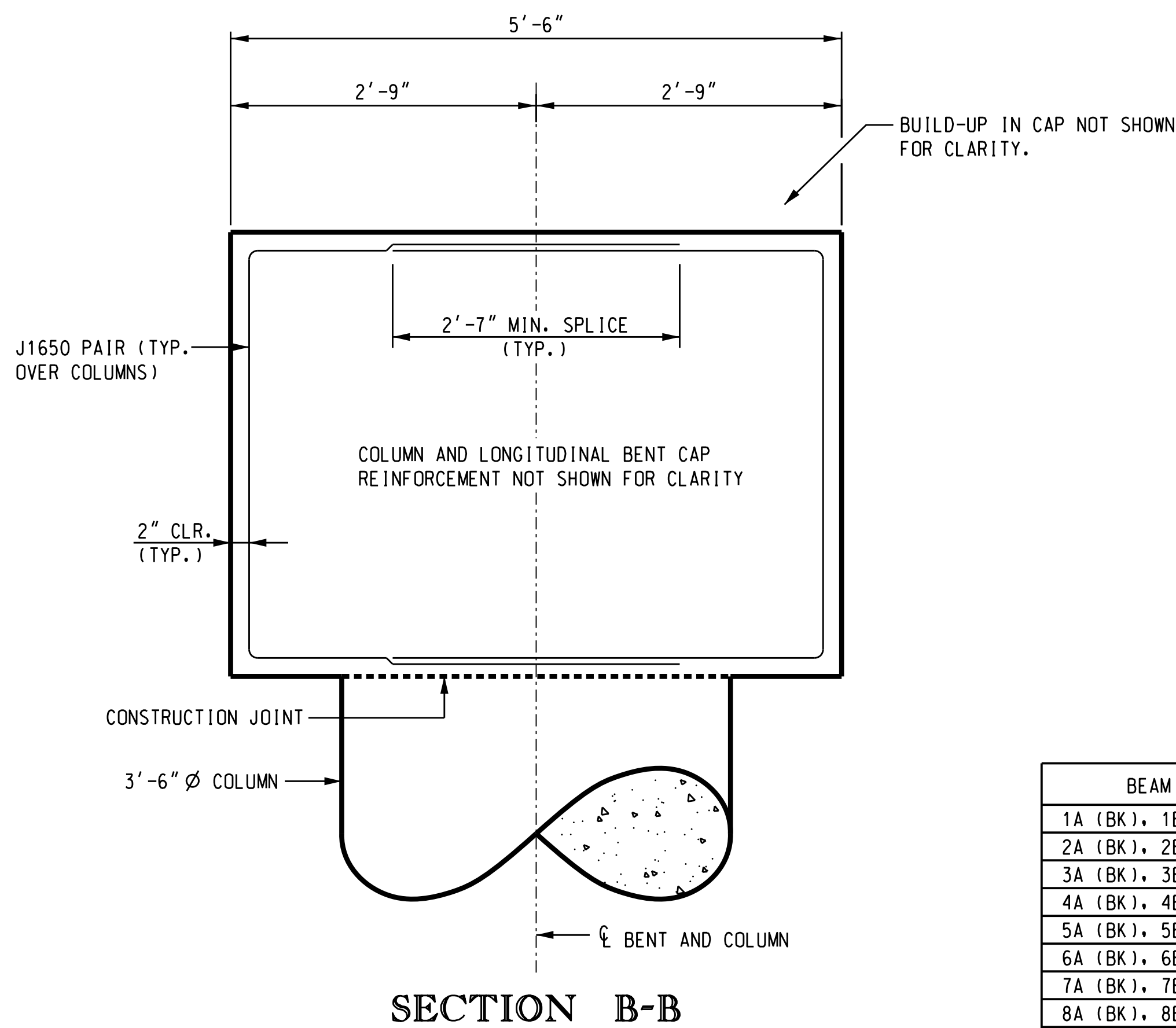


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DES.	WRS ALP 07-22
BY	CHK. DATE

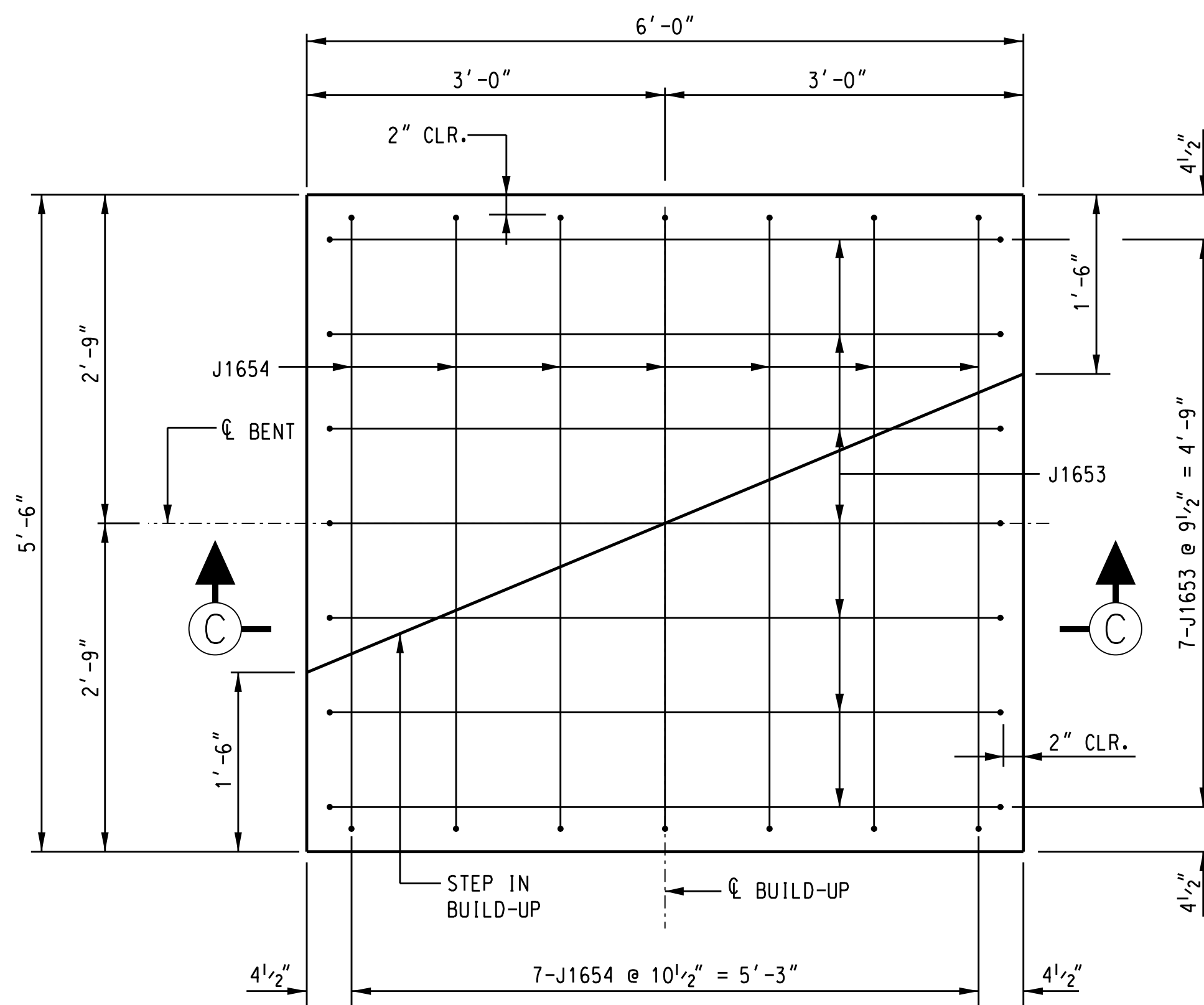
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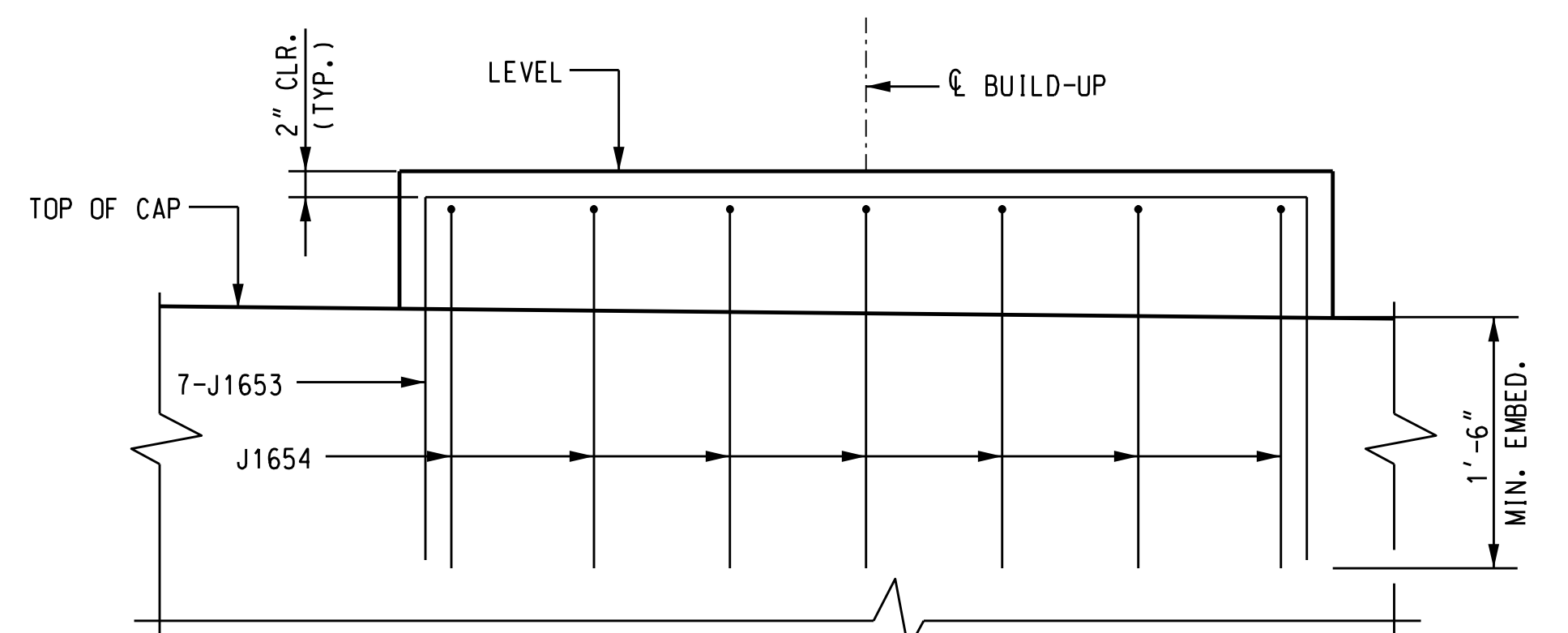
SECTION A-A



SECTION B-B



PLAN OF BUILD-UP



SECTION C-C

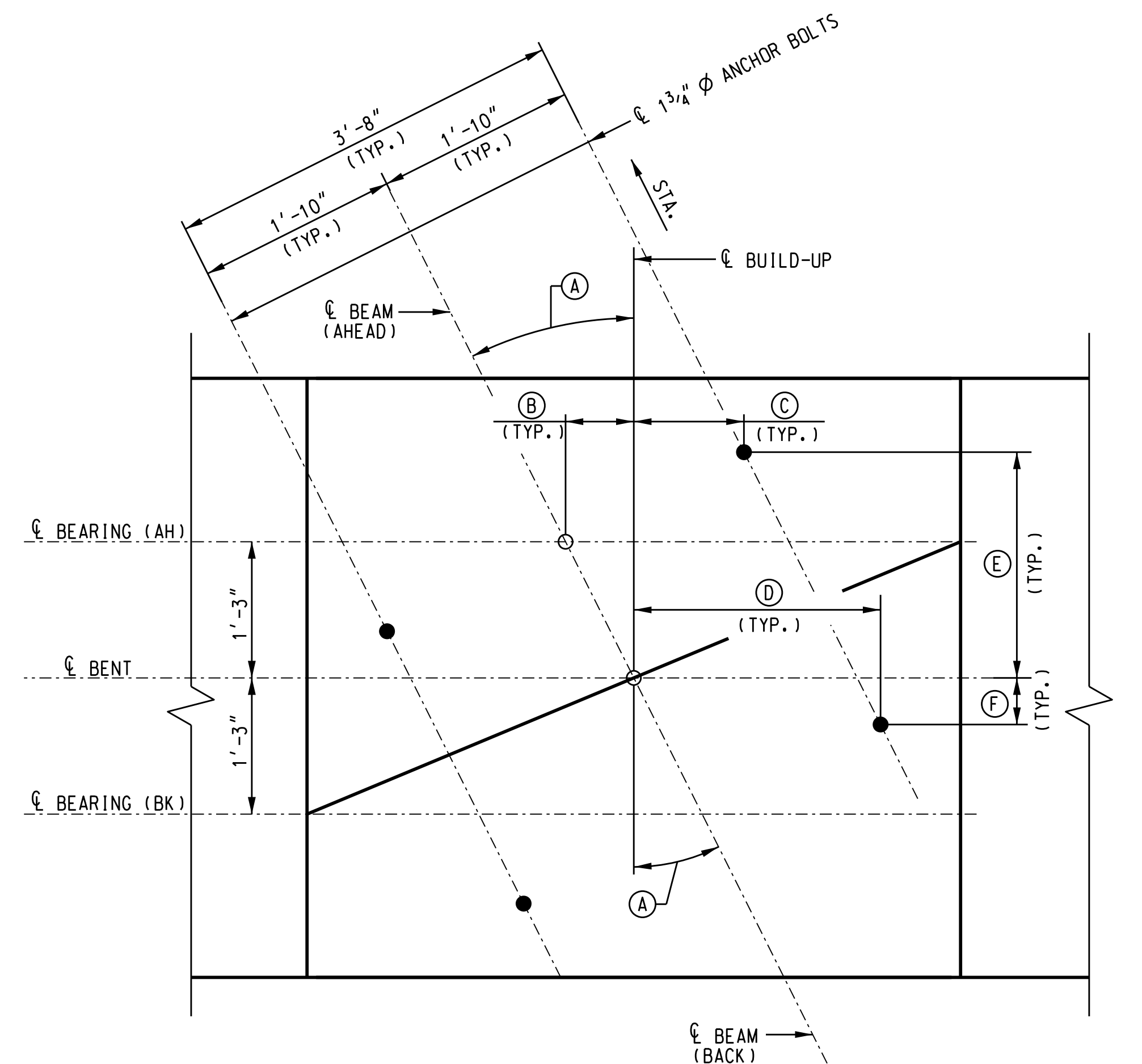
BUILD-UP DETAILS

(OMIT BUILD-UP REINFORCEMENT AT BEAM LINES 1 & 9)

BEAM	ANGLE (A)	DIM. (B)	DIM. (C)	DIM. (D)	DIM. (E)	DIM. (F)
1A (BK), 1B (AH)	23°34'31.3"	6 ⁹ / ₁₆ "	1'-1 ⁵ / ₈ "	2'-2 ¹¹ / ₁₆ "	1'-11 ¹³ / ₁₆ "	6 ³ / ₁₆ "
2A (BK), 2B (AH)	24°36'51.4"	6 ¹ / ₈ "	1'-1 ¹ / ₈ "	2'-2 ¹ / ₈ "	2'-0 ³ / ₁₆ "	5 ¹³ / ₁₆ "
3A (BK), 3B (AH)	25°38'10.9"	7 ³ / ₁₆ "	1'-0 ⁵ / ₈ "	2'-3 ¹ / ₁₆ "	2'-0 ¹ / ₂ "	5 ¹ / ₂ "
4A (BK), 4B (AH)	26°38'28.5"	7 ¹ / ₂ "	1'-0 ¹ / ₈ "	2'-3 ³ / ₁₆ "	2'-0 ¹ / ₈ "	5 ¹ / ₈ "
5A (BK), 5B (AH)	27°37'43.5"	7 ⁷ / ₈ "	11 ⁵ / ₈ "	2'-3 ⁵ / ₁₆ "	2'-1 ³ / ₁₆ "	4 ¹³ / ₁₆ "
6A (BK), 6B (AH)	28°35'55.5"	8 ³ / ₁₆ "	11 ¹ / ₈ "	2'-3 ¹ / ₂ "	2'-1 ¹ / ₂ "	4 ¹ / ₂ "
7A (BK), 7B (AH)	29°33'04.2"	8 ¹ / ₂ "	10 ⁵ / ₈ "	2'-3 ⁵ / ₈ "	2'-1 ¹ / ₈ "	4 ¹ / ₈ "
8A (BK), 8B (AH)	30°29'09.5"	8 ¹³ / ₁₆ "	10 ¹ / ₈ "	2'-3 ¹³ / ₁₆ "	2'-2 ³ / ₁₆ "	3 ¹³ / ₁₆ "
9A (BK), 9B (AH)	31°24'11.4"	9 ³ / ₁₆ "	9 ⁵ / ₈ "	2'-3 ⁵ / ₁₆ "	2'-2 ¹ / ₁₆ "	3 ³ / ₁₆ "

ESTIMATED QUANTITIES - INTERIOR BENT 2		
ITEM	UNIT	QTY.
WET & DRY EXCAVATION FOR BRIDGES	CY	359
CONCRETE FOR STRUCTURES, CLASS 4000	CY	189.7
REINFORCING STEEL FOR STRUCTURES (BRIDGE) (1)	LBS.	44,532
HOOP REINFORCING STEEL FOR STRUCTURES (BRIDGE)	LBS.	2,741
DYNAMIC PILE ANALYZER TEST SET-UP	EACH	2
PILE DRIVING SET - UP	EACH	32
STEEL H BEARING PILING (HP14X73)	LF	1,655
STEEL H BEARING INDEX PILING (HP14X73)	LF	115
ELASTOMERIC BEARING	EACH	18

(1) INCLUDES 744 LBS. FOR ANCHOR BOLT ASSEMBLIES.
PILE QUANTITY IS BASED ON 1'-0" PILE EMBEDMENT.



ANCHOR BOLT LAYOUT



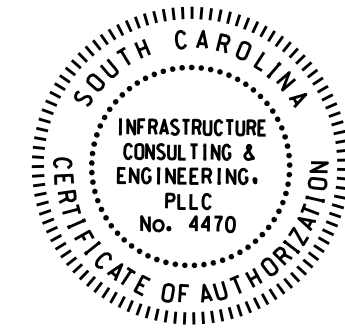
JOINT VENTURE
INFRASTRUCTURE CONSULTING & ENGINEERING

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

INTERIOR BENT DETAILS (1)

US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

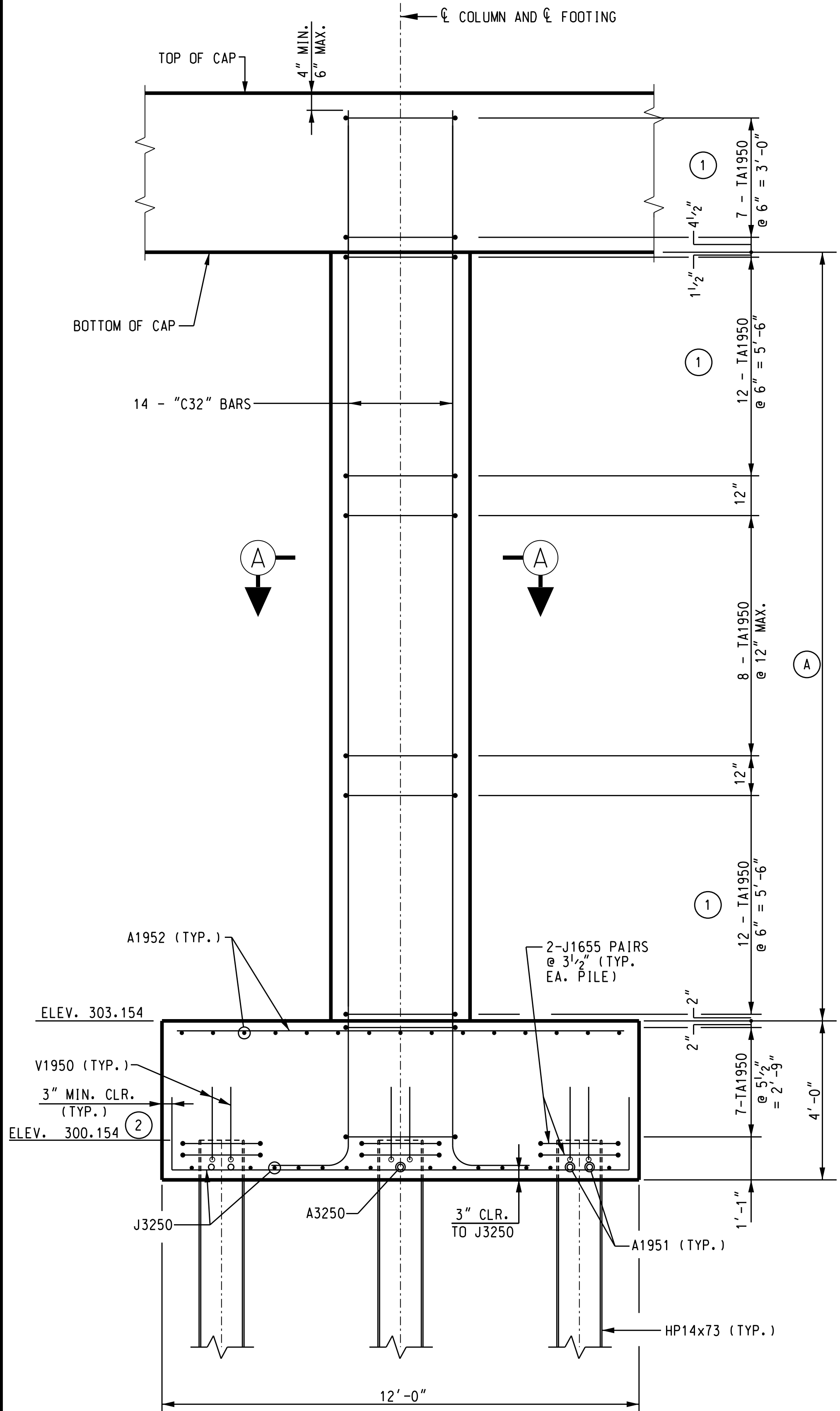
COUNTY RICHLAND ROUTE US 176



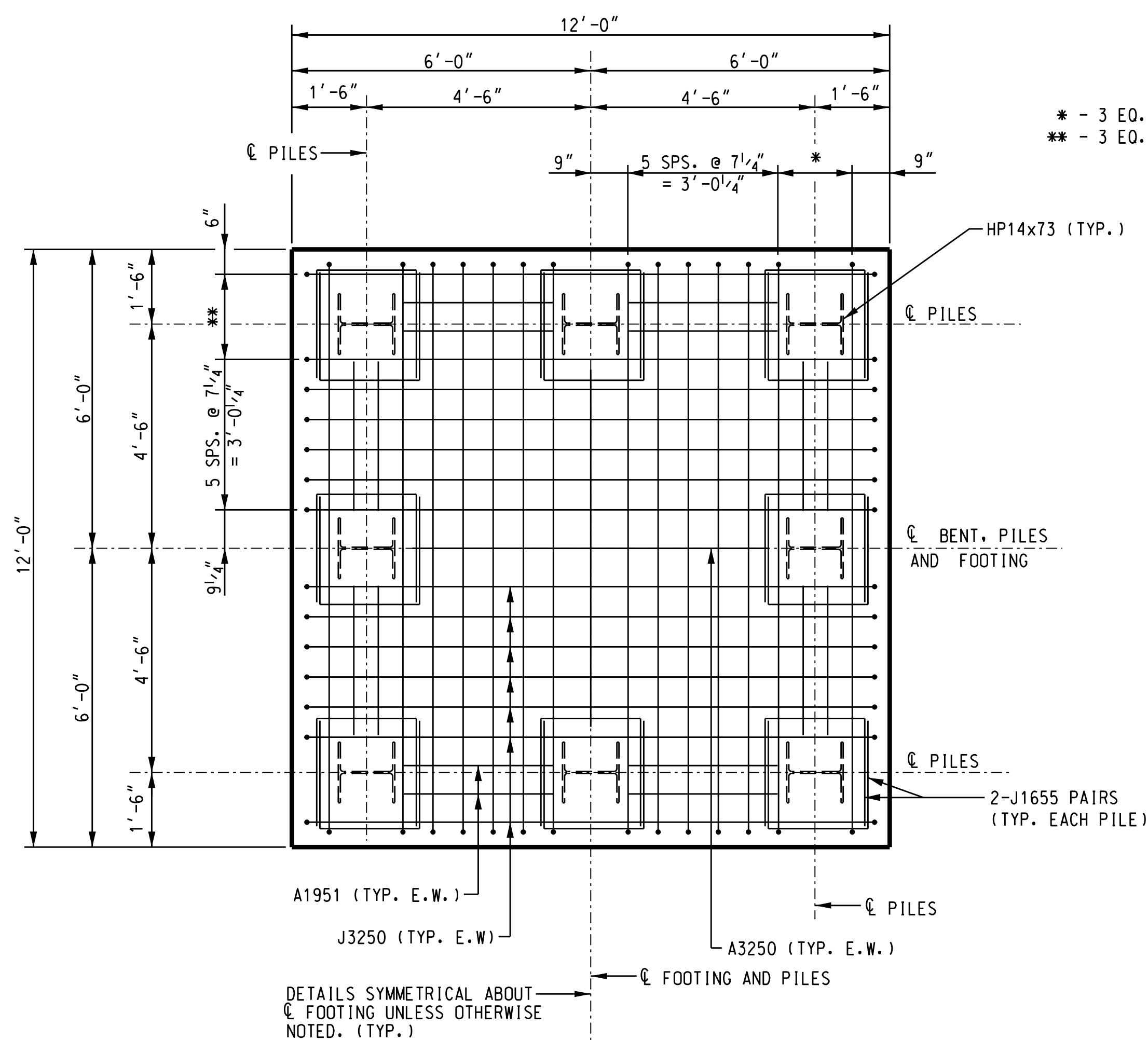
REV.	
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REVIEWED	WRS 09-22
QUAN.	WRS ALP 07-22
DR.	WRS ALP 07-22
DES.	WRS ALP 07-22
BY	CHK. DATE

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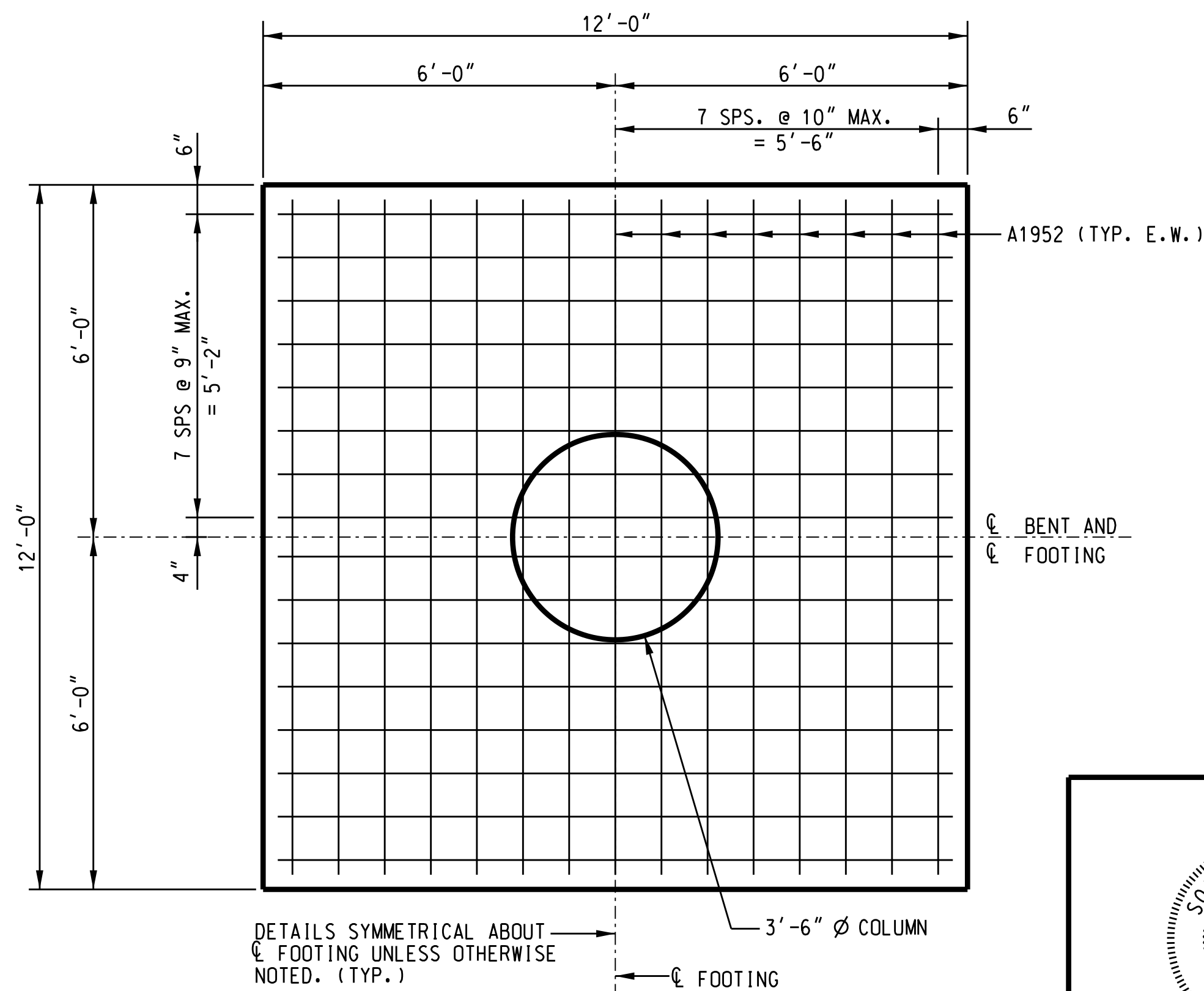
COLUMN NO.	Ⓐ DIM.
COLUMN 1	19'-7 ⁵ / ₁₆ "
COLUMN 2	19'-4 ⁵ / ₁₆ "
COLUMN 3	19'-0 ⁵ / ₈ "
COLUMN 4	18'-9"



COLUMN AND FOOTING ELEVATION



FOOTING PLAN - BOTTOM MAT



FOOTING PLAN - TOP MAT

* - 3 EQ. SPS. = 1'-5³/₄"
** - 3 EQ. SPS. = 1'-8¹/₂"

NOTES:

THE LOCATION OF WELDED SPLICES ON ADJACENT HOOPS SHALL BE STAGGERED AROUND PERIMETER OF COLUMN BY A MINIMUM OF 1/2 OF THE HOOP CIRCUMFERENCE.

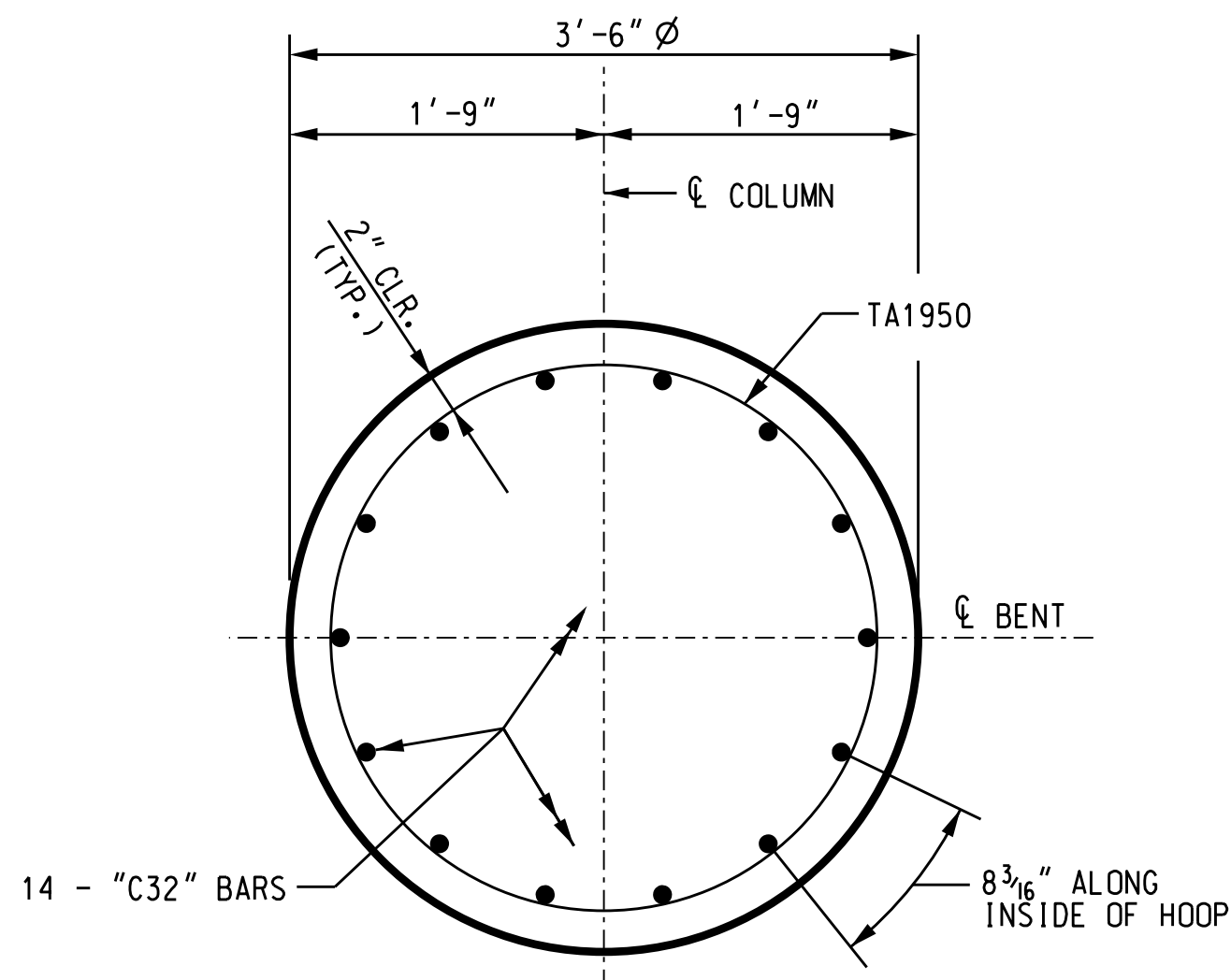
- NO SPLICE ALLOWED IN LONGITUDINAL REINFORCING STEEL.
- PILE EMBED = 1'-6" MAX., 1'-0" MIN.

SHIFT TA1950 BARS TO AVOID FOOTING REINFORCING.

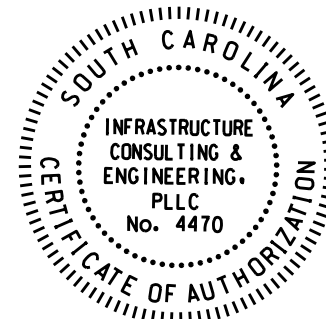
SHIFT A1952 BARS TO AVOID VERTICAL COLUMN REINFORCEMENT.

FOR STEEL H-PILE ANCHORAGE DETAIL, SEE "GENERAL DETAILS" SHEET.

E.W. - DENOTES EACH WAY



SECTION A-A



REV.	
REV.	
REV.	
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DES.	WRS ALP 07-22
BY	CHK. DATE



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SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

INTERIOR BENT DETAILS (2)

US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

COUNTY RICHLAND



ROUTE US 176

BRIDGE PLANS ID	SHEET NO.
P039719-B42a	28

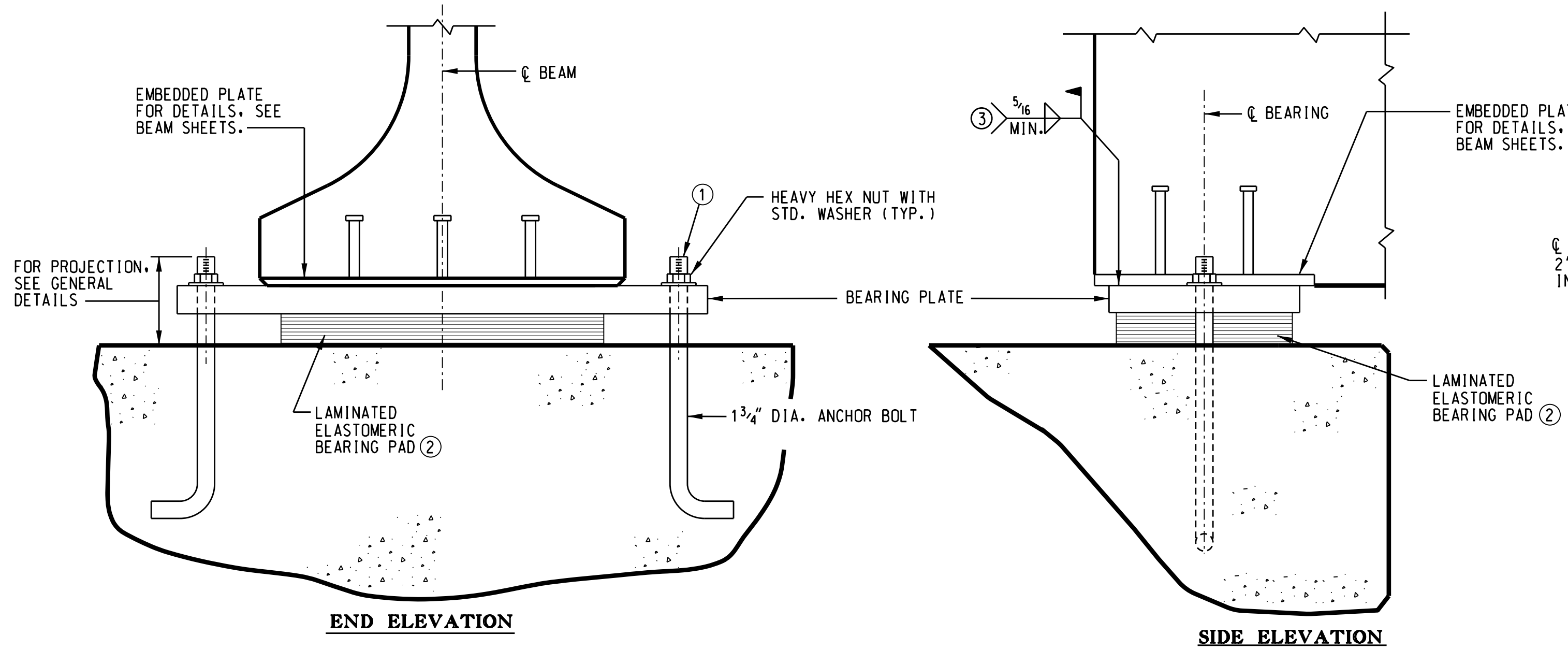
END BENT 1							
REINFORCING STEEL SCHEDULE							
LOCATION	MARK	NO. REQ'D	DIMENSION				LENGTH
			"a"	"b"	"c"	"d"	
CAP	A1640	20	55'-2"	-----	-----	-----	55'-2"
CAP	A1642	12	6'-10 1/8"	-----	-----	-----	6'-10"
			-----	-----	-----	-----	
CAP	A2940	12	56'-6"	-----	-----	-----	56'-6"
			-----	-----	-----	-----	
CAP	A3240	12	57'-1"	-----	-----	-----	57'-1"
			-----	-----	-----	-----	
CAP	B1640	210	6'-6"	0'-7"	-----	-----	7'-1"
			-----	-----	-----	-----	
CAP REVEAL	C1640	8	2'-6"	1'-6"	-----	-----	4'-0"
			-----	-----	-----	-----	
CAP	C1641	8	3'-6"	1'-6"	-----	-----	5'-0"
			-----	-----	-----	-----	
CAP REVEAL	F1640	8	3'-2 1/2"	2'-1 5/8"	2'-0 3/4"	0'-6 5/8"	5'-4"
			-----	-----	-----	-----	
WINGWALL 1	FB1640	8	14'-10"	0'-10"	0'-4"	0'-9 1/4"	15'-8"
			-----	-----	-----	-----	
WINGWALL 1	FB2240	8	14'-4"	1'-7"	0'-7 1/2"	1'-5 3/8"	15'-11"
			-----	-----	-----	-----	
WINGWALL 1	J1640	15	0'-11"	7'-1"	-----	-----	15'-1"
BUILD-UP	J1641	54	3'-8"	2'-3 5/8"	-----	-----	8'-3"
BUILD-UP	J1642	45	4'-4"	2'-3 5/8"	-----	-----	8'-11"
			-----	-----	-----	-----	
CAP	J2240	12	6'-7"	0'-10"	-----	-----	8'-3"
			-----	-----	-----	-----	
CAP REVEAL	R1640	8	1'-7 5/8"	1'-4"	1'-2"	0'-10 1/8"	4'-2"
			-----	-----	-----	-----	
CAP	S1640	123	3'-8"	3'-7"	0'-8"	-----	15'-10"
CAP	S1641	1	3'-8 1/4"	3'-7"	0'-8"	-----	15'-11"
CAP	S1642	1	3'-9"	3'-7"	0'-8"	-----	16'-0"
CAP	S1643	2	3'-10 1/4"	3'-7"	0'-8"	-----	16'-2"
CAP	S1644	1	4'-0"	3'-7"	0'-8"	-----	16'-6"
CAP	S1645	1	3'-8 1/2"	3'-7"	0'-8"	-----	15'-11"
CAP	S1646	1	4'-5 1/8"	3'-7"	0'-8"	-----	17'-4"
CAP	S1647	1	4'-3 1/2"	3'-7"	0'-8"	-----	17'-1"
CAP	S1648	1	4'-7 1/8"	3'-7"	0'-8"	-----	17'-8"
			-----	-----	-----	-----	
CAP	SA1640	13	3'-8"	3'-7"	0'-7"	-----	12'-0"
			-----	-----	-----	-----	
CAP	V1940	26	2'-2"	2'-2"	-----	-----	4'-4"
			-----	-----	-----	-----	
CAP	1 3/4" ANCHOR BOLT	18	-----	-----	-----	-----	2'-5 1/4"

INTERIOR BENT 2								
REINFORCING STEEL SCHEDULE								
LOCATION	MARK	NO. REQ'D	DIMENSION					LENGTH
			"a"	"b"	"c"	"d"	"e"	
CAP	A1650	12	44'-3"	-----	-----	-----	-----	44'-3"
FOOTING	A1951	64	3'-0"	-----	-----	-----	-----	3'-0"
FOOTING	A1952	124	11'-6"	-----	-----	-----	-----	11'-6"
FOOTING	A3250	8	7'-2"	-----	-----	-----	-----	7'-2"
CAP	A3650	72	46'-8"	-----	-----	-----	-----	46'-8"
COLUMN 1	C3250	14	26'-9"	1'-10"	-----	-----	-----	28'-7"
COLUMN 2	C3251	14	26'-5"	1'-10"	-----	-----	-----	28'-3"
COLUMN 3	C3252	14	26'-2"	1'-10"	-----	-----	-----	28'-0"
COLUMN 4	C3253	14	25'-10"	1'-10"	-----	-----	-----	27'-8"
CAP	J1650	24	3'-8"	3'-11"	-----	-----	-----	11'-6"
CAP	J1651	12	5'-0 1/2"	2'-0"	-----	-----	-----	9'-1"
CAP	J1652	18	3'-6 1/2"	2'-0"	-----	-----	-----	7'-6"
BUILD-UP	J1653	49	5'-8"	2'-4"	-----	-----	-----	10'-4"
BUILD-UP	J1654	49	5'-2"	2'-4"	-----	-----	-----	9'-10"
FOOTING	J1655	128	2'-0"	2'-2"	-----	-----	-----	6'-4"
FOOTING	J3250	112	11'-6"	1'-10"	-----	-----	-----	15'-2"
CAP	S1650	354	3'-6"	3'-8"	0'-8"	-----	-----	15'-8"
COLUMN	TA1950	184	3'-2"	-----	-----	-----	-----	9'-11"
FOOTING	V1950	64	2'-2"	2'-2"	-----	-----	-----	4'-4"
CAP	1 3/4" ANCHOR BOLT	36	-----	-----	-----	-----	-----	2'-6"

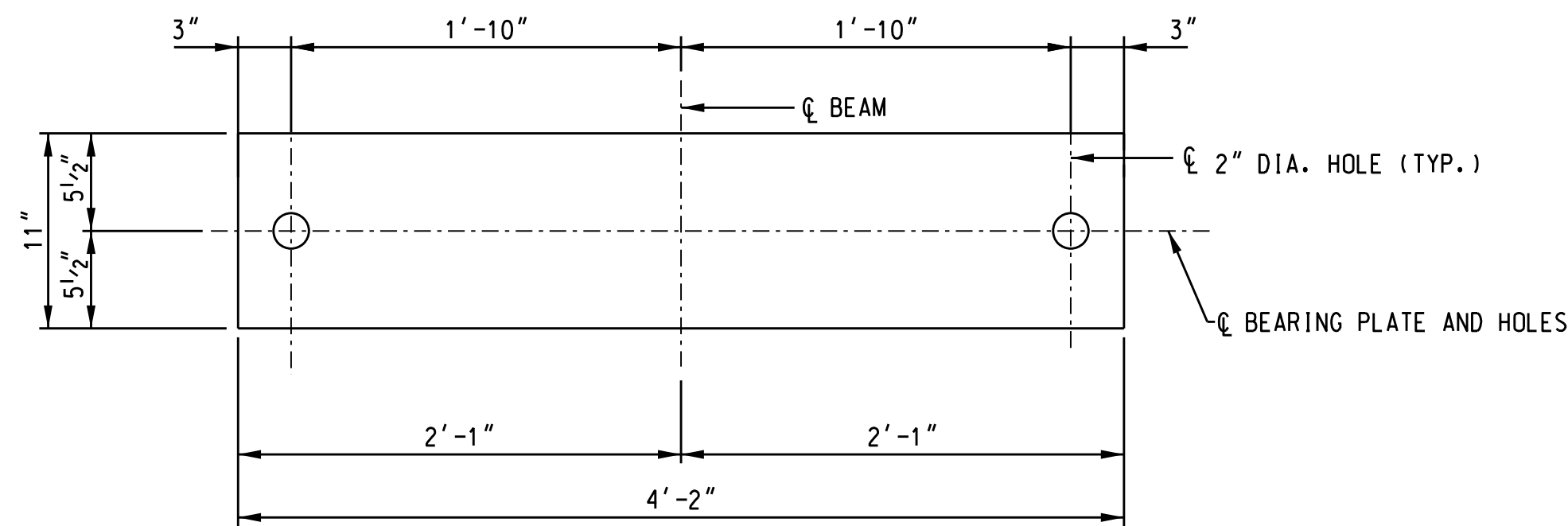
END BENT 3								
REINFORCING STEEL SCHEDULE								
LOCATION	MARK	NO. REQ'D	DIMENSION					LENGTH
			"a"	"b"	"c"	"d"	"e"	
CAP	A1640	20	36'-11"	-----	-----	-----	-----	36'-11"
			-----	-----	-----	-----	-----	
CAP	A2940	12	38'-2"	-----	-----	-----	-----	38'-2"
			-----	-----	-----	-----	-----	
CAP	A3240	12	38'-9"	-----	-----	-----	-----	38'-9"
			-----	-----	-----	-----	-----	
CAP	B1640	90	6'-6"	0'-7"	-----	-----	-----	7'-1"
			-----	-----	-----	-----	-----	
WINGWALL 4	F1640	8	10'-5 3/4"	4'-10 1/2"	4'-9 7/8"	0'-8"	-----	15'-4"
WINGWALL 3	F1641	8	13'-5 1/4"	0'-10"	0'-4"	0'-9 1/8"	-----	14'-3"
WINGWALL 4	F1642	8	3'-9"	1'-6"	0'-1 1/4"	1'-5 7/8"	-----	5'-3"
			-----	-----	-----	-----	-----	
WINGWALL 4	F2240	8	10'-6 3/8"	4'-6 1/8"	4'-5 5/8"	0'-7 3/8"	-----	15'-1"
WINGWALL 3	F2241	8	13'-7"	1'-7"	0'-7 5/8"	1'-5 3/8"	-----	15'-2"
			-----	-----	-----	-----	-----	
WINGWALLS	J1640	30	0'-11"	7'-1"	-----	-----	-----	15'-1"
BUILD-UP	J1641	54	3'-8"	2'-3 5/8"	-----	-----	-----	8'-3"
BUILD-UP	J1642	45	4'-4"	2'-3 5/8"	-----	-----	-----	8'-11"
			-----	-----	-----	-----	-----	
CAP	J2240	8	6'-6"	0'-10"	-----	-----	-----	8'-2"
			-----	-----	-----	-----	-----	
CAP	S1640	82	3'-8"	3'-7"	0'-8"	-----	-----	15'-10"
CAP	S1641	1	3'-8 1/2"	3'-7"	0'-8"	-----	-----	15'-11"
CAP	S1642	1	3'-10"	3'-7"	0'-8"	-----	-----	16'-2"
CAP	S1643	1	4'-0 3/8"	3'-7"	0'-8"	-----	-----	16'-7"
CAP	S1644	1	4'-3 1/2"	3'-7"	0'-8"	-----	-----	17'-1"
CAP	S1645	1	3'-8 1/4"	3'-7"	0'-8"	-----	-----	15'-11"
CAP	S1646	1	3'-9"	3'-7"	0'-8"	-----	-----	16'-0"
CAP	S1647	1	3'-10 1/4"	3'-7"	0'-8"	-----	-----	16'-2"
CAP	S1648	1	4'-0"	3'-7"	0'-8"	-----	-----	16'-6"
			-----	-----	-----	-----	-----	
CAP	SA1640	9	3'-8"	3'-7"	0'-7"	-----	-----	12'-0"
			-----	-----	-----	-----	-----	
CAP	V1940	18	2'-2"	2'-2"	-----	-----	-----	4'-4"
			-----	-----	-----	-----	-----	
CAP	1 3/4" ANCHOR BOLT	18	-----	-----	-----	-----	-----	2'-5 1/4"

 	REV.					SOUTH CAROLINA				DEPARTMENT OF TRANSPORTATION				
	REV.						<u>SUBSTRUCTURE</u> <u>REINFORCEMENT SCHEDULE</u> US 176 WB (BROAD RIVER RD.) BRIDGE OVER I-20							
	REV.													
	REVIEWED	WRS	09-22											
	QUAN.						COUNTY		RICHLAND		ROUTE US 176			
	DR.	RMH	WRS	08-22										
	DES.													
	BY	CHK.	DATE											

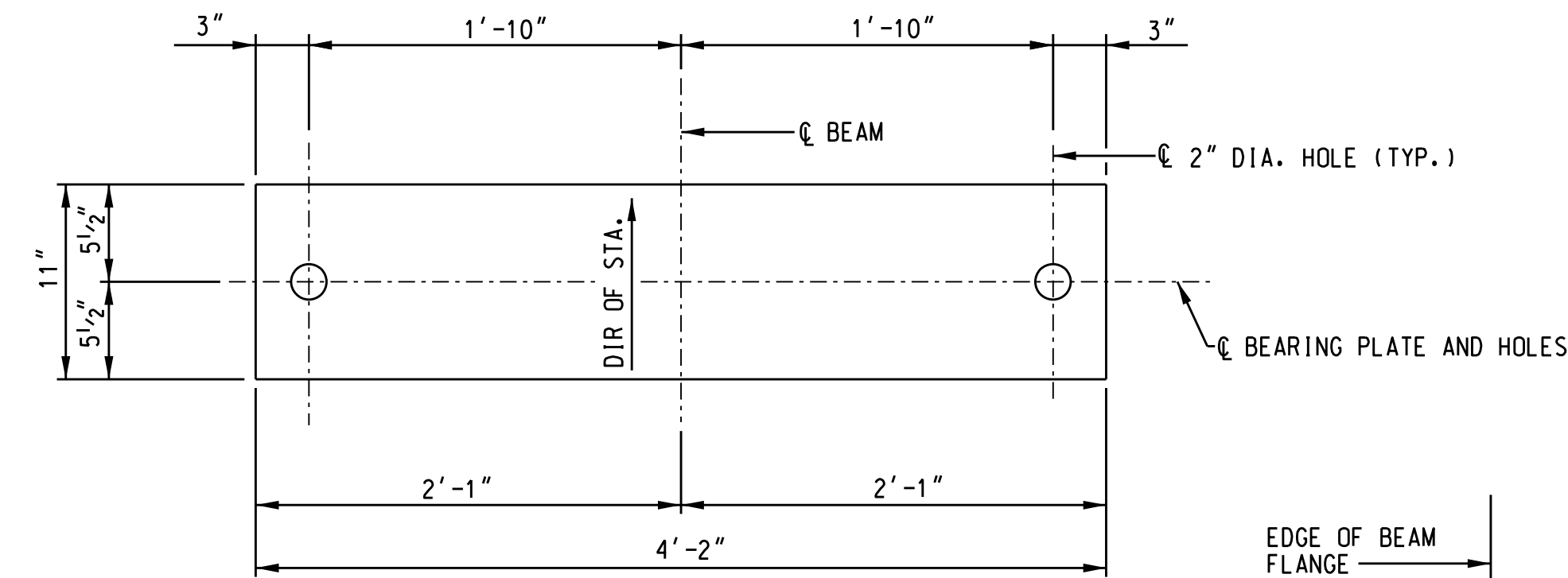
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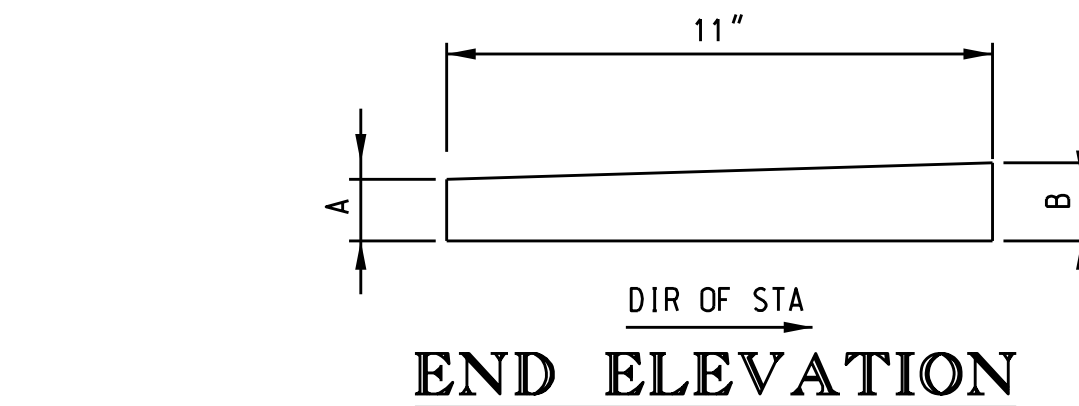
BEARING ASSEMBLY
(INTERIOR BENT SHOWN, END BENT SIMILAR)



PLAN OF FIXED BEARING PLATE - TYPE 1
(18 REQ'D)
END BENT 1 AND 3

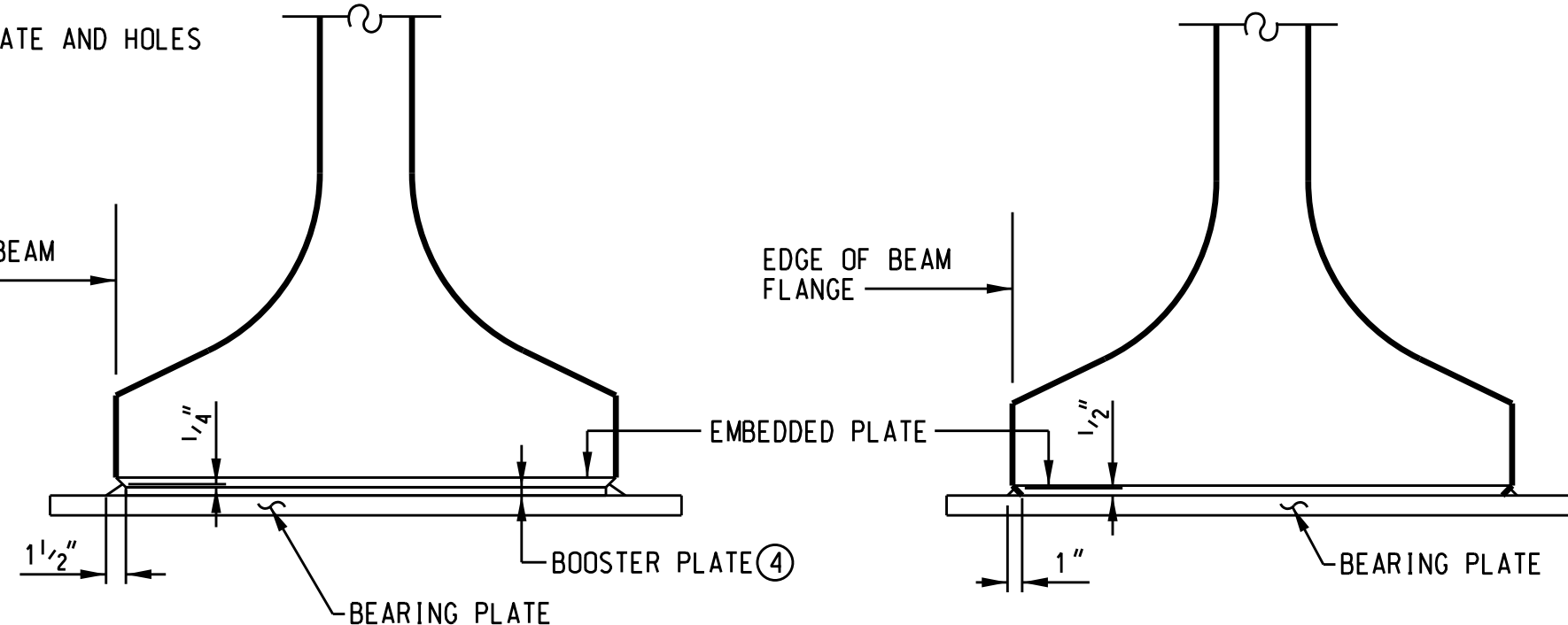


PLAN OF FIXED BEARING PLATE - TYPE 2
(18 REQ'D)
BENT 2 AHEAD AND BACK

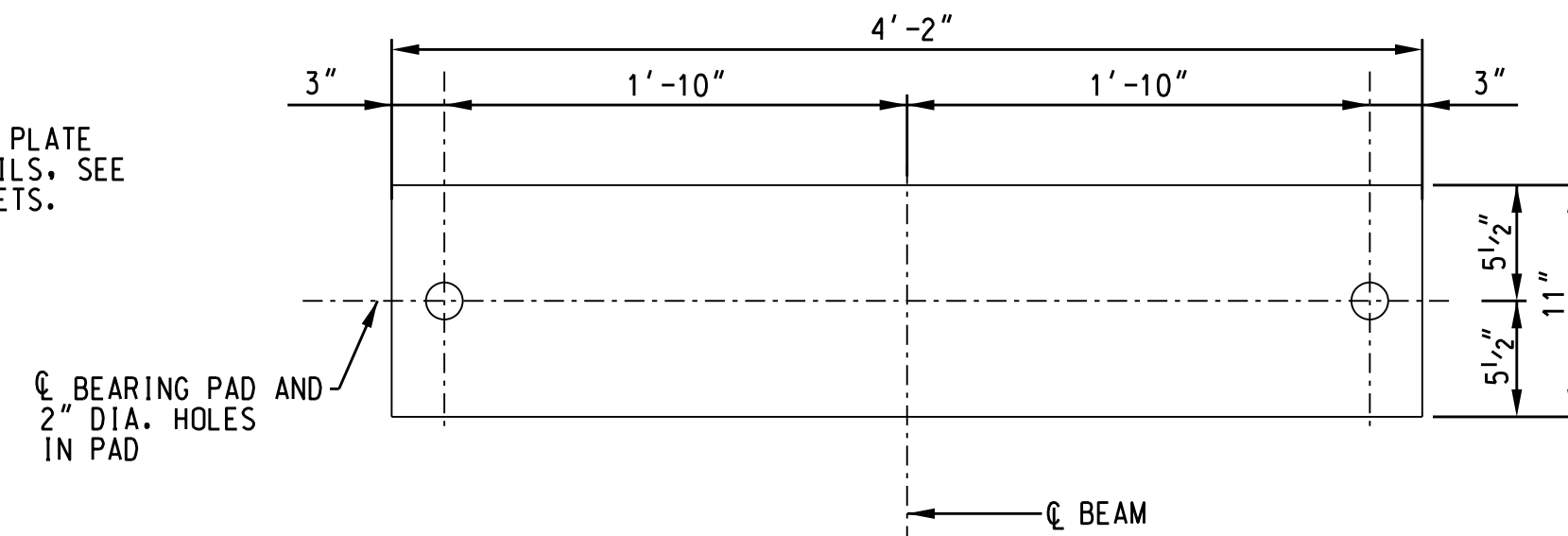


END ELEVATION

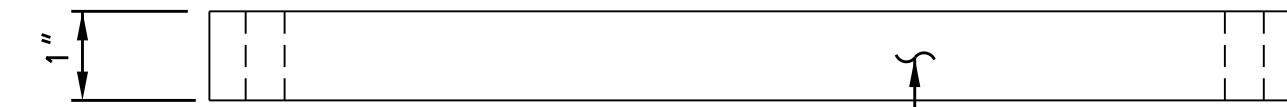
LOCATION	A	B
EB1 (BEAMS 1-5)	1 5/16"	1 11/16"
EB1 (BEAMS 6-9)	1 1/4"	1 3/4"
IB2 (BACK)	1 5/16"	1 11/16"
IB2 (AHEAD)	1 3/8"	1 5/8"
EB3	1 3/8"	1 5/8"



WELD DETAILS FOR CONCRETE BEAMS

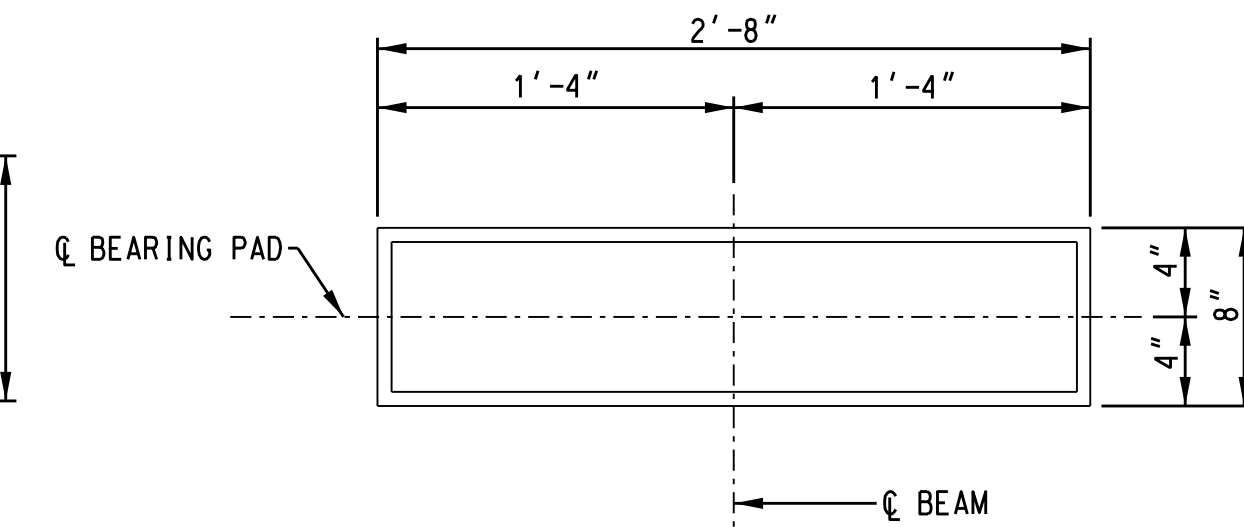


PLAN

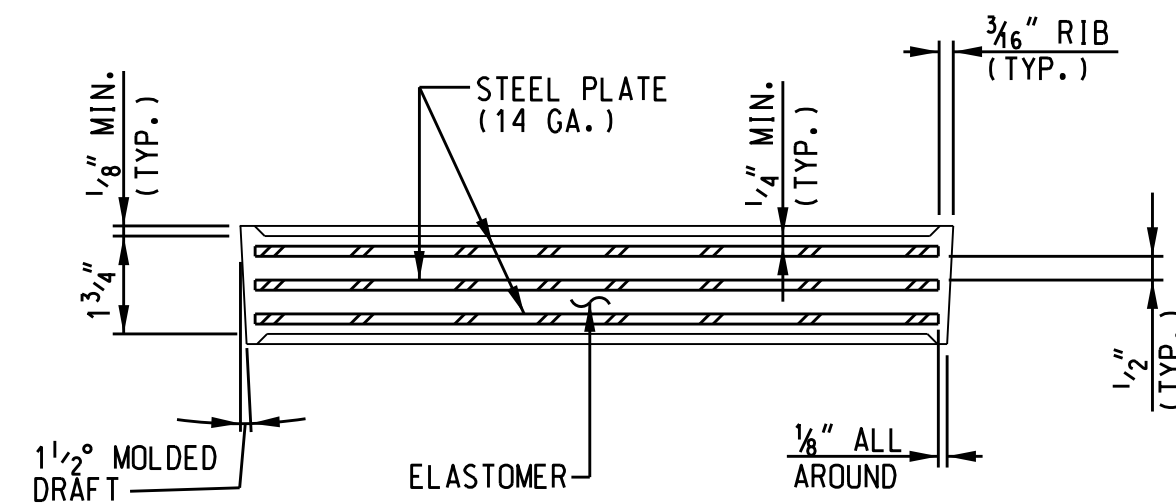


SECTION

BEARING PAD DETAILS - TYPE 1
(18 REQ'D)
END BENT 1 AND 3



PLAN



SECTION

BEARING PAD DETAILS - TYPE 2
(18 REQ'D)
BENT 2 AHEAD AND BACK

NOTES:

- ① BURR THE THREAD OF THE BOLT WITH A SHARP POINTED TOOL 1/16" ABOVE TOP OF WASHER. THEN SET NUT TO MAINTAIN 1/16" CLEAR BETWEEN NUT AND WASHER. THE THREAD OF THE BOLT SHALL THEN BE BURRED ABOVE NUT.
- ② PIN GROOVES IN LAMINATED BEARINGS SHALL BE FILLED BY THE MANUFACTURER.
- ③ FIELD WELD ONLY. NO FIELD WELD WILL BE MADE WHILE ELASTOMERIC BEARING PAD IS IN CONTACT WITH METAL UNLESS THERE IS MORE THAN 11#2" OF STEEL BETWEEN WELD AND ELASTOMER. IN NO CASE SHALL THE ELASTOMER OR ELASTOMERIC BOND BE EXPOSED TO INSTANTANEOUS TEMPS. GREATER THAN 400° F. ANY DAMAGE TO ELASTOMERIC BEARING DUE TO WELDING WILL BE CAUSE FOR REJECTION. TEMPERATURE SHALL BE CONTROLLED BY USE OF HEAT CRAYONS FURNISHED BY THE CONTRACTOR.
- ④ BOOSTER PLATES ARE NOT REQUIRED.

FOR ELASTOMERIC BEARING SPECIFICATIONS, SEE SCDOT STANDARD SPECIFICATIONS.

PADS WERE DESIGNED USING AASHTO METHOD A. PAD MATERIAL SHALL BE ELASTOMER GRADE 2.

TYPE 1 AND TYPE 2 ELASTOMER SHALL BE GRADE 60 DUROMETER HARDNESS.

BEARING PLATES SHALL CONFORM TO AASHTO M270, GRADE 50.

ELASTOMERIC BEARING DESIGN LOAD

TYPE 1

MAX. D.L. = 166.7k

TYPE 2

MAX D.L. + L.L. = 261.0k
MAX D.L. = 167.7k



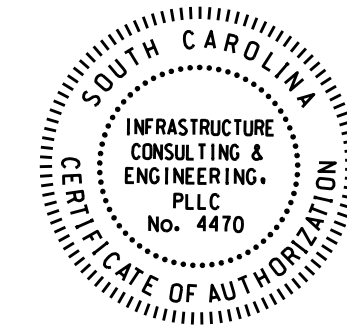
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DEPARTMENT OF TRANSPORTATION

BEARING DETAILS

US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

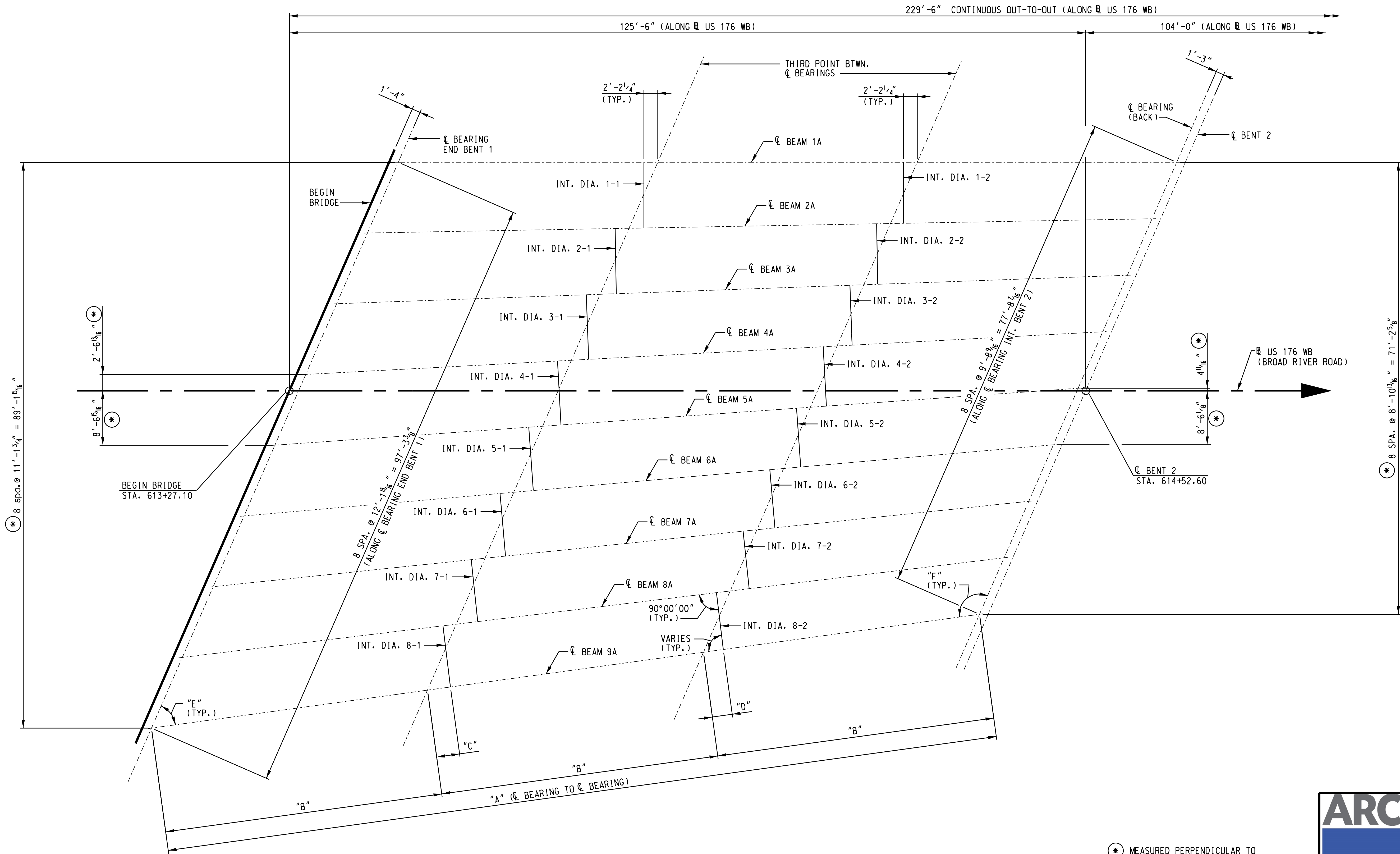
COUNTY RICHLAND ROUTE US 176



REV.	
REV.	
REV.	
REVIEWED	WRS 09-22
QUAN.	
DR.	ADG WRS 07-22
DES.	WRS ALP 07-22
BY	CHK. DATE

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BRIDGE PLANS ID	SHEET NO.
P039719-B42a	30

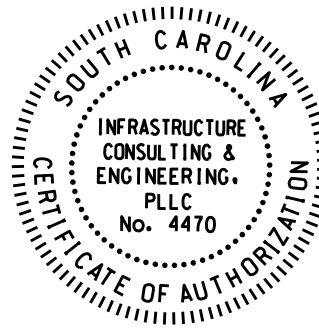
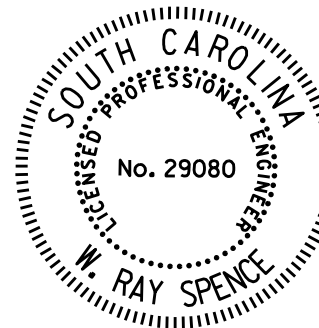


FRAMING PLAN - SPAN A

NOTE: ALL DIMENSIONS ARE ALONG BEAM.

TABLE OF DIMENSIONS - SPAN A						
BEAM	DIM. "A"	DIM. "B"	DIM. "C"	DIM. "D"	ANGLE "E"	ANGLE "F"
1A	122'-8 ³ / ₁₆ "	40'-10 ³ / ₄ "	---	---	66°25'28.66"	113°34'31.34"
2A	123'-8 ³ / ₁₆ "	41'-2 ³ / ₄ "	2'-4 ³ / ₁₆ "	2'-0 ⁵ / ₁₆ "	65°23'08.58"	114°36'51.42"
3A	124'-8 ⁵ / ₈ "	41'-6 ⁷ / ₈ "	2'-6 ⁷ / ₁₆ "	2'-2 ³ / ₈ "	64°21'49.08"	115°38'10.92"
4A	125'-9 ⁹ / ₁₆ "	41'-11 ³ / ₁₆ "	2'-8 ¹¹ / ₁₆ "	2'-4 ¹ / ₁₆ "	63°21'31.52"	116°38'28.48"
5A	126'-10 ¹⁵ / ₁₆ "	42'-3 ⁵ / ₈ "	2'-10 ¹⁵ / ₁₆ "	2'-6 ⁷ / ₁₆ "	62°22'16.51"	117°37'43.49"
6A	128'-0 ¹⁵ / ₁₆ "	42'-8 ¹ / ₄ "	3'-0 ¹ / ₈ "	2'-8 ³ / ₈ "	61°24'04.50"	118°35'55.50"
7A	129'-3 ¹ / ₁₆ "	43'-1"	3'-2 ⁵ / ₁₆ "	2'-10 ¹ / ₄ "	60°26'55.78"	119°33'04.22"
8A	130'-5 ³ / ₄ "	43'-5 ⁵ / ₁₆ "	3'-4 ⁷ / ₈ "	3'-0 ¹ / ₁₆ "	59°30'50.48"	120°29'09.52"
9A	131'-8 ¹ / ₈ "	43'-10 ⁵ / ₁₆ "	3'-7 ³ / ₄ "	3'-1 ⁷ / ₈ "	58°35'48.60"	121°24'11.40"

⊙ MEASURED PERPENDICULAR TO
US 176 WB (BROAD RIVER ROAD)



REV.			
REV.			
REV.			
REVIEWED	WRS	09-22	
QUAN.			
DR.	RMH	ALP	08-22
DES.	WRS	ALP	08-22
BY	CHK.	DATE	

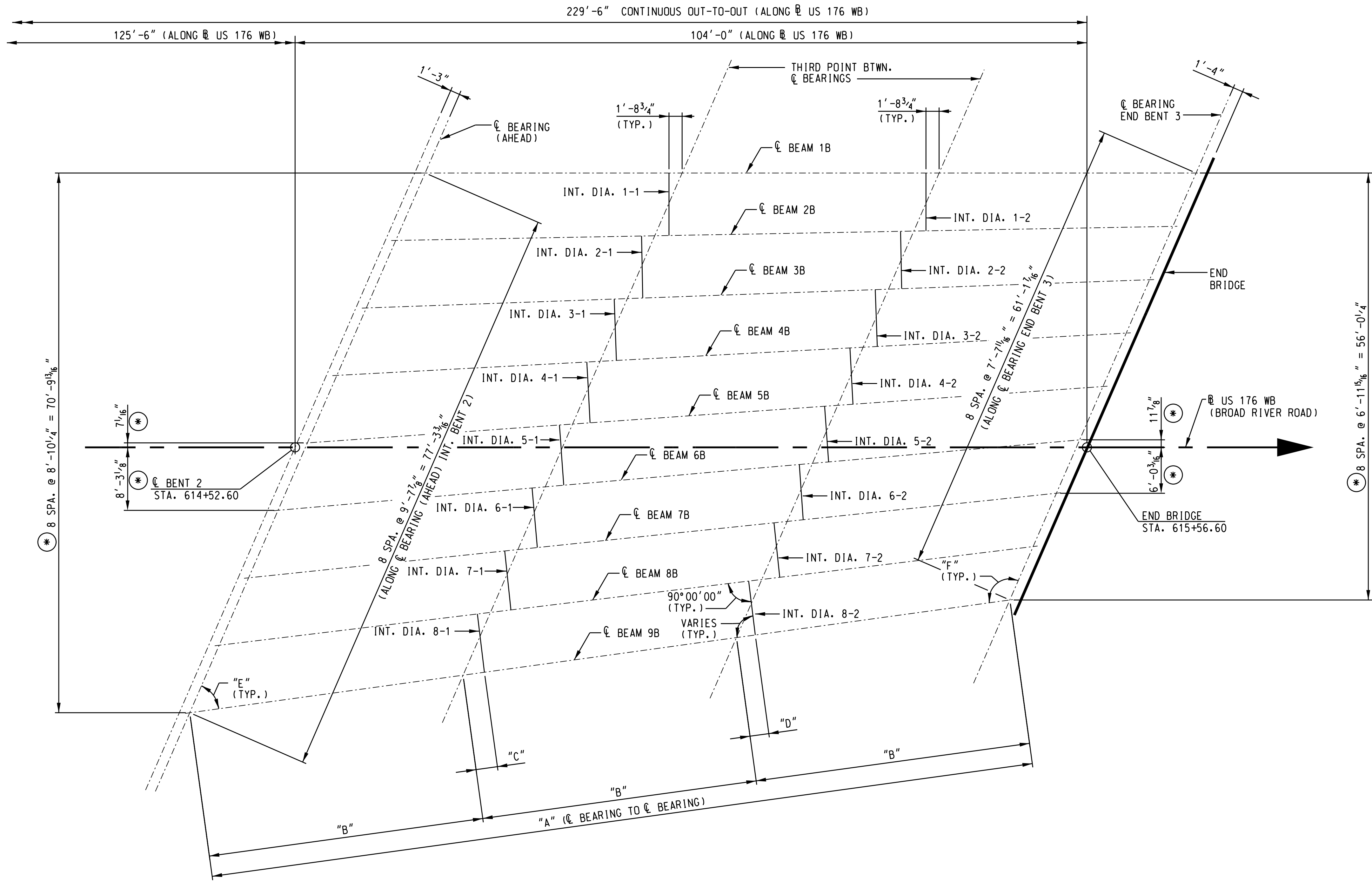


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FRAMING PLAN
(SPAN A)
US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20
COUNTY RICHLAND ROUTE US 176

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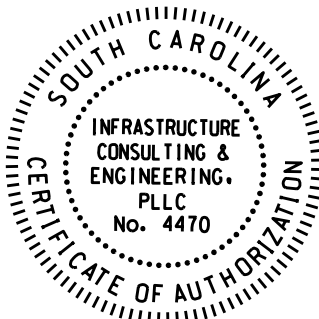
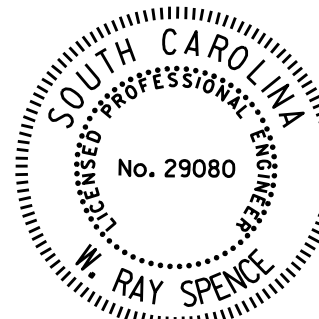


FRAMING PLAN - SPAN B

NOTE: ALL DIMENSIONS ARE ALONG BEAM.

TABLE OF DIMENSIONS - SPAN B						
BEAM	DIM. "A"	DIM. "B"	DIM. "C"	DIM. "D"	ANGLE "E"	ANGLE "F"
1B	101'-2 ³ / ₁₆ "	33'-8 ³ / ₄ "	---	---	66°25'28.66"	113°34'31.34"
2B	102'-0 ¹ / ₁₆ "	34'-0"	1'-10 ³ / ₈ "	1'-7 ¹ / ₈ "	65°23'08.58"	114°36'51.42"
3B	102'-10 ³ / ₈ "	34'-3 ¹ / ₁₆ "	2'-0 ³ / ₁₆ "	1'-8 ¹ / ₁₆ "	64°21'49.08"	115°38'10.92"
4B	103'-9"	34'-7"	2'-1 ¹ / ₈ "	1'-10 ¹ / ₁₆ "	63°21'31.52"	116°38'28.48"
5B	104'-8 ¹ / ₁₆ "	34'-10 ¹ / ₁₆ "	2'-3 ⁵ / ₈ "	2'-0"	62°22'16.51"	117°37'43.49"
6B	105'-7 ¹ / ₂ "	35'-2 ¹ / ₂ "	2'-5 ¹ / ₄ "	2'-1 ¹ / ₂ "	61°24'04.50"	118°35'55.50"
7B	106'-7 ¹ / ₄ "	35'-6 ¹ / ₁₆ "	2'-6 ¹ / ₈ "	2'-1 ¹ / ₂ "	60°26'55.78"	119°33'04.23"
8B	107'-7 ³ / ₈ "	35'-10 ³ / ₁₆ "	2'-8 ⁷ / ₁₆ "	2'-4 ⁷ / ₁₆ "	59°30'50.48"	120°29'09.52"
9B	108'-7 ¹ / ₁₆ "	36'-2 ⁵ / ₈ "	2'-9 ⁵ / ₁₆ "	2'-5 ⁷ / ₈ "	58°35'48.61"	121°24'11.40"

* MEASURED PERPENDICULAR TO
US 176 WB (BROAD RIVER ROAD)



REV.			
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REV.			
REVIEWED	WRS	09-22	
QUAN.			
DR.	RMH	ALP	08-22
DES.	WRS	ALP	08-22
BY	CHK.	DATE	



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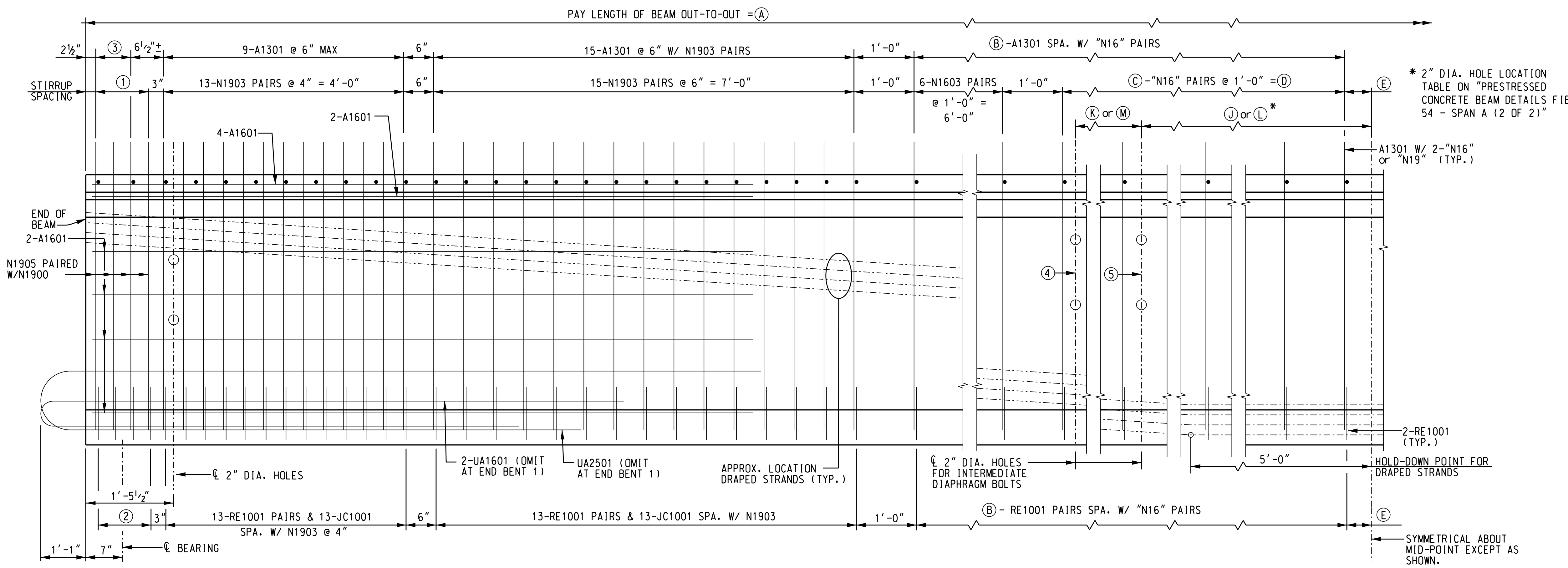
FRAMING PLAN
(SPAN B)

US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

COUNTY
RICHLAND

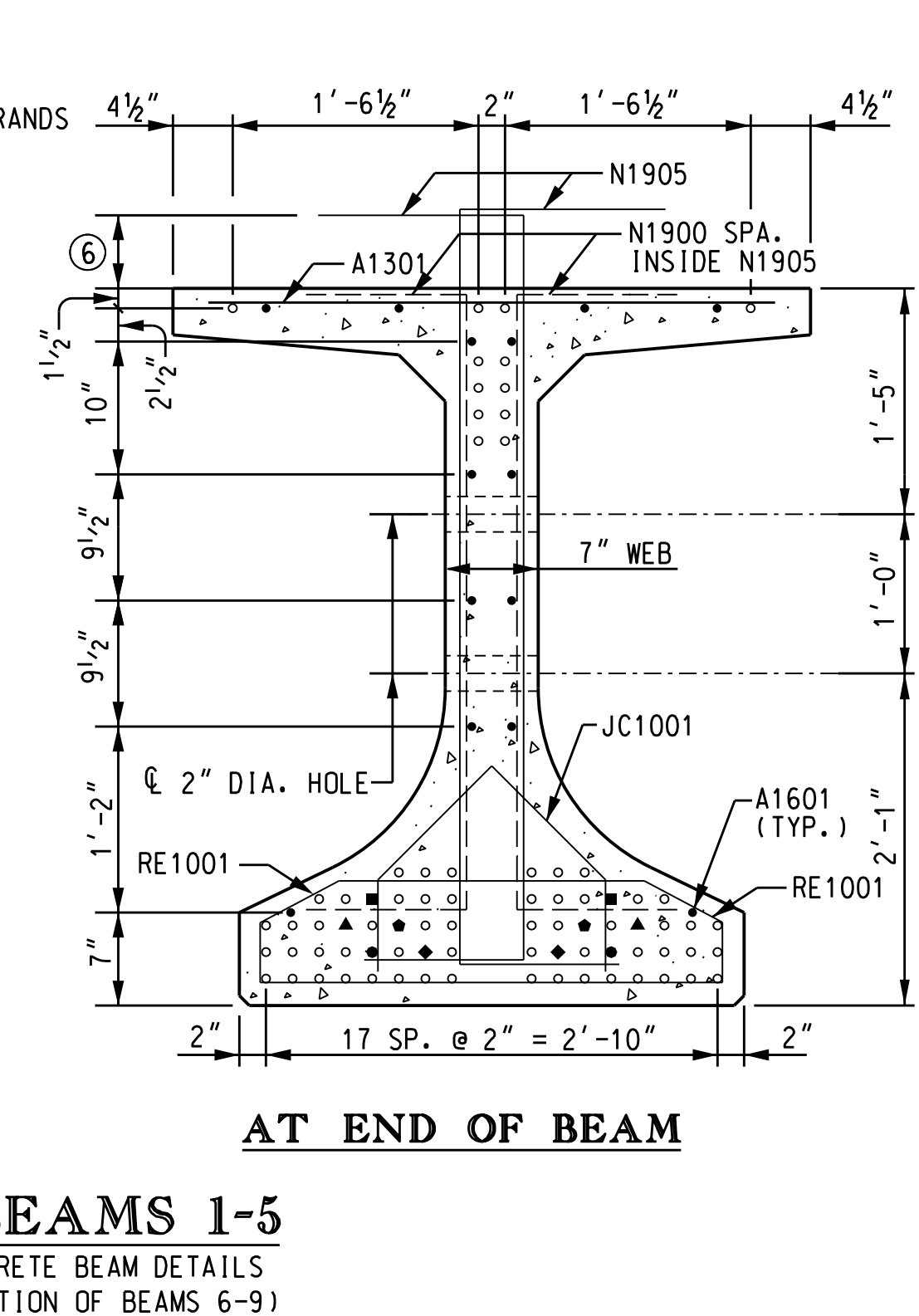
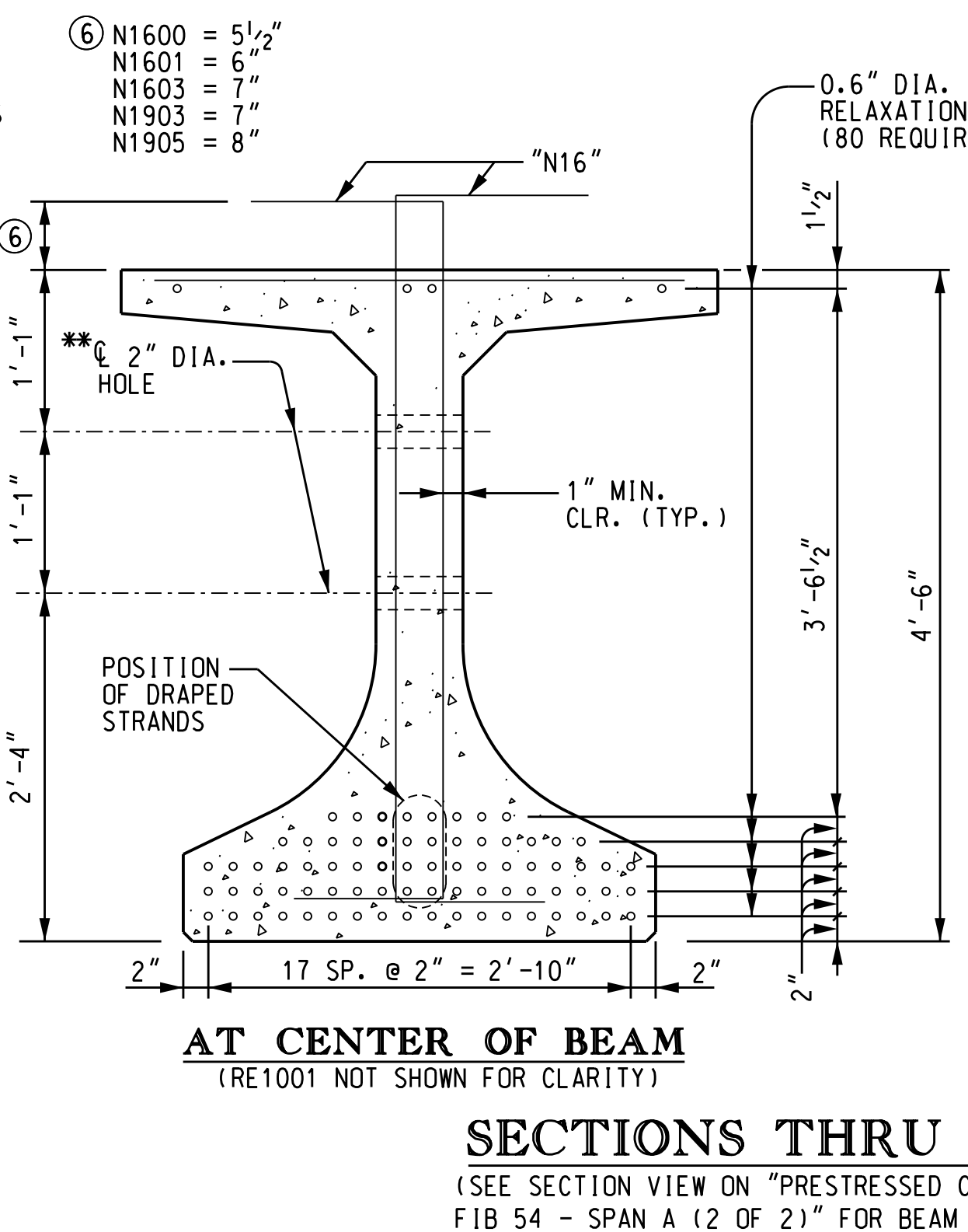
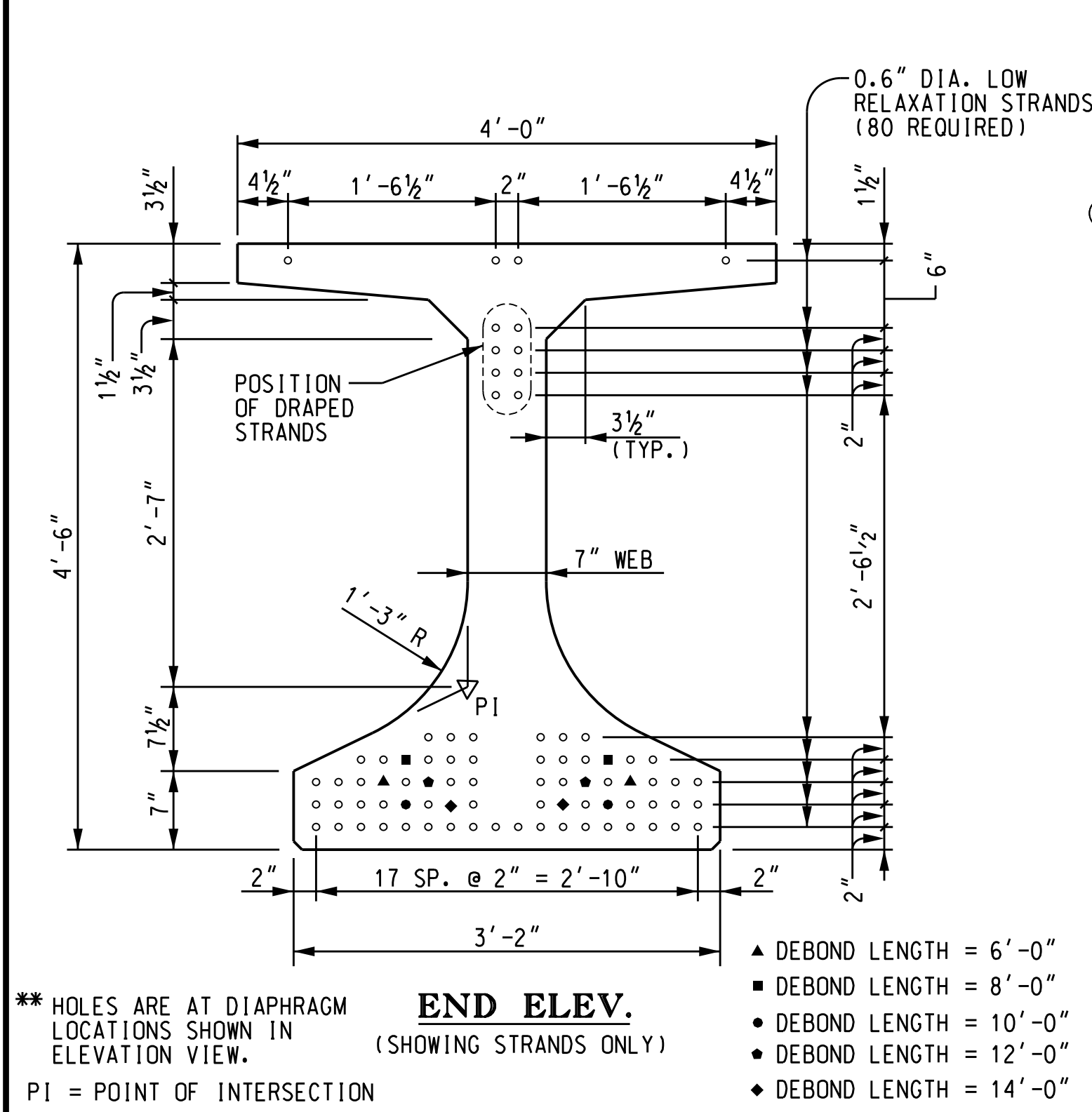
ROUTE
US 176

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- ④ 4-N1905 PAIRS SPA. W/ N1900 SPA. @ 3 3/8" MAX = 10"
- ② 4-RE1001 PAIRS AND 4-JC1001 SPA. W/ N1905
- ③ 2-A1301 @ 7"
- ④ OMIT HOLES AT BEAM 1, DIAPHR. 1-2 (AHD. STA. FROM C SPAN) AND AT BEAM 8, DIAPHR. 8-1 (BCK. STA. FROM C SPAN) (SEE FRAMING PLAN)
- ⑤ OMIT HOLES AT BEAM 1, DIAPHR. 1-1 (AHD. STA. FROM C SPAN) AND AT BEAM 8, DIAPHR. 8-2 (BCK. STA. FROM C SPAN). (SEE FRAMING PLAN)

HALF SIDE ELEVATION
(SEE SECTION VIEW ON "PRESTRESSED CONCRETE BEAM DETAILS FIB 54 - SPAN A (2 OF 2)" FOR BEAM SECTION OF BEAMS 6-9)



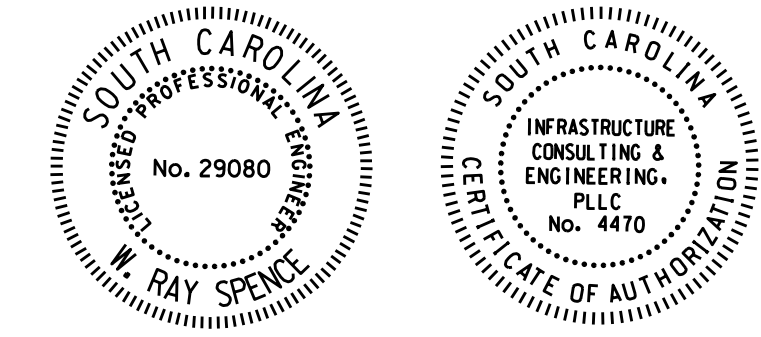
SECTIONS THRU BEAMS 1-5
(SEE SECTION VIEW ON "PRESTRESSED CONCRETE BEAM DETAILS FIB 54 - SPAN A (2 OF 2)" FOR BEAM SECTION OF BEAMS 6-9)

NOTES:

CONTRACTOR IS RESPONSIBLE FOR INVESTIGATING THE CAPACITY OF BEAM FLANGES TO ENSURE FLANGES ARE ADEQUATE TO SUPPORT ALL CONSTRUCTION LOADS. A MINIMUM OF #13 REINFORCING BARS PLACED TRANSVERSELY AT 24" SPACING IS REQUIRED IN ALL TOP FLANGES.

FOR ADDITIONAL NOTES AND DETAILS, SEE "PRESTRESSED CONCRETE BEAM DETAILS FIB 54 - SPAN A (2 OF 2)" AND "PRESTRESSED CONCRETE BEAM DETAILS FIB 54".

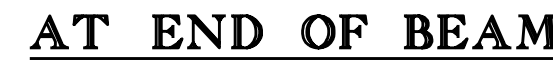
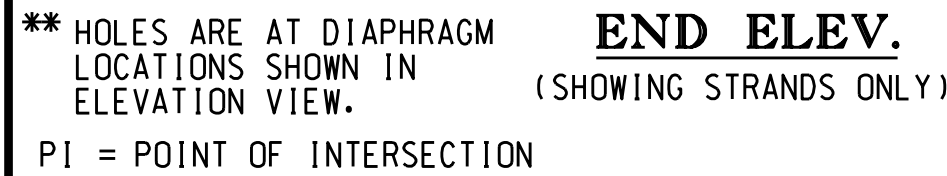
DESIGN DATA	
Low Relaxation Strands	
Tensile Strength (fpu) = 270 ksi	
Initial Prestress (0.75 fpu) = 202.5 ksi	
Class 10.000 Concrete	
f'c = 10 ksi	
f'ci = 8.5 ksi	



REV.	
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REV.	
REVIEWED	WRS 09-22
QUAN.	ALP KLC 08-22
DR.	ALP KLC 08-22
DES.	ALP KLC 08-22
BY	CHK. DATE

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DEPARTMENT OF TRANSPORTATION
PRESTRESSED CONCRETE BEAM
DETAILS FIB 54 - SPAN A (1 OF 2)
US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20
COUNTY RICHLAND
ROUTE US 176



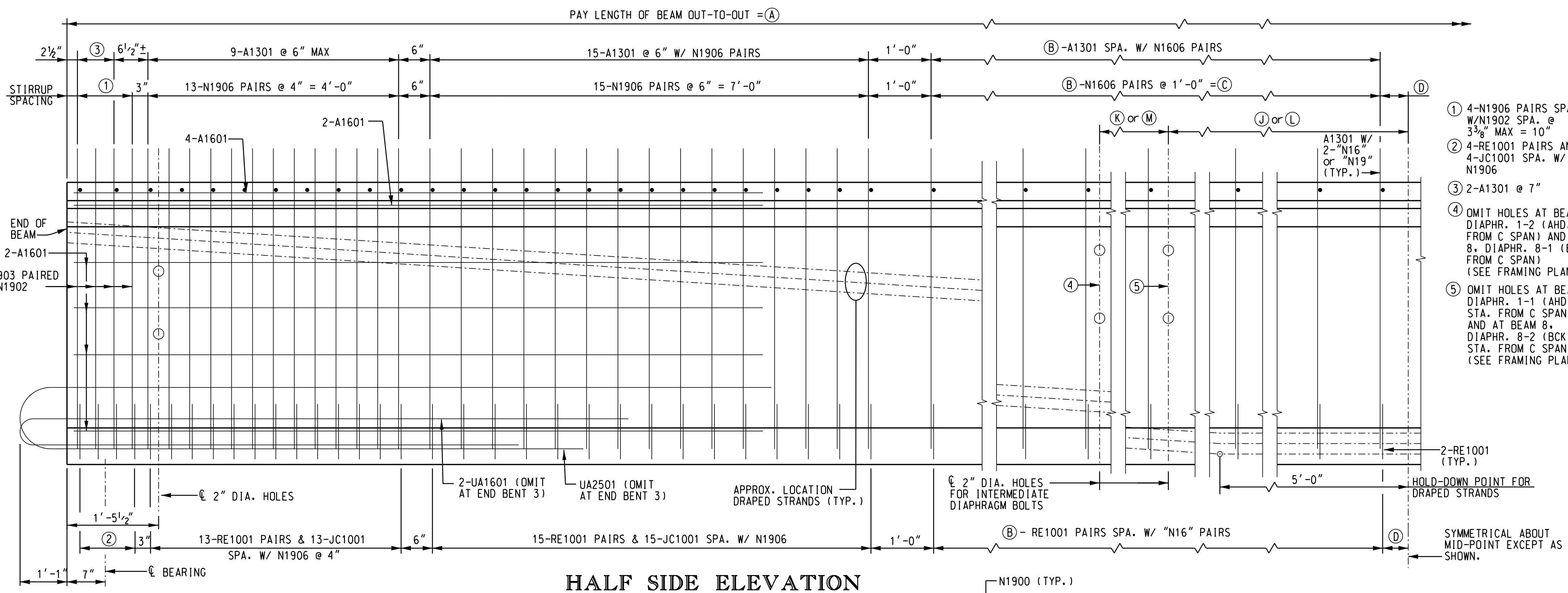
* Measured from midpoint of beam to ϕ hole



Measurement is from the C of beam to the appropriate diaphragm as labeled on the framing plan

			
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		INFRASTRUCTURE CONSULTING & ENGINEERING	
SOUTH CAROLINA			
DEPARTMENT OF TRANSPORTATION			
<u>PRESTRESSED CONCRETE BEAM</u> <u>DETAILS FIB 54 - SPAN A (2 OF 2)</u>			
US 176 WB (BROAD RIVER RD.) BRIDGE OVER I-20			
COUNTY RICHLAND		ROUTE US 176	

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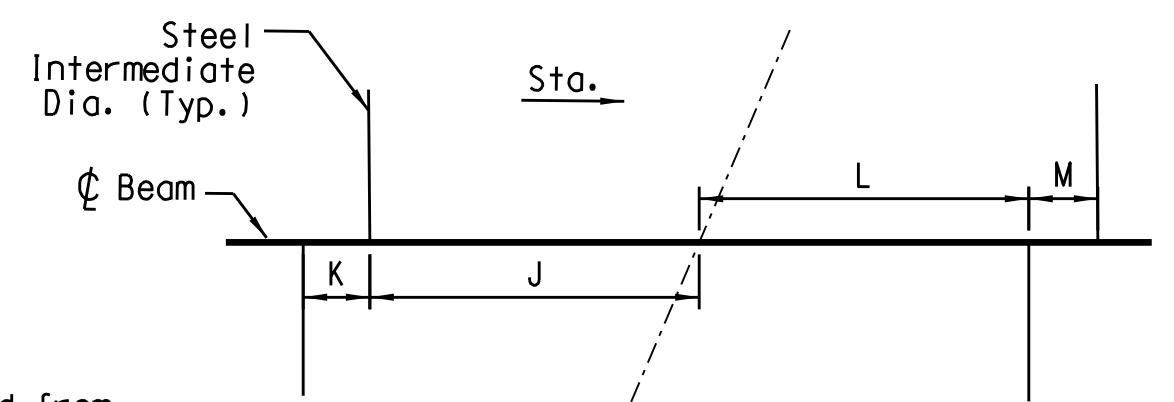


- 4-N1906 PAIRS SPA. W/N1902 SPA. @ 3 3/8" MAX = 10"
- 4-RE1001 PAIRS AND 4-JC1001 SPA. W/ N1906
- 2-A1301 @ 7"
- OMIT HOLES AT BEAM 1, DIAPHR. 1-2 (AHD. STA. FROM C SPAN) AND AT BEAM 8, DIAPHR. 8-1 (BCK. STA. FROM C SPAN) (SEE FRAMING PLAN)
- OMIT HOLES AT BEAM 1, DIAPHR. 1-1 (AHD. STA. FROM C SPAN) AND AT BEAM 8, DIAPHR. 8-2 (BCK. STA. FROM C SPAN). (SEE FRAMING PLAN)

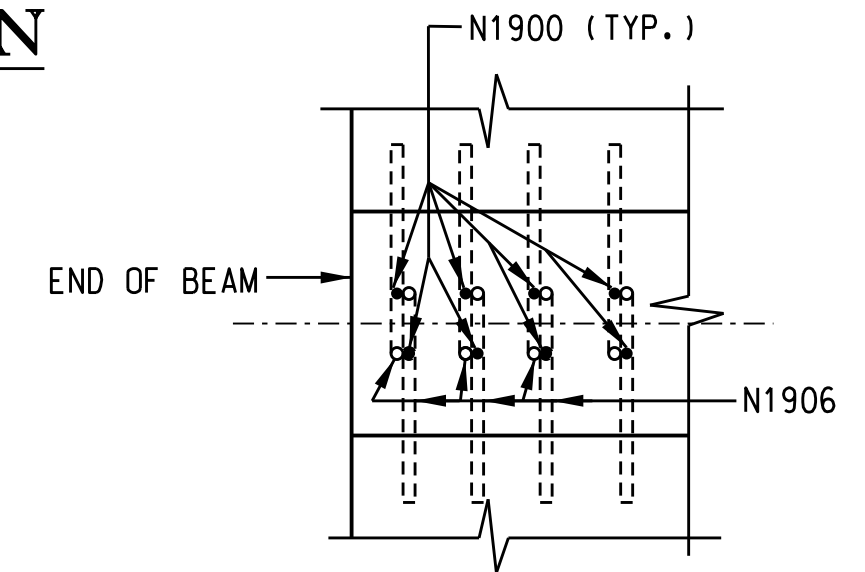
2" DIA. HOLE LOCATION TABLE				
BEAM	(J)	(K)	(L)	(M)
1	-	18'-7 1/8" *	15'-1 5/8"	-
2	15'-1 5/8"	3'-7 1/8"	15'-3 1/4"	3'-3 1/8"
3	15'-1 9/16"	3'-8 1/16"	15'-5"	3'-5 9/16"
4	15'-1 5/8"	3'-10 1/16"	15'-6 3/4"	3'-7 3/16"
5	15'-1 3/4"	4'-0 3/8"	15'-8 5/8"	3'-8 3/4"
6	15'-2"	4'-2"	15'-10 1/2"	3'-10 1/4"
7	15'-2 3/8"	4'-3 5/8"	16'-0 1/16"	3'-10 1/4"
8	15'-2 13/16"	4'-5 3/16"	16'-2 1/16"	4'-1 1/4"
9	15'-3 3/16"	-	-	20'-7 1/8" *

Measurement is from the center of beam to the appropriate diaphragm as labeled on the framing plan

* Measured from midpoint of beam to center of hole



2" DIA. HOLE LOCATION DIAGRAM

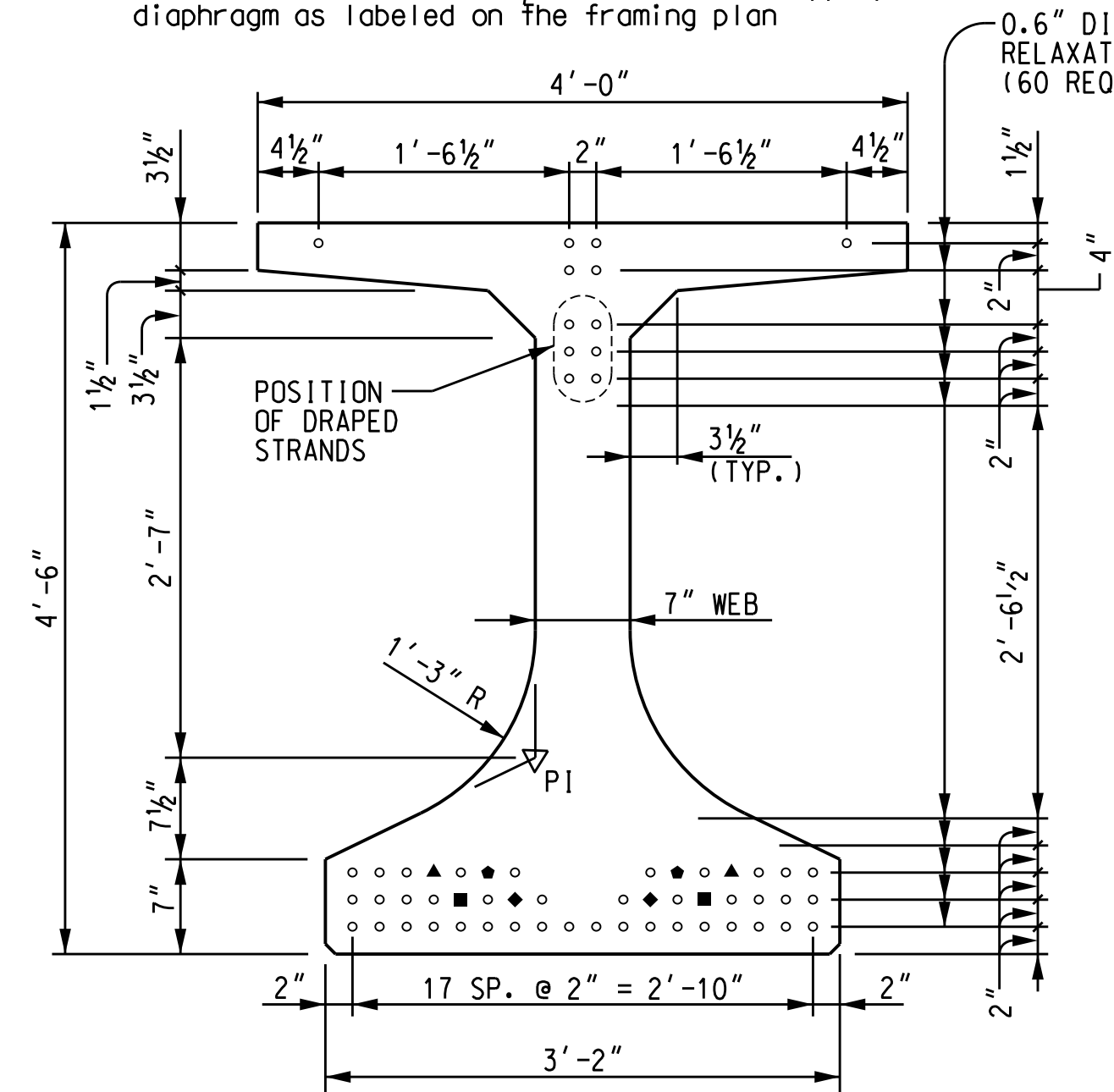


PLAN OF STIRRUPS AT BEAM END

NOTES:

CONTRACTOR IS RESPONSIBLE FOR INVESTIGATING THE CAPACITY OF BEAM FLANGES TO ENSURE FLANGES ARE ADEQUATE TO SUPPORT ALL CONSTRUCTION LOADS. A MINIMUM OF #13 REINFORCING BARS PLACED TRANSVERSELY AT 24" SPACING IS REQUIRED IN ALL TOP FLANGES.

FOR ADDITIONAL NOTES AND DETAILS, SEE "PRESTRESSED CONCRETE BEAM DETAILS FIB 54".

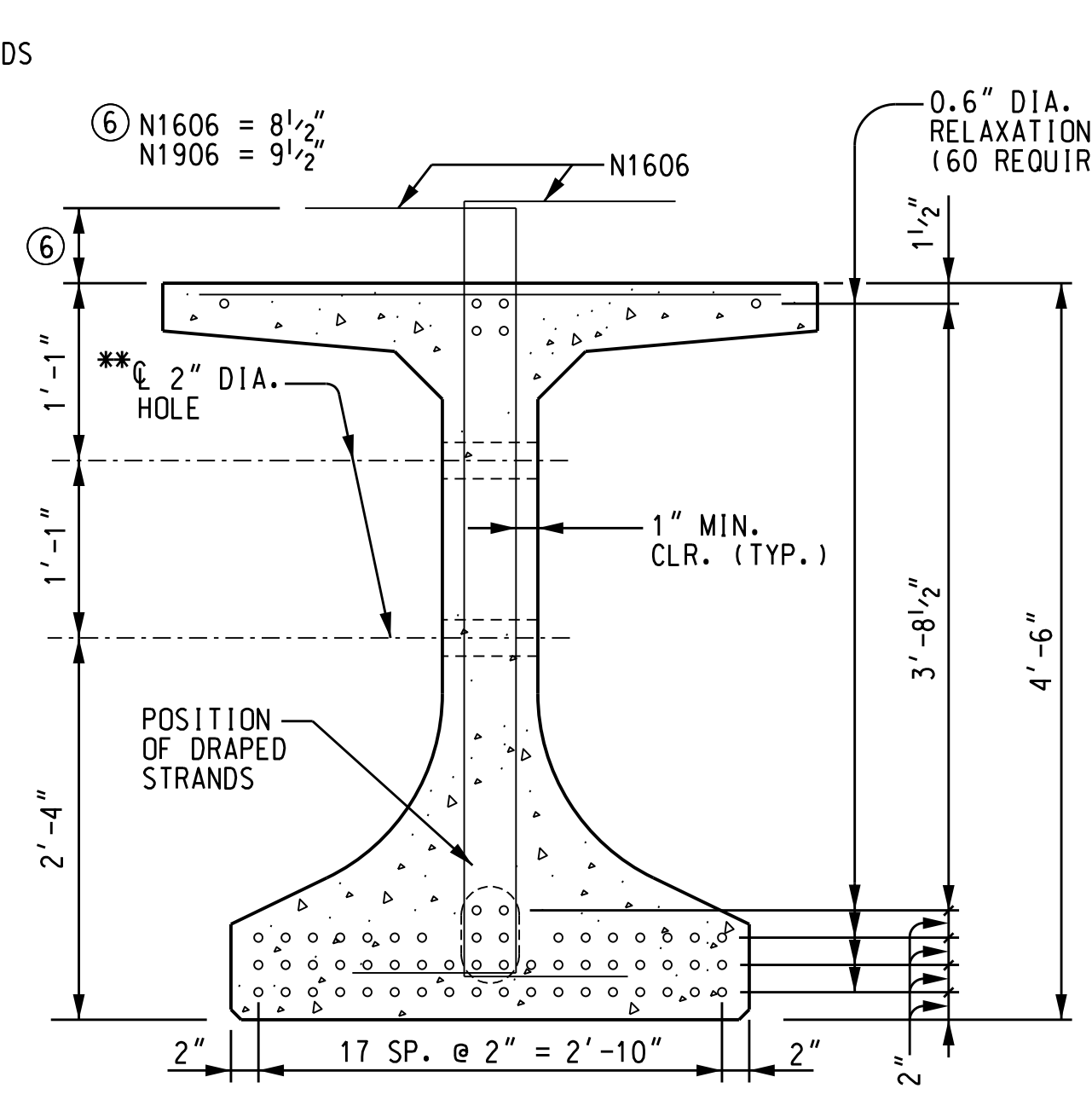


END ELEV. (SHOWING STRANDS ONLY)

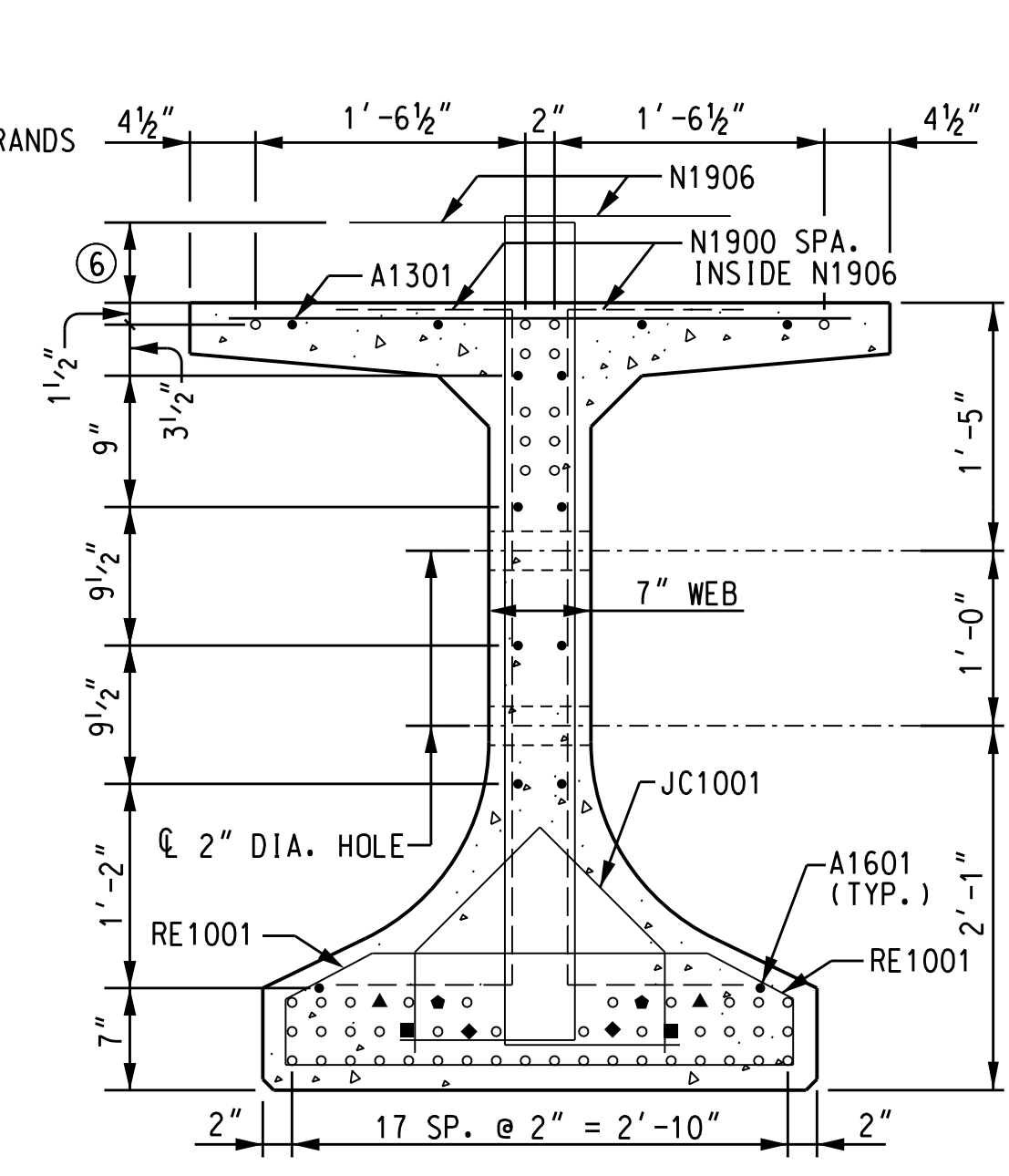
** HOLES ARE AT DIAPHRAGM LOCATIONS SHOWN IN ELEVATION VIEW.

P1 = POINT OF INTERSECTION

- DEBOND LENGTH = 2'-0"
- DEBOND LENGTH = 4'-0"
- DEBOND LENGTH = 6'-0"
- DEBOND LENGTH = 8'-0"



AT CENTER OF BEAM (RE1001 NOT SHOWN FOR CLARITY)

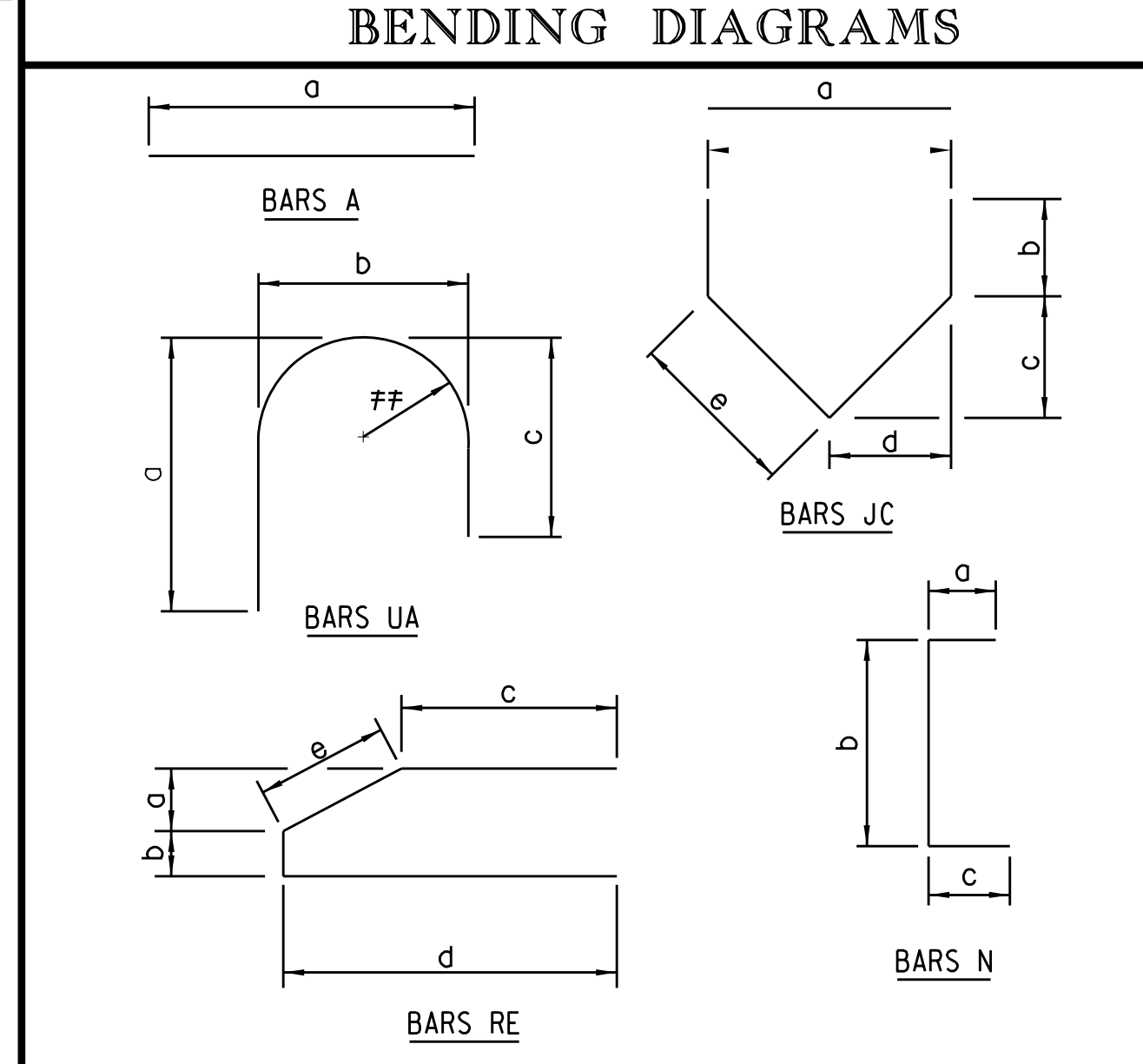


AT END OF BEAM

SECTIONS THRU BEAM

REINF. STEEL SCHED.						
MARK	NO. REQ'D	DIMENSION				
		"a"	"b"	"c"	"d"	LENGTH
A1301	(AA)	3'-8"	---	---	---	3'-8"
A1601	28	12'-0"	---	---	---	12'-0"
N1606	(BB)	10"	4'-11 1/2"	1'-0"	---	6'-9 1/2"
N1900	16	1'-0"	3'-10"	1'-0"	---	5'-10"
N1906	128	1'-0"	4'-11 1/2"	1'-0"	---	6'-11 1/2"
JC1001	(CC)	1'-5"	7"	10"	8 1/2"	1-1 1/8"
RE1001	(DD)	4"	5 3/8"	1'-3 1/2"	2'-0"	9 3/8"
UA1601	2	9'-6"	5"	8'-3"	---	17'-11"
UA2501	1	11'-9"	11 3/4"	9'-0"	---	21'-2"

For Information Only - Paid for as Prestressed Beam



BEAM DIMENSIONS, REINFORCING STEEL, & QUANTITIES TABLE											
BEAM	(A)	(B)	(C)	(D)	(AA)	(BB)	(CC)	(DD)	(XX)	(YY)	(ZZ)
1	102'-4 3/16"	39	38'-0"	2"	130	156	71	142	24.5	3,527	6,124
2	103'-2 1/16"	39	38'-0"	1"	130	156	71	142	24.7	3,527	6,173
3	104'-0 3/16"	40	39'-0"	2"	132	160	72	144	24.9	3,563	6,224
4	104'-11"	40	39'-0"	2"	132	160	72	144	25.1	3,563	6,278
5	105'-10 1/16"	40	39'-0"	5"	132	160	72	144	25.3	3,563	6,334
6	106'-9 1/2"	41	40'-0"	2"	134	164	73	146	25.5	3,598	6,392
7	107'-9 1/4"	41	40'-0"	4"	134	164	73	146	25.8	3,598	6,452
8	108'-9 3/8"	42	41'-0"	2"	136	168	74	148	26.0	3,633	6,515
9	109'-9 1/16"	42	41'-0"	5"	136	168	74	148	26.3	3,633	6,579

DESIGN DATA

Low Relaxation Strands

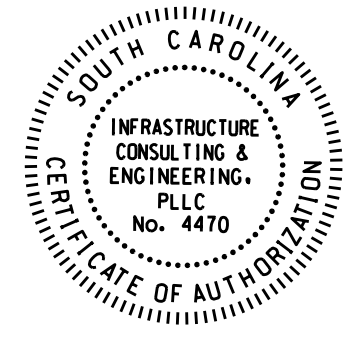
Tensile Strength (fpu) = 270 ksi

Initial Prestress (0.75 fpu) = 202.5 ksi

Class 10,000 Concrete

f'c = 10 ksi

f'ci = 8.5 ksi



REV.	
REV.	
REV.	
REVIEWED	WRS 09-22
QUAN.	ALP KLC 07-22
DR.	ALP KLC 07-22
DES.	ALP KLC 07-22
BY	CHK. DATE

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SOUTH CAROLINA

DEPARTMENT OF TRANSPORTATION

PRESTRESSED CONCRETE BEAM

DETAILS FIB 54 - SPAN B

US 176 WB (BROAD RIVER RD.)

BRIDGE OVER I-20

COUNTY RICHLAND

ROUTE US 176

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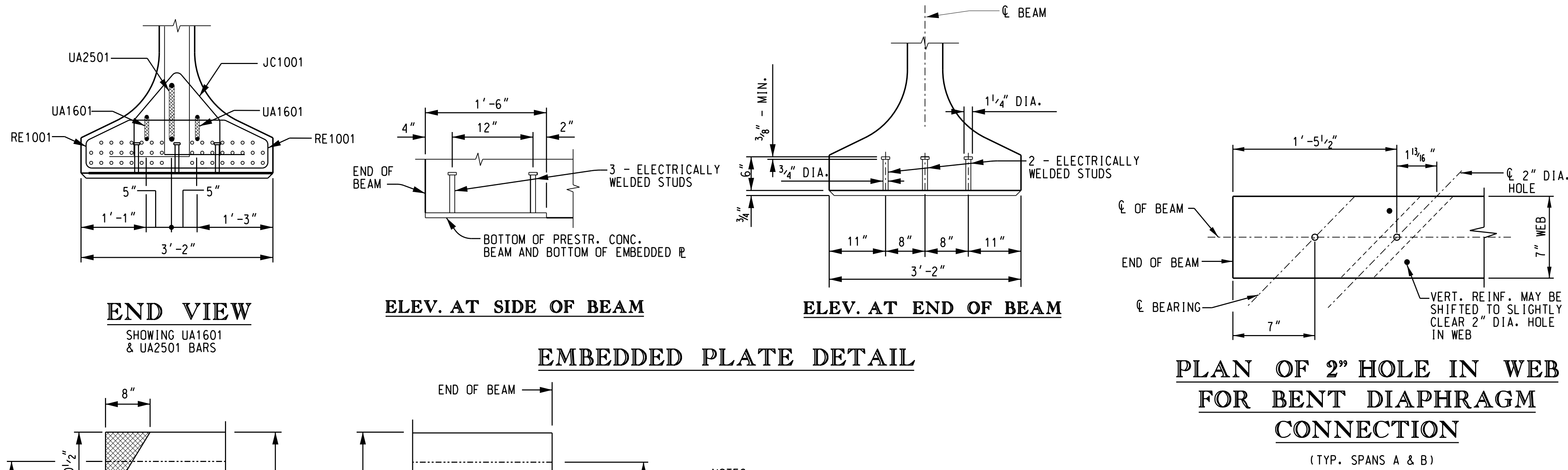
BEAM CAMBER AND DEFLECTION								
		BEAM CAMBER		DEFLECTION DUE TO				
SPAN	BEAM #	AT RELEASE	* AT ERECTION	INTERIOR DIAPHRAGM	STAY-IN-PLACE FORMS**	SLAB	BARRIER PARAPET	FWS
A	1	4"	7 ¹ / ₁₆ "	- 1 ¹ / ₁₆ "	-5 ⁵ / ₁₆ "	-3 ⁵ / ₁₆ "	-3 ⁵ / ₈ " ***	-1 ¹ / ₈ "
	2	4"	7 ¹ / ₁₆ "	- 1 ¹ / ₁₆ "	-1 ¹ / ₂ "	-4 ¹ / ₁₆ "	-3 ⁵ / ₈ " ***	-1 ¹ / ₈ "
	3	4"	7 ¹ / ₈ "	- 1 ¹ / ₁₆ "	-1 ¹ / ₂ "	-4 ¹ / ₈ "	-3 ⁵ / ₈ " ***	-1 ¹ / ₈ "
	4	4 ¹ / ₁₆ "	7 ³ / ₁₆ "	- 1 ¹ / ₁₆ "	-1 ¹ / ₂ "	-4 ¹ / ₈ "	-	-1 ¹ / ₈ "
	5	4 ¹ / ₁₆ "	7 ³ / ₁₆ "	- 1 ¹ / ₁₆ "	-1 ¹ / ₂ "	-4 ¹ / ₈ "	-	-1 ¹ / ₈ "
	6	4 ³ / ₈ "	7 ¹ / ₁₆ "	- 1 ¹ / ₁₆ "	-1 ¹ / ₂ "	-4 ¹ / ₄ "	-	-1 ¹ / ₈ "
	7	4 ³ / ₈ "	7 ³ / ₄ "	- 1 ¹ / ₁₆ "	-9 ⁹ / ₁₆ "	-4 ³ / ₄ "	-1 ¹ / ₈ "	-1 ¹ / ₈ "
	8	4 ¹ / ₁₆ "	7 ³ / ₄ "	- 1 ¹ / ₁₆ "	-9 ⁹ / ₁₆ "	-4 ³ / ₁₆ "	-1 ¹ / ₈ "	-1 ¹ / ₈ "
	9	4 ¹ / ₁₆ "	7 ¹ / ₁₆ "	- 1 ¹ / ₁₆ "	-7 ¹ / ₁₆ "	-4 ³ / ₁₆ "	-1 ¹ / ₈ "	-1 ¹ / ₈ "
B	1	2"	3 ⁹ / ₁₆ "	- 1 ¹ / ₁₆ "	-5 ⁵ / ₁₆ "	-1 ³ / ₈ "	-1 ¹ / ₈ " ***	- 1 ¹ / ₁₆ "
	2	2"	3 ⁹ / ₁₆ "	- 1 ¹ / ₁₆ "	-1 ¹ / ₁₆ "	-1 ¹ / ₂ "	-1 ¹ / ₈ " ***	- 1 ¹ / ₁₆ "
	3	2"	3 ⁹ / ₁₆ "	- 1 ¹ / ₁₆ "	-1 ¹ / ₂ "	-1 ¹ / ₂ "	-1 ¹ / ₈ " ***	- 1 ¹ / ₁₆ "
	4	2 ¹ / ₁₆ "	3 ⁵ / ₈ "	- 1 ¹ / ₁₆ "	-1 ¹ / ₁₆ "	-1 ¹ / ₂ "	-	- 1 ¹ / ₁₆ "
	5	2 ¹ / ₁₆ "	3 ⁵ / ₈ "	- 1 ¹ / ₁₆ "	-1 ¹ / ₂ "	-1 ¹ / ₂ "	-	- 1 ¹ / ₁₆ "
	6	2 ¹ / ₁₆ "	3 ¹ / ₁₆ "	- 1 ¹ / ₁₆ "	-3 ³ / ₈ "	-1 ⁹ / ₁₆ "	-	- 1 ¹ / ₁₆ "
	7	2 ¹ / ₁₆ "	3 ¹ / ₁₆ "	- 1 ¹ / ₁₆ "	-3 ³ / ₈ "	-1 ⁷ / ₈ "	- 1 ¹ / ₁₆ "	- 1 ¹ / ₁₆ "
	8	2 ¹ / ₈ "	3 ¹ / ₁₆ "	- 1 ¹ / ₁₆ "	-3 ³ / ₈ "	-1 ⁷ / ₈ "	- 1 ¹ / ₁₆ "	- 1 ¹ / ₁₆ "
	9	2 ¹ / ₈ "	3 ³ / ₄ "	- 1 ¹ / ₁₆ "	-3 ³ / ₈ "	-1 ¹ / ₁₆ "	- 1 ¹ / ₁₆ "	- 1 ¹ / ₁₆ "

* Based on a beam age of 60 days at the time of erection.

** Deflection due to the weight of the metal forms and the weight of the concrete in the valleys of the forms.

*** Includes deflection due to sidewalk in addition to parapet.

"+" indicates upward movement
"-" indicates downward movement



NOTES:

SEE SECTION 704 OF THE STANDARD SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS AND INFORMATION REGARDING PRESTRESSED CONCRETE BEAMS. SHOP DRAWINGS MUST BE SUBMITTED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL OVERHANG BRACKETS IN THE TOP FLANGE OF EXTERIOR BEAMS SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M 111, AASHTO M 232, OR ASTM F 2329 AS APPROPRIATE AND SHALL BE DETAILED ACCORDINGLY IN THE SHOP PLANS.

USE PRESTRESSING STRANDS THAT CONFORM TO THE LATEST AASHTO M 203 FOR GRADE 270 (LOW RELAXATION).

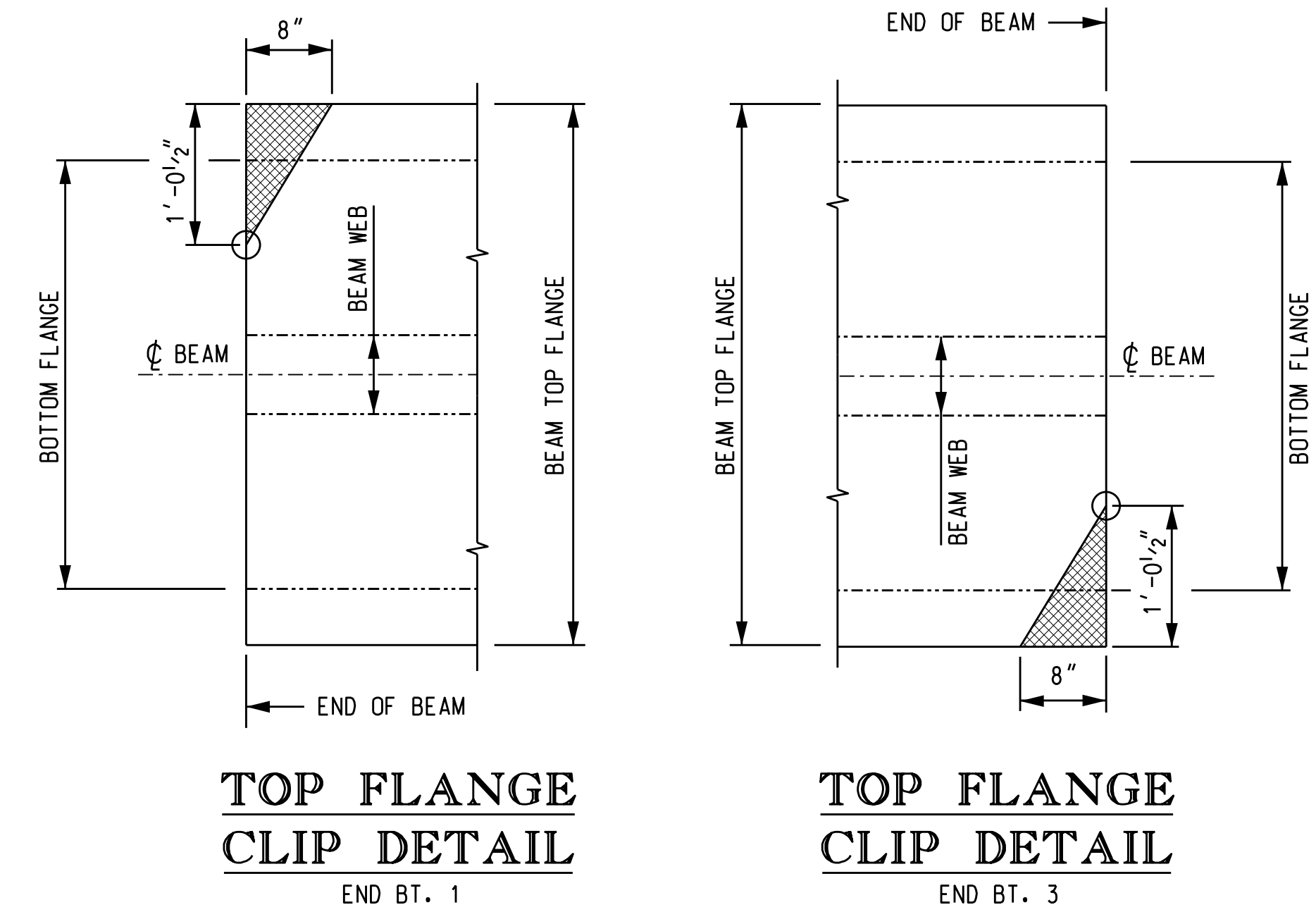
THE TENSIONING LOAD IN IN SPANS A & B IS 43.94 KIPS. DO NOT RELEASE THE STRANDS UNTIL THE COMPRESSIVE STRENGTH OF THE CONCRETE HAS REACHED THE VALUE SHOWN FOR f'ci.

ON THE TOP SURFACE OF BEAMS WHERE CAST-IN-PLACE CONCRETE WILL BE PLACED, PROVIDE A FINISH THAT IS CLEAN, FREE OF LAITANCE, AND INTENTIONALLY ROUGHENED TO A FULL AMPLITUDE OF APPROXIMATELY 1/4 ". FINISH TOP OF BEAM LEVEL.

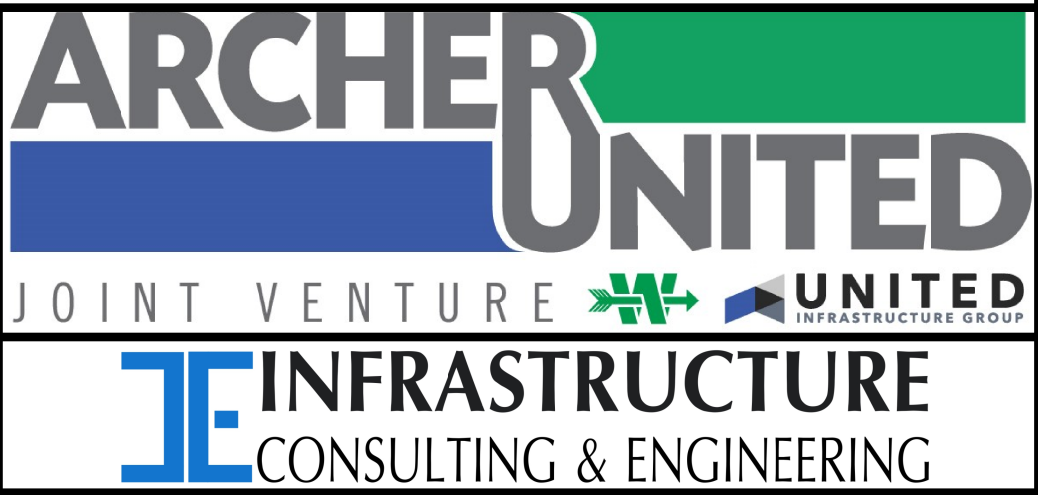
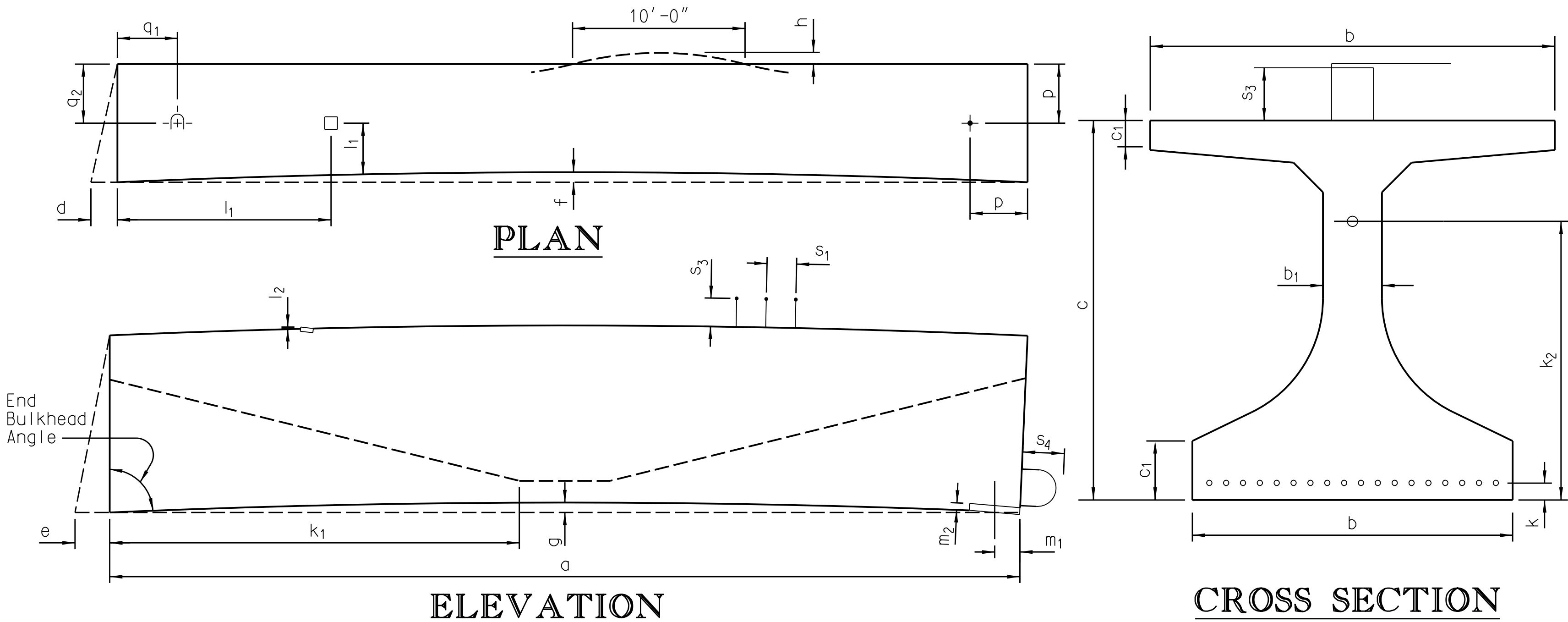
ALWAYS MAINTAIN PRESTRESSED CONCRETE BEAMS IN AN UPRIGHT POSITION. USE LIFTING DEVICES PROVIDED AT EACH END OF THE BEAM TO LIFT OR HANDLE BEAMS. DO NOT PERMIT BEAMS TO BE PLACED OR STORED ON INTERIOR SUPPORTS CAUSING NEGATIVE MOMENTS.

LOCATE HOLES FOR DIAPHRAGM BOLTS AS SHOWN. FORM HOLES WITH 2" INSIDE DIA. PIPE AND PREVENT MOVEMENT DURING CASTING BY SECURELY FASTENING THE PIPE.

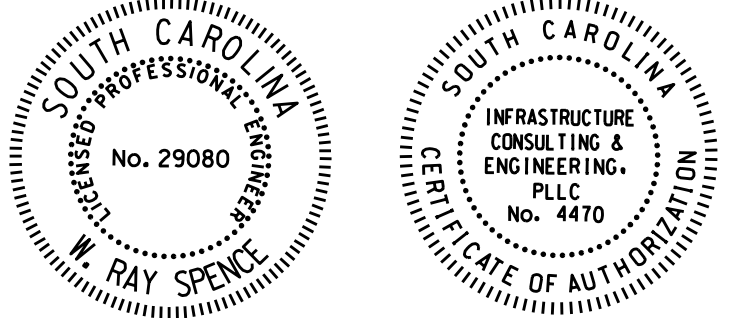
a	Length	± 1 ¹ / ₄ " per 25' length, ± 1" max.
b	Width (overall)	+ 3 ³ / ₈ ", - 1 ¹ / ₄ "
b ₁	Web Width	+ 3 ³ / ₈ ", - 1 ¹ / ₄ "
c	Depth (overall)	+ 1 ¹ / ₂ ", - 1 ¹ / ₄ "
c ₁	Flange Depth	± 1 ¹ / ₄ "
d	Variation from Specified Plan End Squareness or Skew	± 1 ¹ / ₈ " per 12" width, ± 1 ¹ / ₂ " max.
e	Variation from Specified Elevation End Squareness or Skew	± 3 ¹ / ₁₆ " per 12" depth, ± 1" max.
f	Sweep	1 ¹ / ₈ " per 10' length
g	Camber Variation from Design Camber (measurement of camber for comparison to predicted design values should be completed within 72 hrs. of transfer of prestr. force)	± 1 ¹ / ₈ " per 10' ± 1 ¹ / ₂ " max. up to 80' length ± 1" max. for length greater than 80'
h	Local Smoothness of Any Surface	1 ¹ / ₄ " in 10'
k	Location of Strand (Individual)	± 1 ¹ / ₄ "
k	Location of Strand (Bundled)	± 1 ¹ / ₂ "
k ₁	Location of Harp Points for Harped Strands from Design Location	± 20"
k ₂	Location of Post-Tensioning Duct	± 1 ¹ / ₄ "
l ₁	Location of Embedment	± 1"
l ₂	Tipping and Flushness of Embedment	± 1 ¹ / ₄ "
m ₁	Location of Bearing Assembly	± 5 ⁵ / ₈ "
m ₂	Tipping and Flushness of Bearing Assembly	± 1 ¹ / ₈ "
p	Location of Inserts for Structural Connections	± 1 ¹ / ₂ "
q ₁	Location of Handling Device Parallel to Length of Member	± 6"
q ₂	Location of Handling Device Transverse to Length of Member	± 1"
s ₁	Longitudinal Spacing of Stirrups	± 2"
s ₂	Longitudinal Spacing of Stirrups within Distance "c" from Member Ends	± 1"
s ₃	Stirrup Projection from Beam Surface	+ 1 ¹ / ₄ ", - 1 ¹ / ₂ "
s ₄	Reinforcing Bar Projection from Beam End	± 1 ¹ / ₂ "



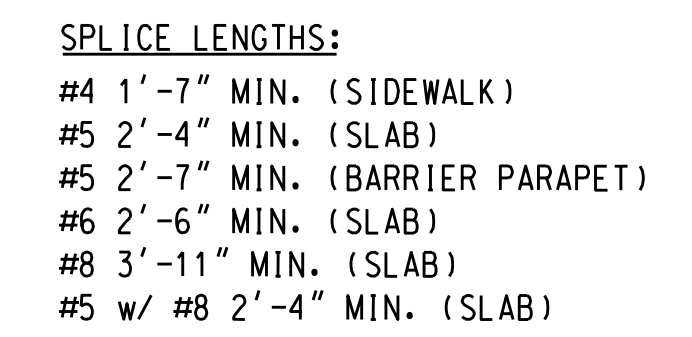
TOLERANCES



SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
PRESTRESSED CONCRETE BEAM
DETAILS FIB 54
US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20
COUNTY RICHLAND
ROUTE US 176



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QUAN.	ALP KLC 08-22
DR.	ALP KLC 08-22
DES.	ALP KLC 08-22
BY	CHK. DATE



(TRANSVERSE DIMENSIONS ARE MEASURED PERPENDICULAR TO
B US 176 WB UNLESS NOTED OTHERWISE)

NOTES:
ALL BENTS ARE PARALLEL.
FOR OVERHEAD SIGN BRACKET DETAILS, SEE "SUPERSTRUCTURE DETAILS" SHEET.
* MEASURED PERPENDICULAR TO GUTTER LINE.
* SEE MASH BARRIER/RAILING WALL SHEETS FOR SPACING.
PLACE BAR RUN IN ORDER OF BAR CALLOUT BEGINNING AT END BENT 1.

(*) INCLUDES 1,330 LBS. FOR TIE ROD ASSEMBLIES

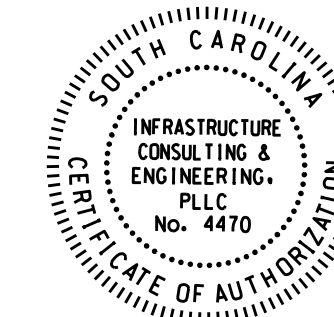


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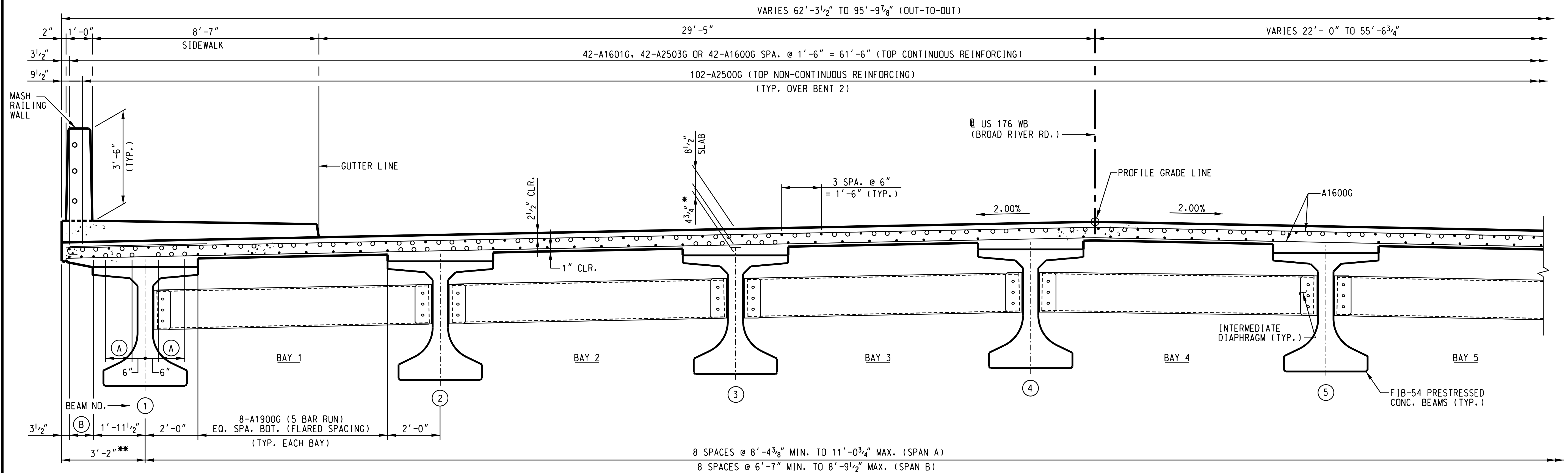
**SOUTH CAROLINA
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US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

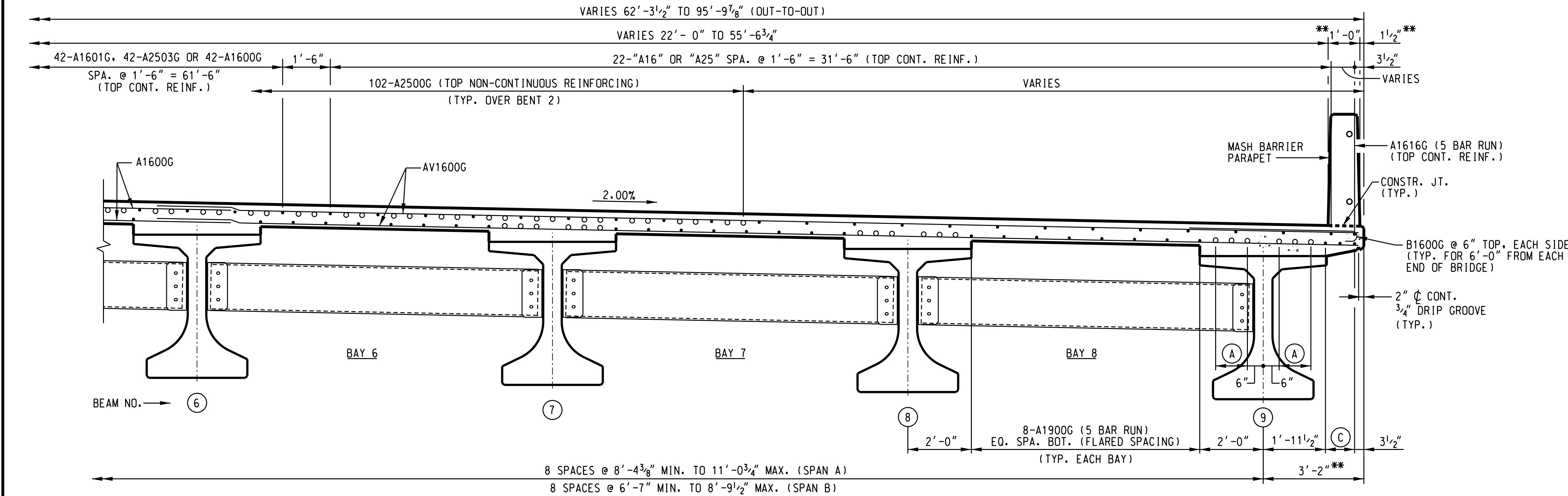
22	COUNTY	RICHLAND	ROUTE	US 176
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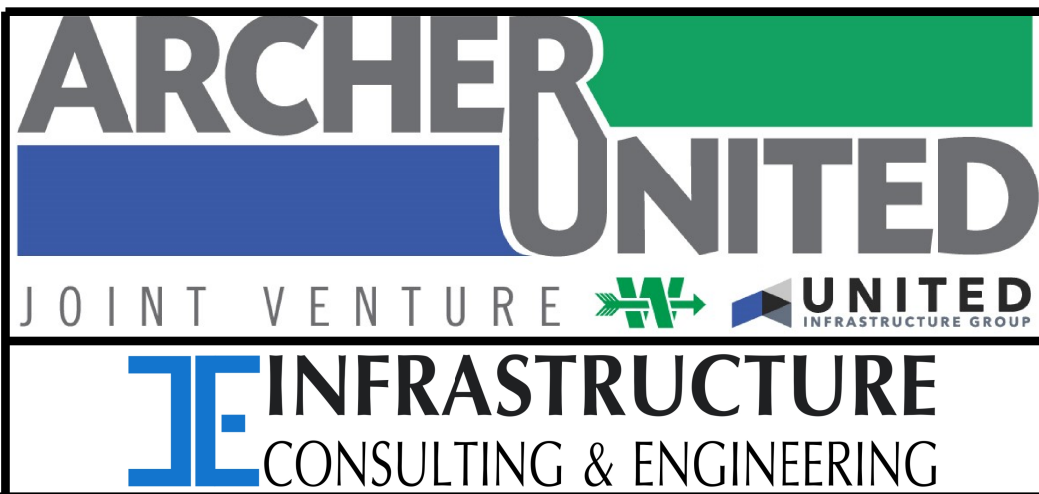


PARTIAL TYPICAL SECTION
(LOOKING IN DIRECTION OF STATIONING)

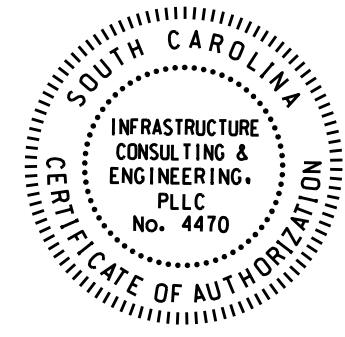
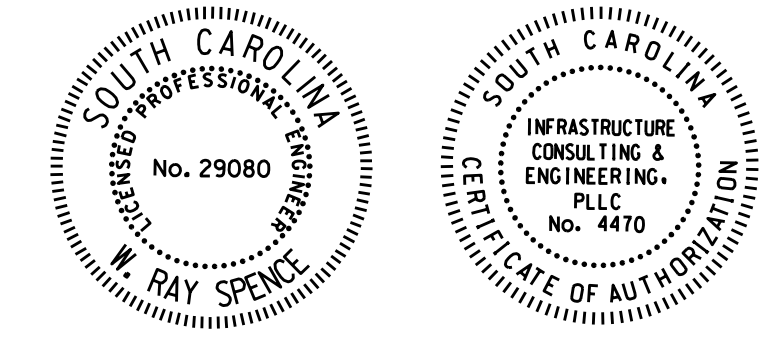


PARTIAL TYPICAL SECTION
(LOOKING IN DIRECTION OF STATIONING)

- NOTES:**
- ALL DIMENSIONS MEASURED PERPENDICULAR TO US 176 WB UNLESS NOTED OTHERWISE.
- DECK SLAB, SIDEWALK AND BARRIER REINFORCEMENT SHALL BE GALVANIZED.
- (A) 3-A2500G @ 6" SPA. = 1'-0" (BOTTOM NON-CONTINUOUS REINFORCING OVER BENT 2) (TYP. AT BEAMS 1, 2, 3, 7, 8 & 9 ONLY)
- (B) 3-A2501G (5 BAR RUN) SPA. @ 5 1/2" = 11" (BOTTOM CONTINUOUS REINFORCING)
- (C) 3-A2502G (5 BAR RUN) SPA. @ 5 1/2" = 11" (BOTTOM CONTINUOUS REINFORCING)
- * AT BEARING, VARIES IN SPAN TO COMPENSATE FOR VARIATIONS OF CAMBER AND VERTICAL ORDINATE
- ** PERPENDICULAR TO GUTTER LINE
- DENOTES CONTINUOUS LONGITUDINAL REINFORCING
- DENOTES NON-CONTINUOUS LONGITUDINAL REINFORCING

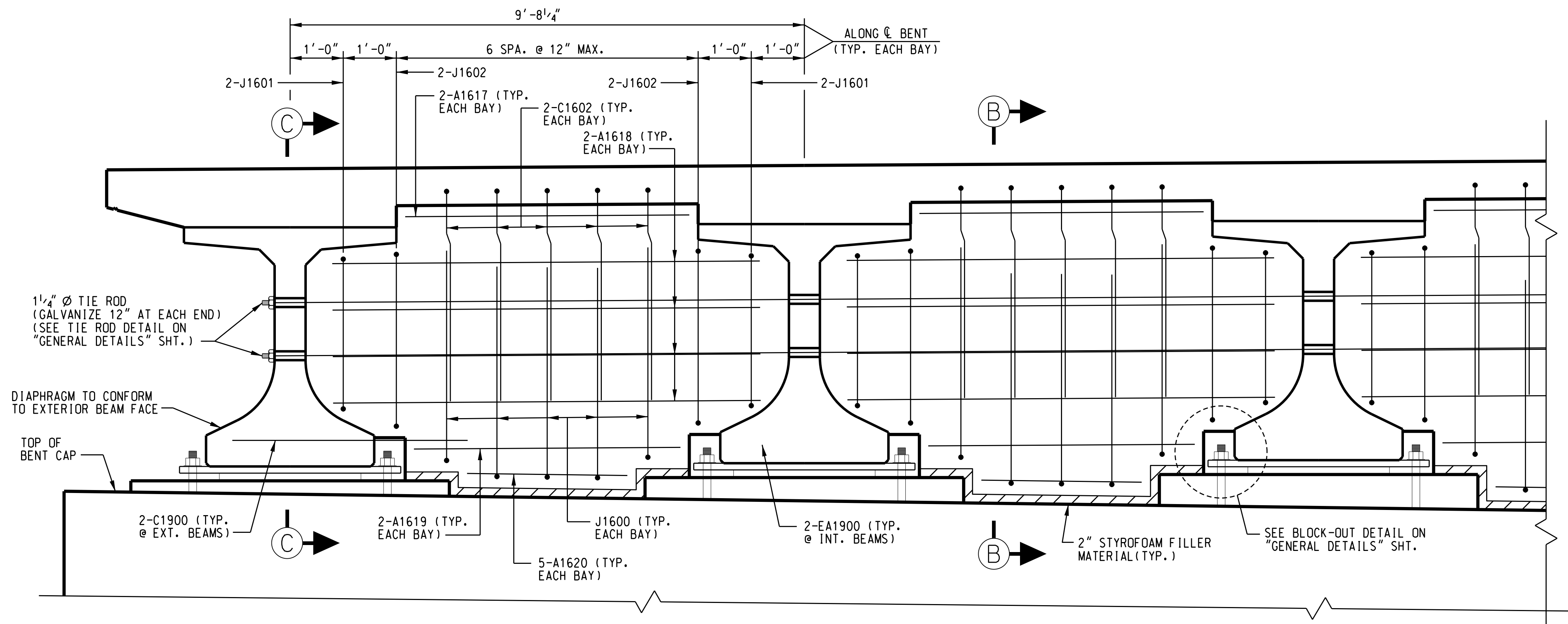


SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	
TYPICAL SECTION	
US 176 WB (BROAD RIVER RD.) BRIDGE OVER I-20	
COUNTY	RICHLAND
ROUTE	US 176



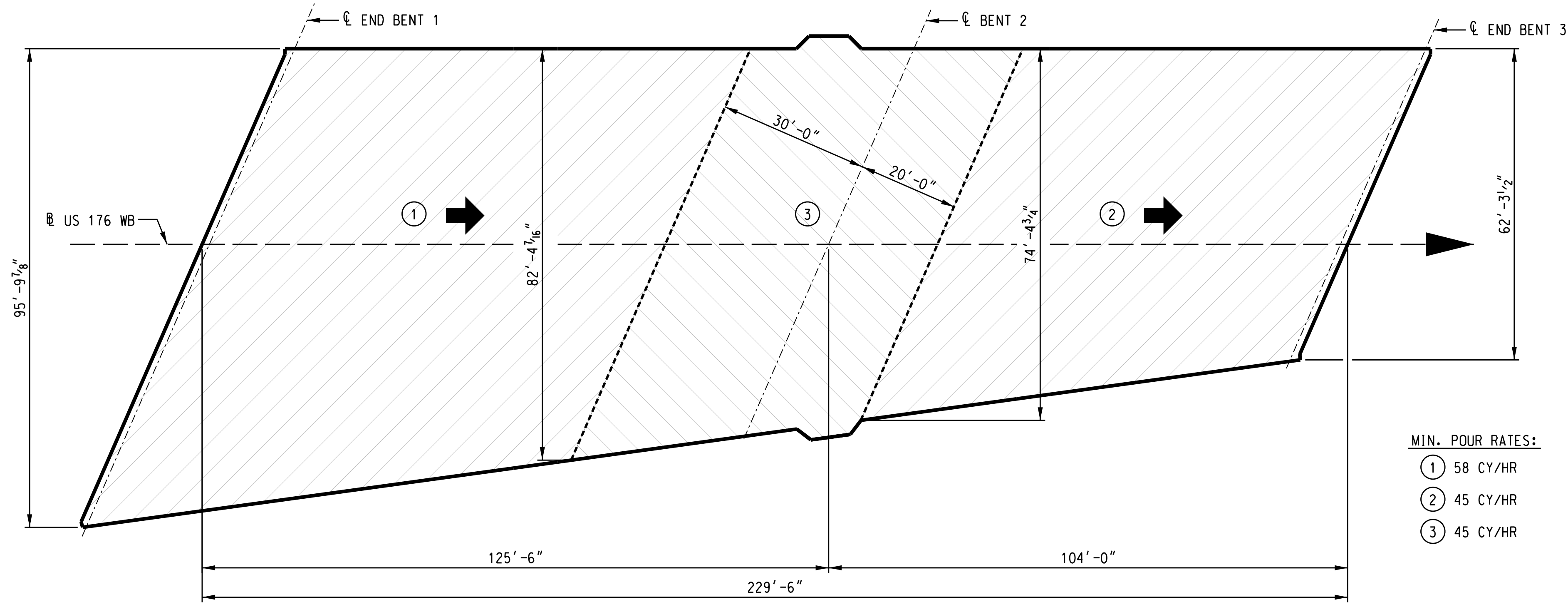
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DR.	WRS ALP 08-22
DES.	WRS ALP 07-22
BY	CHK. DATE

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PARTIAL ELEVATION OF INTERIOR BENT DIAPHRAGM

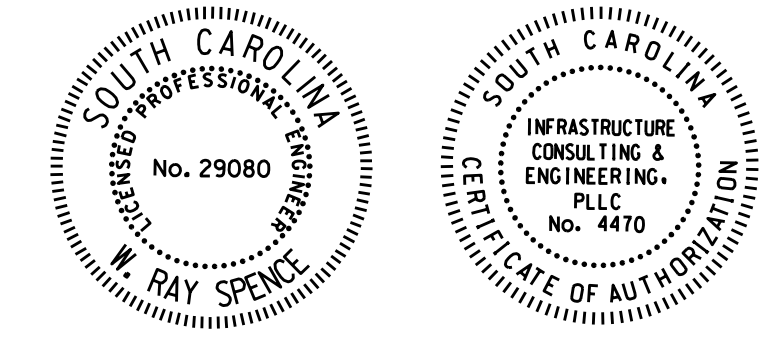
THE CONTRACTOR SHALL SUBMIT OVERHEAD SIGN STRUCTURE DETAILS AND LOADING INFORMATION TO THE STRUCTURAL ENGINEER-OF-RECORD FOR REVIEW AND ACCEPTANCE PRIOR TO PLACEMENT OF THE BRIDGE DECK.



POURING SEQUENCE SKETCH

- MIN. POUR RATES:
- 1 58 CY/HR
 - 2 45 CY/HR
 - 3 45 CY/HR

- POURING SEQUENCE NOTES
1. THE POURING SEQUENCE FOR THE SLAB SHALL BE IN THE NUMERICAL ORDER INDICATED, WITH EACH NUMBERED SECTION CONSTITUTING A SEPARATE POUR. MINIMUM POUR RATE SHALL BE 45 CY/HR UNLESS NOTED OTHERWISE.
 2. 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.
 3. NO PRESCRIBED ORDER FOR PARAPET POURS, HOWEVER, PARAPET SHALL NOT BE POURED UNTIL 5 DAYS AFTER ALL SLAB POURS HAVE BEEN MADE OR ALL SLAB POURS HAVE REACHED SPECIFIED 28-DAY COMPRESSIVE STRENGTH. STRIKE ALL SLAB FALSEWORK PRIOR TO PLACING BARRIER PARAPET PER SCDDT STANDARD SPECIFICATION 702.4.5 ITEM 4.
 4. THE CONTRACTOR SHALL MAKE ADEQUATE PROVISION DURING PLACEMENT OF SLAB TO PREVENT THE EXTERIOR BEAMS FROM TWISTING.
 5. NO CONSTRUCTION JOINTS WILL BE ALLOWED AT CENTERLINE OF INTERIOR BENTS.
- # - INDICATES POUR NUMBER
- ← - INDICATES POUR DIRECTION (IF NOT SPECIFIED, POUR CAN BE MADE IN EITHER DIRECTION)



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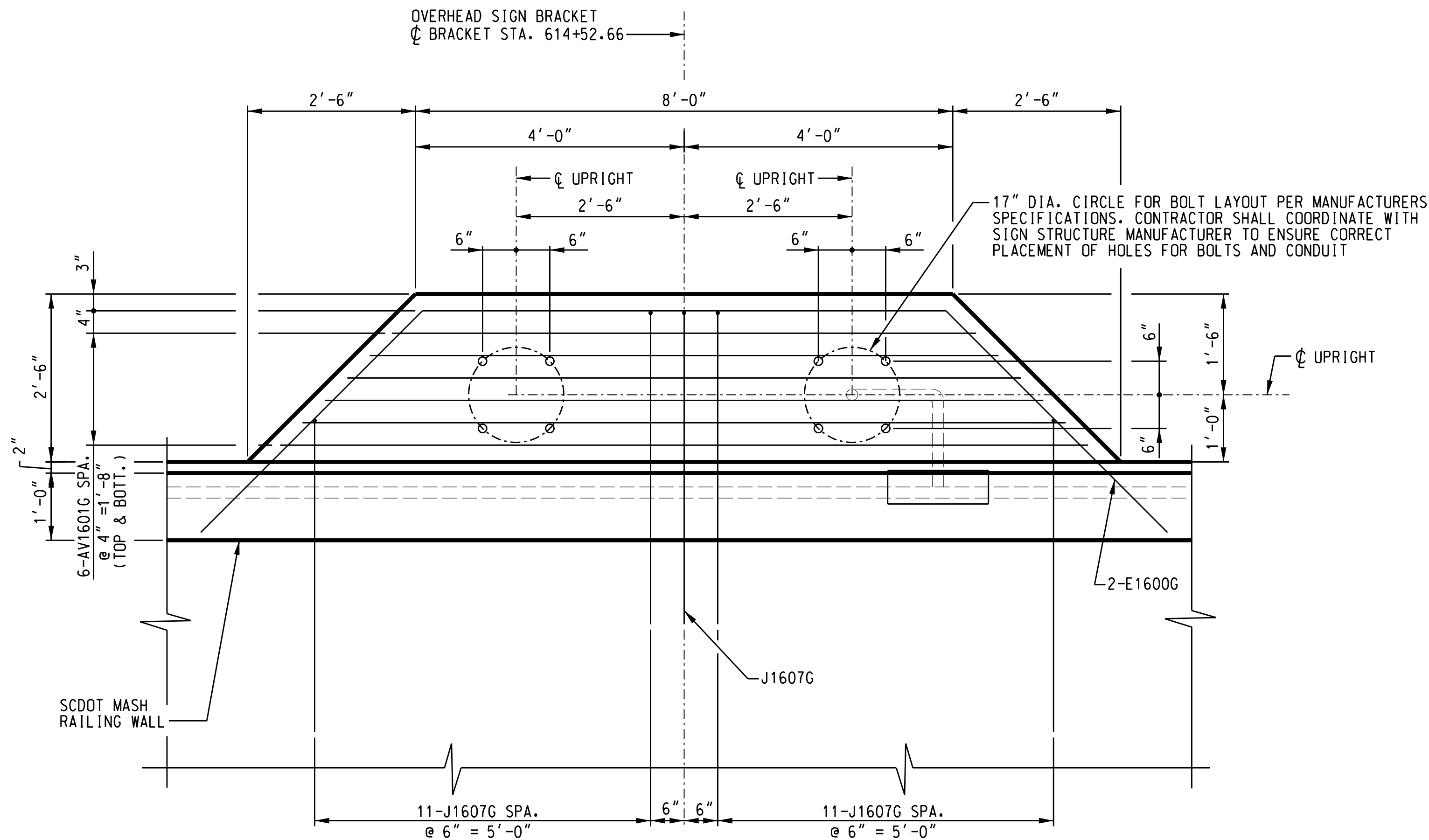
SUPERSTRUCTURE DETAILS (1)

US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

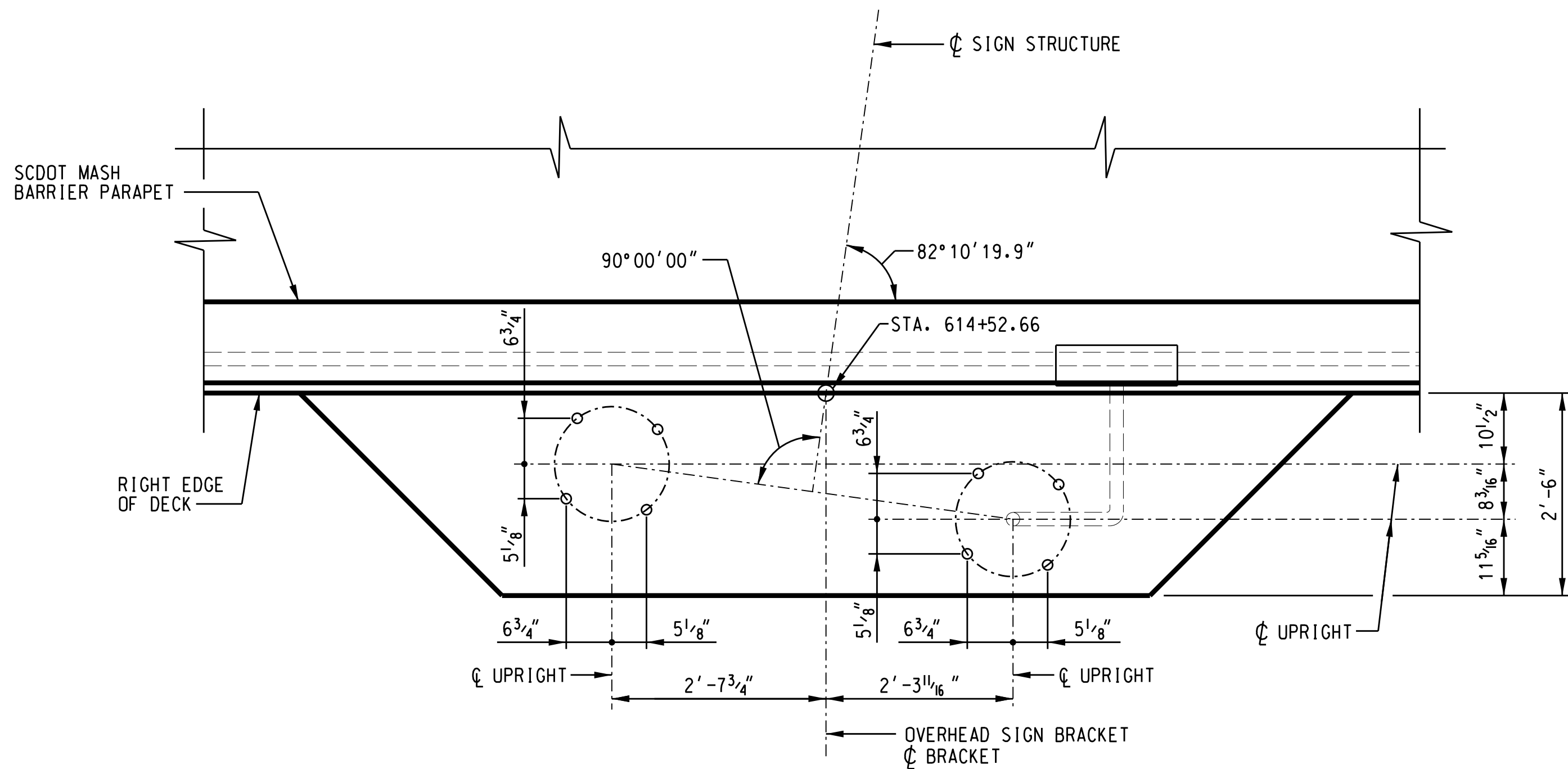
COUNTY RICHLAND ROUTE US 176

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BRIDGE PLANS ID	SHEET NO.
P039719-B42a	39



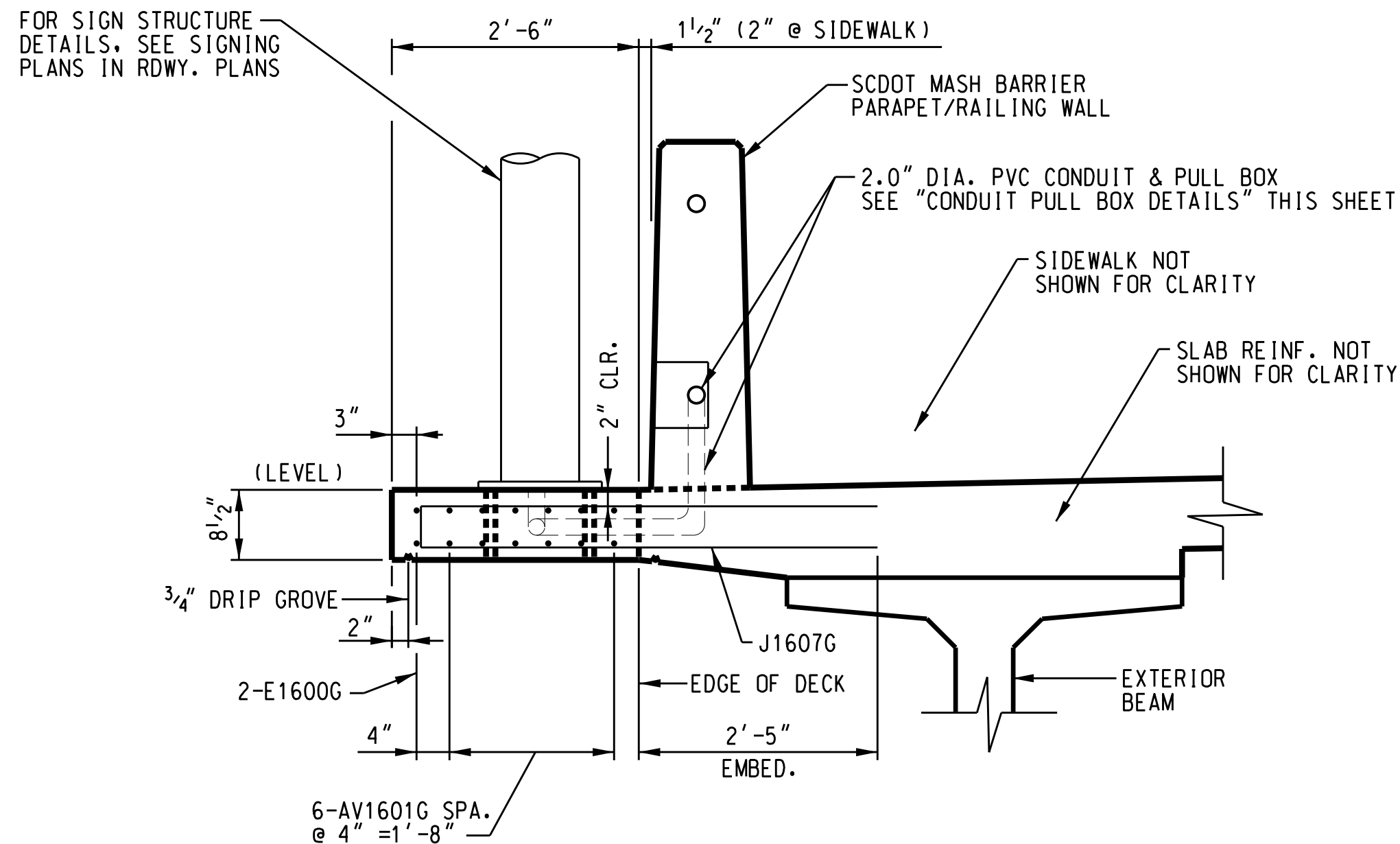
**SIGN BRACKET PLAN
AT LEFT EDGE OF DECK**



**SIGN BRACKET PLAN
AT RIGHT EDGE OF DECK**

NOTE: SEE "SIGN BRACKET PLAN AT LEFT EDGE OF DECK" DETAIL FOR ADDITIONAL INFORMATION NOT SHOWN.

THE CONTRACTOR SHALL SUBMIT OVERHEAD SIGN STRUCTURE DETAILS AND LOADING INFORMATION TO THE STRUCTURAL ENGINEER-OF-RECORD FOR REVIEW AND ACCEPTANCE PRIOR TO PLACEMENT OF THE BRIDGE DECK.

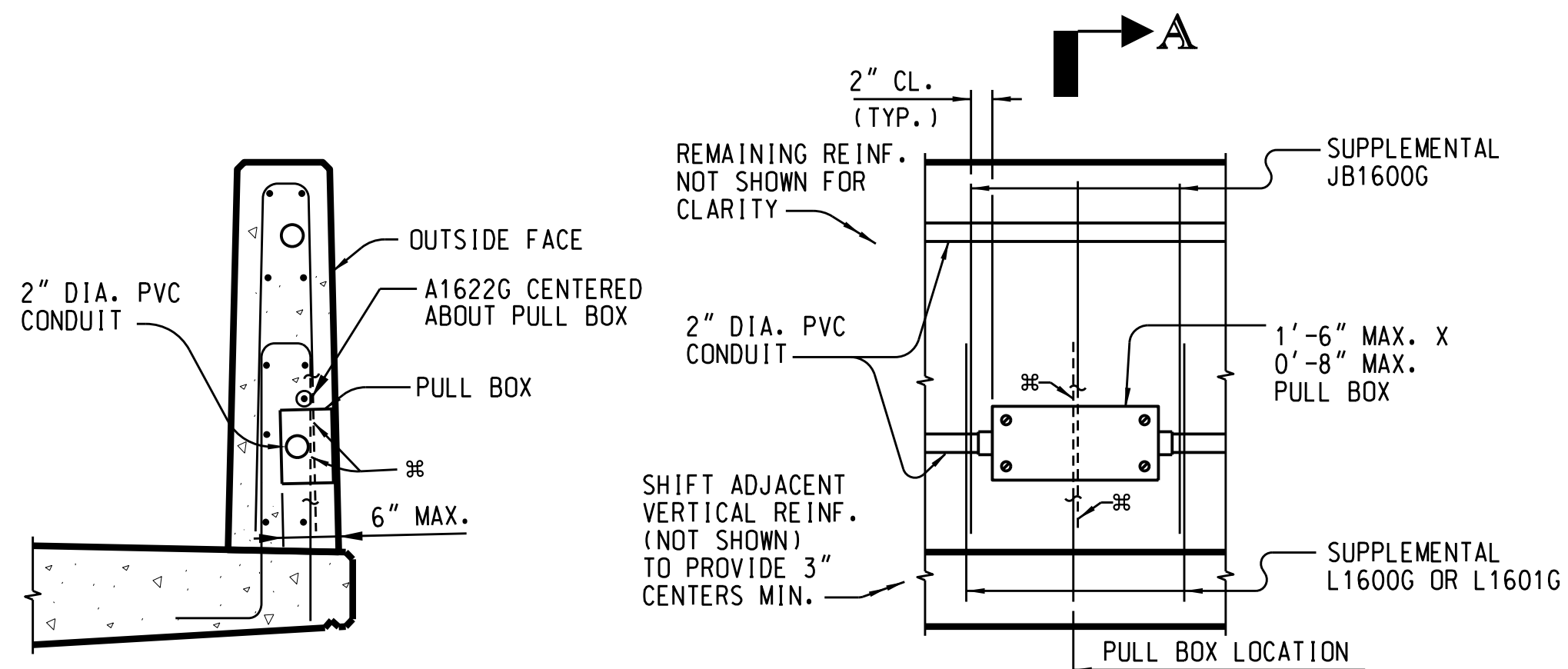


SIGN BRACKET SECTION

FOR SIGN BRACKET LOCATIONS, SEE "PLAN OF SPAN" SHT.

POUR SIGN BRACKET MONOLITHICALLY WITH DECK.

BAR SPACING MAY BE ADJUSTED SLIGHTLY TO CLEAR ANCHOR BOLT HOLES AND DECK REINFORCING.



**SECTION THRU BARRIER
PARAPET AT PULL BOX**

**ELEVATION OF BARRIER
PARAPET AT PULL BOX**

CONDUIT PULL BOX DETAILS

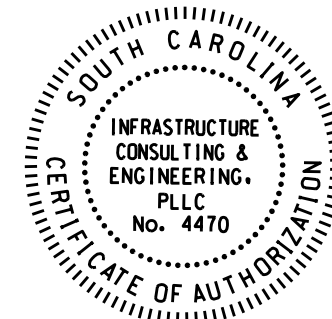
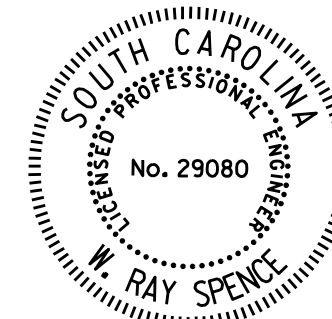
MOUNT NONMETALLIC OR GALVANIZED STEEL PULL BOXES FLUSH WITH THE OUTSIDE FACE OF THE BARRIER PARAPET.

PULL BOXES ARE REQUIRED AT OVERHEAD SIGN BRACKET LOCATIONS.

PROVIDE PULL BOXES WITH GASKETED WEATHERPROOF COVERS.

3/8" FIELD CUT AND/OR BEND BARRIER REINFORCING ALONG OUTSIDE FACE AROUND THE PULL BOXES AS NECESSARY TO PROVIDE 2 INCH CLEARANCE BETWEEN THE REINFORCING AND THE PULL BOXES.

SUPPLEMENTAL PULL BOX REINFORCEMENT IS INCLUDED IN THE SUPERSTRUCTURE REINFORCING STEEL SCHEDULE.



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SUPERSTRUCTURE DETAILS (2)

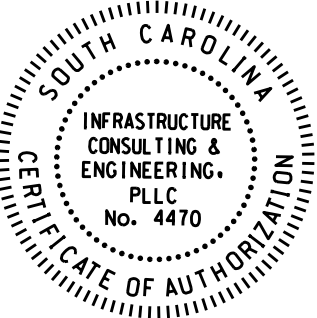
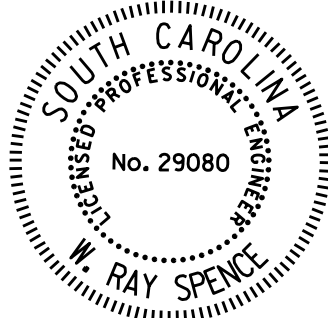
US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

COUNTY RICHLAND ROUTE US 176

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SUPERSTRUCTURE									
REINFORCING STEEL SCHEDULE									
LOCATION	MARK	NO. REQ'D	DIMENSION					LENGTH	
			"a"	"b"	"c"	"d"	"e"		
SIDEWALK	A1300G	88	30'-1"	-----	-----	-----	-----	30'-1"	
			-----	-----	-----	-----	-----		
SLAB	A1600G	501	60'-0"	-----	-----	-----	-----	60'-0"	
SLAB	A1601G	110	48'-3"	-----	-----	-----	-----	48'-3"	
SLAB	A1602G	1	5'-9"	-----	-----	-----	-----	5'-9"	
SLAB	A1603G	1	16'-1"	-----	-----	-----	-----	16'-1"	
SLAB	A1604G	1	26'-4"	-----	-----	-----	-----	26'-4"	
SLAB	A1605G	1	36'-6"	-----	-----	-----	-----	36'-6"	
SLAB	A1606G	1	46'-10"	-----	-----	-----	-----	46'-10"	
SLAB	A1607G	1	57'-1"	-----	-----	-----	-----	57'-1"	
SLAB	A1608G	2	34'-11"	-----	-----	-----	-----	34'-11"	
SLAB	A1609G	2	40'-0"	-----	-----	-----	-----	40'-0"	
SLAB	A1610G	2	45'-2"	-----	-----	-----	-----	45'-2"	
SLAB	A1611G	1	10'-8"	-----	-----	-----	-----	10'-8"	
SLAB	A1612G	1	20'-11"	-----	-----	-----	-----	20'-11"	
SLAB	A1613G	1	31'-2"	-----	-----	-----	-----	31'-2"	
SLAB	A1614G	1	41'-5"	-----	-----	-----	-----	41'-5"	
SLAB	A1615G	1	51'-8"	-----	-----	-----	-----	51'-8"	
SLAB	A1616G	5	51'-1"	-----	-----	-----	-----	51'-1"	
BT. 2 DIAPHRAGM	A1617	16	4'-8"	-----	-----	-----	-----	4'-8"	
BT. 2 DIAPHRAGM	A1618	64	7'-7"	-----	-----	-----	-----	7'-7"	
BT. 2 DIAPHRAGM	A1619	16	4'-4"	-----	-----	-----	-----	4'-4"	
BT. 2 DIAPHRAGM	A1320	40	3'-0"	-----	-----	-----	-----	3'-0"	
BT. 2 DIAPHRAGM	A1621	4	5'-0"	-----	-----	-----	-----	5'-0"	
BARRIER/RAILING WALL	A1622G	2	10'-0"	-----	-----	-----	-----	10'-0"	
RAILING WALL	A1623G	40	59'-4"	-----	-----	-----	-----	59'-4"	
BARRIER PARAPET	A1624G	50	51'-5"	-----	-----	-----	-----	51'-5"	
END BENT 1	A1630	20	55'-3"	-----	-----	-----	-----	55'-3"	
END BENT 1	A1631	16	7'-1"	-----	-----	-----	-----	7'-1"	
END BENT 1	A1632	24	10'-2"	-----	-----	-----	-----	10'-2"	
END BENT 1	A1633	24	7'-2"	-----	-----	-----	-----	7'-2"	
END BENT 1	A1634	4	2'-6"	-----	-----	-----	-----	2'-6"	
END BENT 1	A1635	6	4'-2"	-----	-----	-----	-----	4'-2"	
END BENT 1	A1636	6	1'-6"	-----	-----	-----	-----	1'-6"	
END BENT 1 REVEAL	A1637	12	5'-6"	-----	-----	-----	-----	5'-6"	
END BENT 3	A1680	24	5'-8"	-----	-----	-----	-----	5'-8"	
END BENT 3	A1681	8	2'-7"	-----	-----	-----	-----	2'-7"	
END BENT 3	A1682	2	2'-5"	-----	-----	-----	-----	2'-5"	
END BENT 3	A1683	6	3'-9"	-----	-----	-----	-----	3'-9"	
END BENT 3	A1684	2	1'-6"	-----	-----	-----	-----	1'-6"	
END BENT 3	A1685	4	36'-11"	-----	-----	-----	-----	36'-11"	
END BENT 3	A1686	16	2'-8"	-----	-----	-----	-----	2'-8"	
			-----	-----	-----	-----	-----		
SLAB	A1900G	320	51'-3"	-----	-----	-----	-----	51'-3"	
			-----	-----	-----	-----	-----		
END BENT 1	A2200	4	55'-6"	-----	-----	-----	-----	55'-6"	
END BENT 3	A2201	4	37'-4"	-----	-----	-----	-----	37'-4"	
SLAB	A2500G	138	40'-0"	-----	-----	-----	-----	40'-0"	
SLAB	A2501G	15	49'-0"	-----	-----	-----	-----	49'-0"	
SLAB	A2502G	15	52'-6"	-----	-----	-----	-----	52'-6"	
SLAB	A2503G	96	42'-0"	-----	-----	-----	-----	42'-0"	
SLAB	A2504G	1	16'-7"	-----	-----	-----	-----	16'-7"	
SLAB	A2505G	1	26'-10"	-----	-----	-----	-----	26'-10"	
SLAB	A2506G	1	37'-1"	-----	-----	-----	-----	37'-1"	
SLAB	A2507G	1	47'-4"	-----	-----	-----	-----	47'-4"	
SLAB	A2508G	1	57'-8"	-----	-----	-----	-----	57'-8"	
SLAB	A2509G	2	35'-11"	-----	-----	-----	-----	35'-11"	
			-----	-----	-----	-----	-----		
SLAB	AV1600G	459	28'-3"	10'-0"	46'-6"	0'-1"	-----	28'-3"	
SIGN BRACKET	AV1601G	24	10'-4"	8'-8"	12'-0"	0'-8"	-----	10'-4"	
			-----	-----	-----	-----	-----		
SIDEWALK	BA1300G	231	10'-3"	0'-7 1/2"	-----	-----	-----	10'-11"	
			-----	-----	-----	-----	-----		
SLAB	B1600G	52	6'-0"	0'-7"	-----	-----	-----	6'-7"	
			-----	-----	-----	-----	-----		
SIDEWALK	C1300G	231	2'-0"	0'-9"	-----	-----	-----	2'-9"	
			-----	-----	-----	-----	-----		
CAP REV.	C1600	12	2'-6"	1'-6"	-----	-----	-----	4'-0"	
WINGWALL 1	C1601	9	3'-6"	1'-6"	-----	-----	-----	5'-0"	
BT. 2 DIAPHRAGM	C1602	80	4'-2"	0'-10"	-----	-----	-----	5'-0"	
BT. 2 DIAPHRAGM	C1900	4	3'-6"	1'-0"	-----	-----	-----	4'-6"	
END BENTS 1 & 3	C1901G	172	6'-0"	2'-10"	-----	-----	-----	8'-10"	

SUPERSTRUCTURE CONTINUED									
REINFORCING STEEL SCHEDULE									
LOCATION	MARK	NO. REQ'D	DIMENSION					LENGTH	
			"a"	"b"	"c"	"d"	"e"		
SIGN BRACKET	E1600G	4	7'-10"	4'-8"	3'-4"	-----	-----	17'-2"	
			-----	-----	-----	-----	-----		
BT. 2 DIAPHRAGM	EA1900	14	4'-0"	1'-0"	0'-5 1/2"	-----	-----	6'-0"	
			-----	-----	-----	-----	-----		
CAP REV.	F1600	12	3'-2 1/2"	2'-1 5/8"	2'-0 3/4"	0'-6 5/8"	-----	5'-4"	
WINGWALL 3	F1601	13	13'-5 1/4"	0'-10"	0'-4"	0'-9 1/8"	-----	14'-3"	
WINGWALL 4	F1602	13	10'-5 3/4"	4'-10 1/2"	4'-9 7/8"	0'-8"	-----	15'-4"	
WINGWALL 4	F1603	10	3'-9"	1'-6"	0'-1 1/4"	1'-5 7/8"	-----	5'-3"	
WINGWALL 3	F2201	13	13'-7"	1'-7"	0'-7 5/8"	1'-5 3/8"	-----	15'-2"	
WINGWALL 4	F2202	13	10'-6 3/8"	4'-6 1/8"	4'-5 5/8"	0'-7 3/8"	-----	15'-1"	
			-----	-----	-----	-----	-----		
END BENTS 1 & 3	FA1900G	173	3'-0"	1'-0"	0'-8 1/2"	0'-8 1/2"	0'-8"	4'-8"	
			-----	-----	-----	-----	-----		
WINGWALL 1	FB1600	12	14'-10"	0'-10"	0'-4"	0'-9 1/4"	-----	15'-8"	
WINGWALL 1	FB2200	12	14'-4"	1'-7"	0'-7 1/2"	1'-5 3/8"	-----	15'-11"	
			-----	-----	-----	-----	-----		
BT. 2 DIAPHRAGM	J1600	40	5'-1"	0'-6 1/2"	-----	-----	-----	6'-2"	
BT. 2 DIAPHRAGM	J1601	32	2'-11"	3'-9"	-----	-----	-----	10'-5"	
BT. 2 DIAPHRAGM	J1602	32	3'-4"	3'-9"	-----	-----	-----	10'-10"	
END BENTS 1 & 3	J1603	144	2'-0"	3'-4"	-----	-----	-----	8'-8"	
END BENTS 1 & 3	J1604	100	3'-3"	4'-0"	-----	-----	-----	11'-3"	
WINGWALLS	J1605	45	0'-11"	5'-0"	-----	-----	-----	10'-11"	
BT. 2 DIAPHRAGM	J1606	10	1'-3"	2'-0"	-----	-----	-----	5'-3"	
SIGN BRACKET	J1607G	46	0'-5"	4'-8"	-----	-----	-----	9'-9"	
			-----	-----	-----	-----	-----		
BARRIER/RAILING WALL	JB1600G	509	0'-5 3/4"	3'-2"	0'-7 1/4"	-----	-----	6'-10"	
			-----	-----	-----	-----	-----		
BARRIER PARAPET	L1600G	246	1'-0"	2'-7"	0'-6 1/2"	2'-7"	-----	6'-9"	
RAILING WALL	L1601G	263	1'-0"	3'-3"	0'-6 1/2"	3'-3"	-----	8'-1"	
			-----	-----	-----	-----	-----		
END BENTS 1 & 3	N1600	100	0'-10"	4'-0"	3'-6"	-----	-----	8'-4"	
			-----	-----	-----	-----	-----		
CAP REV.	R1600	12	1'-7 5/8"	1'-4"	1'-2"	0'-10 1/8"	-----	4'-2"	
			-----	-----	-----	-----	-----		
1 1/4" TIE ROD ASSEM. (BENT 2 DIAPHRAGM)			Qty. 4 (2 at 79'-1" , 2 at 78'-6")					WT. = 1,330 LBS	
SBU 1" AS NECESSARY									
BBU 2 3/8" AS NECESSARY									
BBU (NEAR INT BENT) 2" AS NECESSARY									
BBU (NEAR INT BENT AT BEAMS 1-3 & 7-9) 1 3/4" AS NECESSARY									



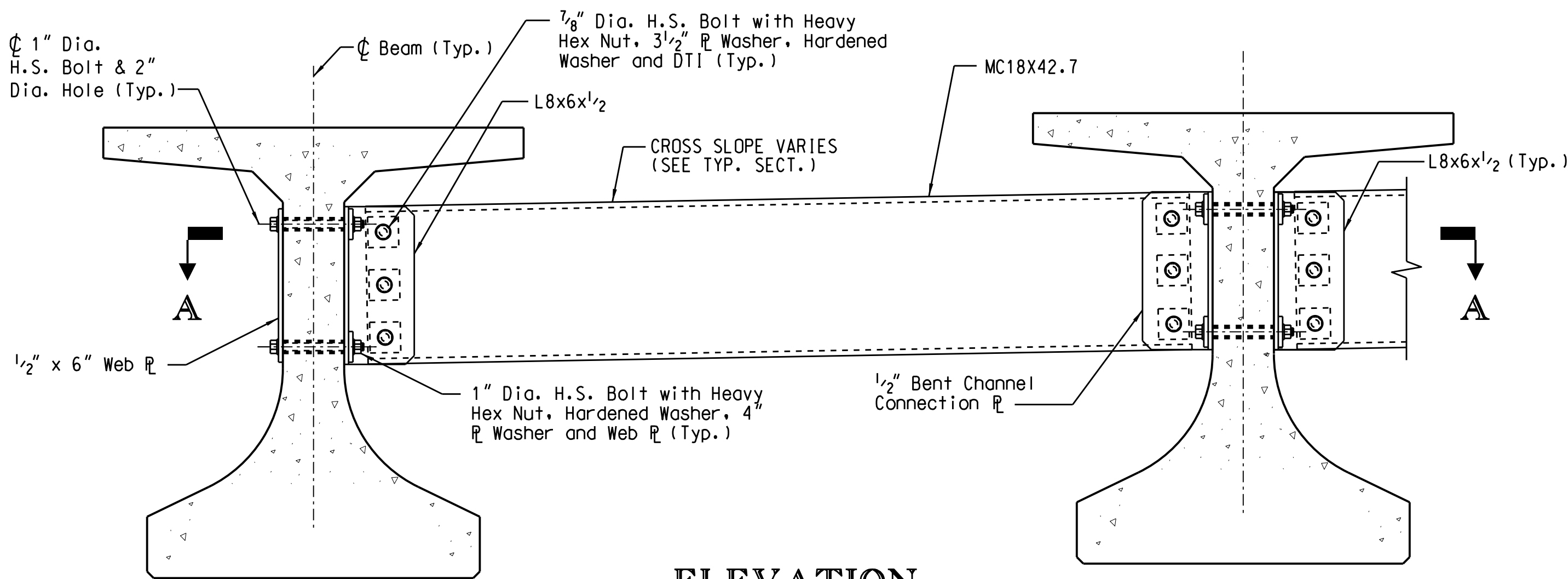
REV.			
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REVIEWED	WRS	09-22	
QUAN.			
DR.	WRS	ALP	08-22
DES.	WRS	ALP	07-22
BY	CHK.	DATE	



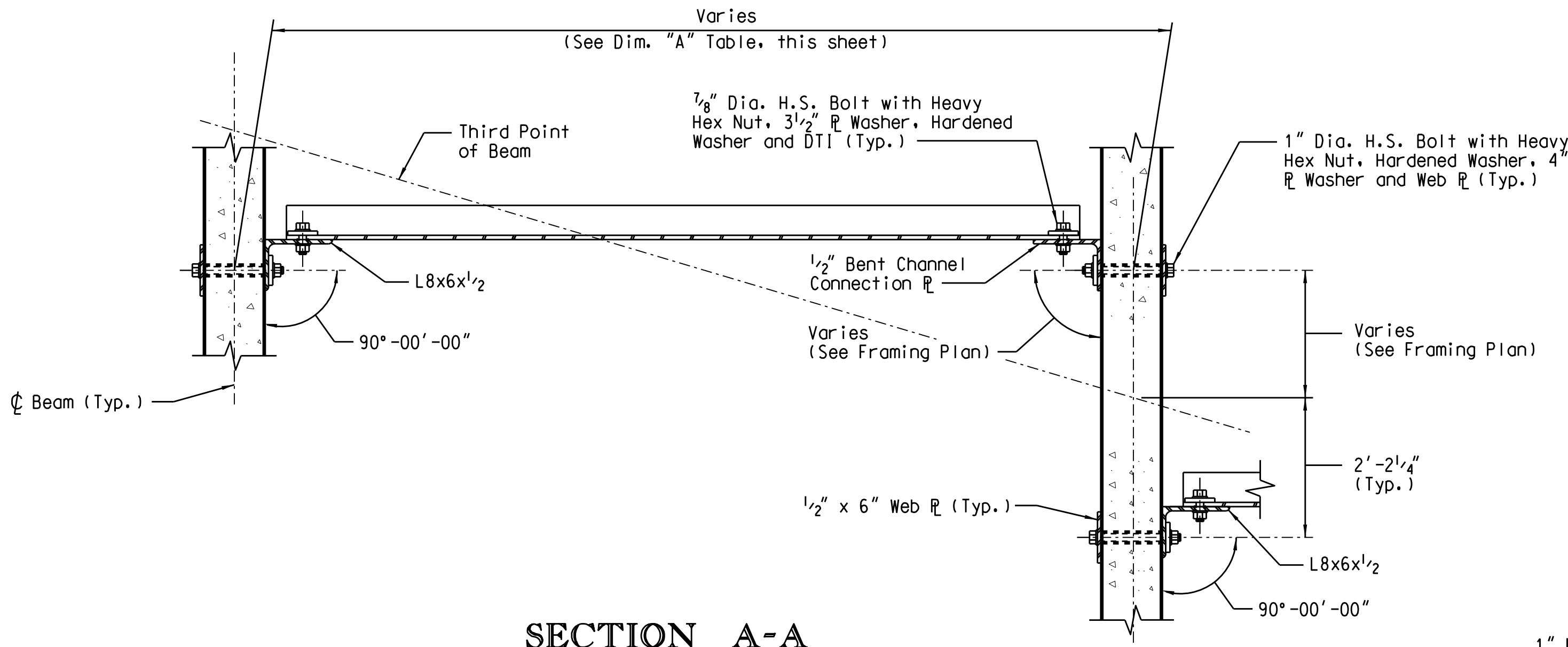
SOUTH CAROLINA	
DEPARTMENT OF TRANSPORTATION	
SUPERSTRUCTURE REINFORCEMENT SCHEDULE	
US 176 WB (BROAD RIVER RD.) BRIDGE OVER I-20	
COUNTY	RICHLAND
ROUTE	US 176

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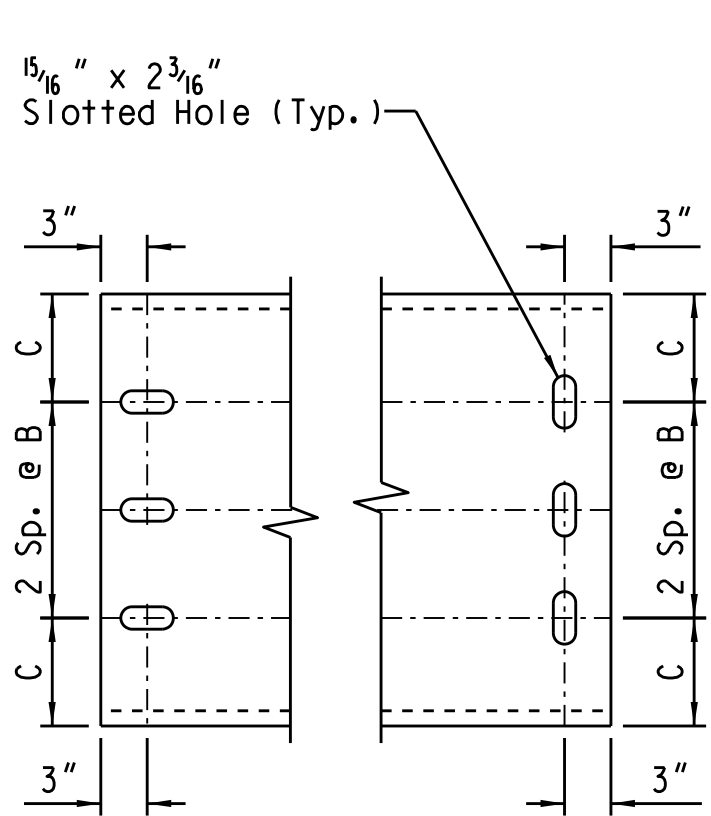
BRIDGE PLANS ID	SHEET NO.
P039719-B42a	41



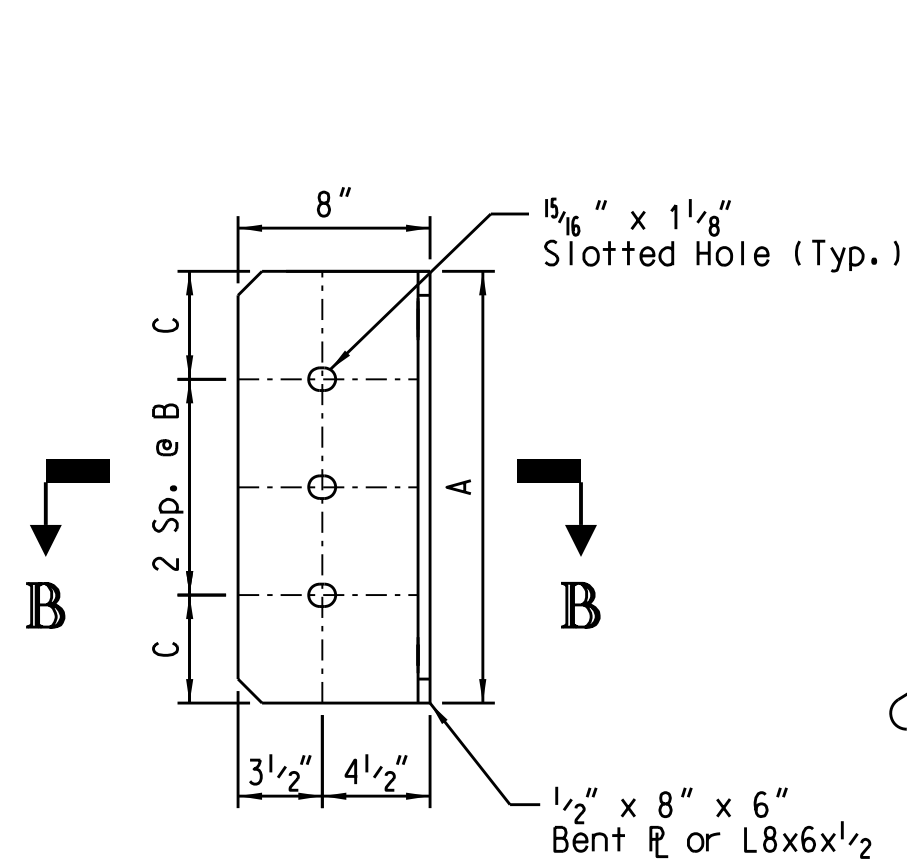
ELEVATION
(Looking in Direction of Stationing)



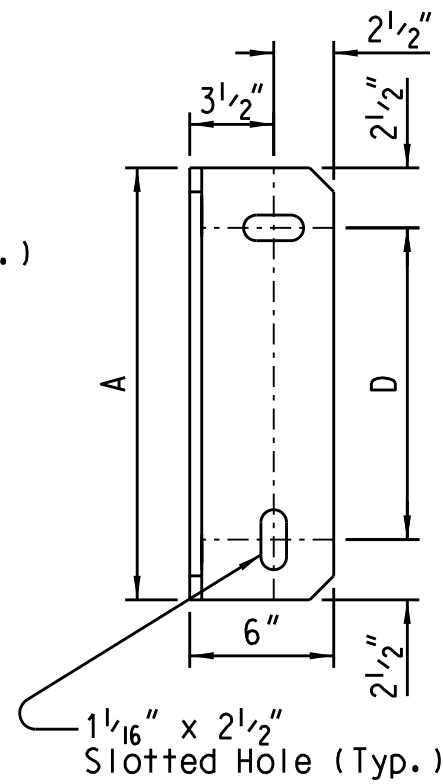
SECTION A-A



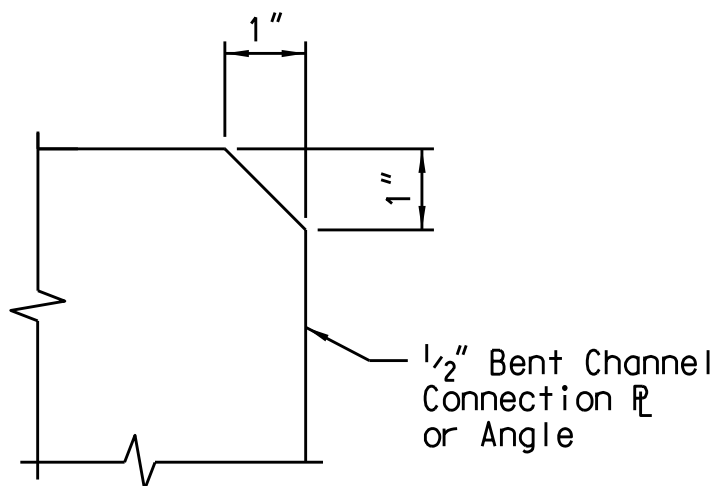
18" CHANNEL



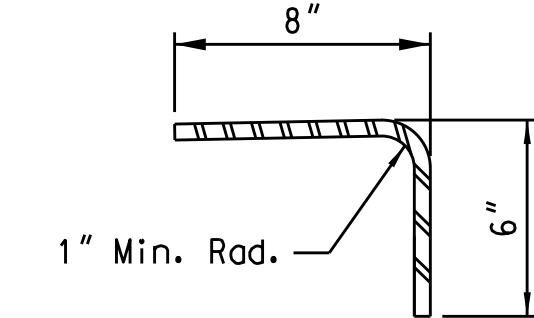
DIAPHRAGM FACE
(For 18" Channel)



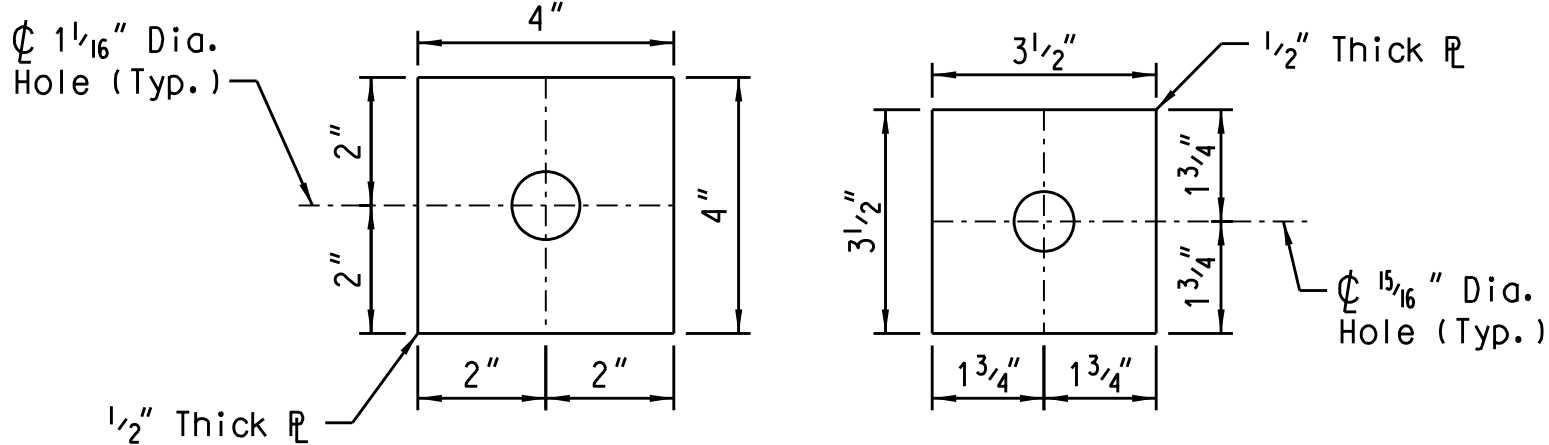
WEB FACE



CORNER CLIP

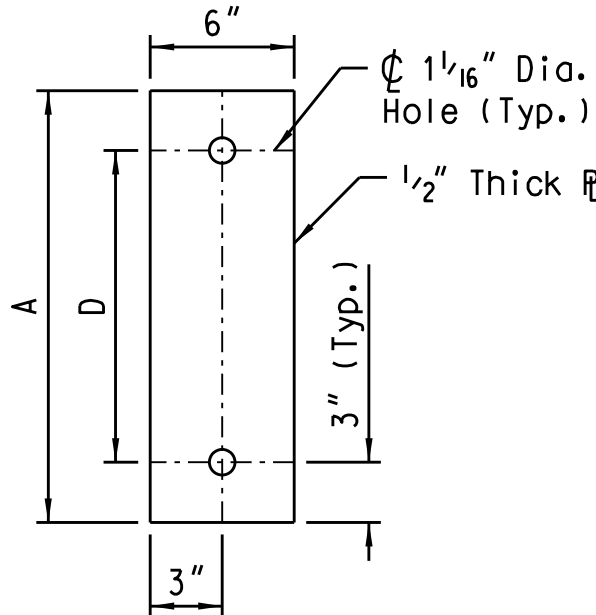


SECTION B-B
(For Bent Channel Connection)



WASHER DETAIL

Note: Use 3 1/2" \square Washer over all 1 5/16" x 2 3/16" holes.
Use 4" \square Washer over all 1 1/16" x 2 1/2" holes.



WEB \square DETAIL

Dim. "A" Table of Dimensions		
Diaphragm	Span A	Span B
1-1	10'-4 1/4"	8'-2 1/16"
2-1	10'-3 3/16"	8'-1 5/8"
3-1	10'-2 1/8"	8'-0 3/4"
4-1	10'-1 1/16"	8'-0"
5-1	10'-0"	7'-11"
6-1	9'-10 1/8"	7'-10 1/8"
7-1	9'-9 3/4"	7'-9 1/4"
8-1	9'-8 5/8"	7'-8 3/8"
1-2	9'-7 3/8"	7'-7 1/16"
2-2	9'-6 3/8"	7'-6 5/16"
3-2	9'-5 3/8"	7'-5 3/16"
4-2	9'-4 3/8"	7'-4 3/4"
5-2	9'-3 3/8"	7'-3 5/16"
6-2	9'-2 3/8"	7'-3 1/2"
7-2	9'-1 5/16"	7'-2 5/16"
8-2	9'-0 1/4"	7'-1 1/2"

Notes:

Provide structural steel sections, plates, and plate washers that conform to the requirements of AASHTO M 270, Grade 50. Galvanize all components of diaphragms including connection angle and \square washers in accordance with AASHTO M 111. Perform galvanizing after fabrication is completed. Roughen faying surfaces of bolted connections by means of hand-wire brushing. Power-wire brushing is not permitted.

Make all bolted diaphragm connections with 7/8" or 1" ASTM F3125, Grade A325 (Type 1) bolts. Mechanically galvanize bolts, heavy hex nuts, hardened washers, and direct tension indicators (DTI's) in accordance with ASTM B 695 Class 50. For the 1" bolt assemblies, galvanizing in accordance with AASHTO M 232 may be substituted for mechanical galvanizing.

Submit shop plans for steel intermediate diaphragms in accordance with the Standard Specifications.

After installation of steel diaphragms, repair all damaged areas of the galvanized finish in accordance with ASTM A 780. Use paint method to repair finish on hardware.

Form bolt holes in prestressed concrete beams using 2" inside diameter pipe and leave pipe in place after forms are removed.

Tension bolts through the beam web to be snug tight and then turn the bolts an additional 1/4 turn. Peen threads on all bolts installed through the beam web. Install all other bolts using a DTI and hardened washer with each bolt assembly to verify proper tensioning.

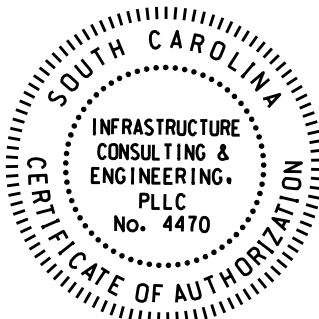
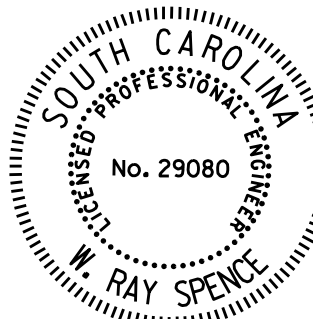
Do not place deck slab until all intermediate diaphragms are properly installed and tightened in each span where deck concrete will be placed during the pour.

Leave steel intermediate diaphragms in place as a permanent part of the completed structure.

CONNECTION DIMENSIONS					
BEAM	DIAPHRAGM	A	B	C	D
F1B-54	MC18X42.7	1'-6"	5"	4"	1'-0"

CHANNEL END DETAIL

CHANNEL CONNECTION \square DETAILS



REV.		
REV.	WRS	ALP 07-22
	P039719-B42a	
REV.	PCW	HL 09-20
	ASTM F3125	
REVIEWED	WRS	09-22
QUAN.		
DR.	WRS	SAN 12-11
DES.		
BY	CHK.	DATE



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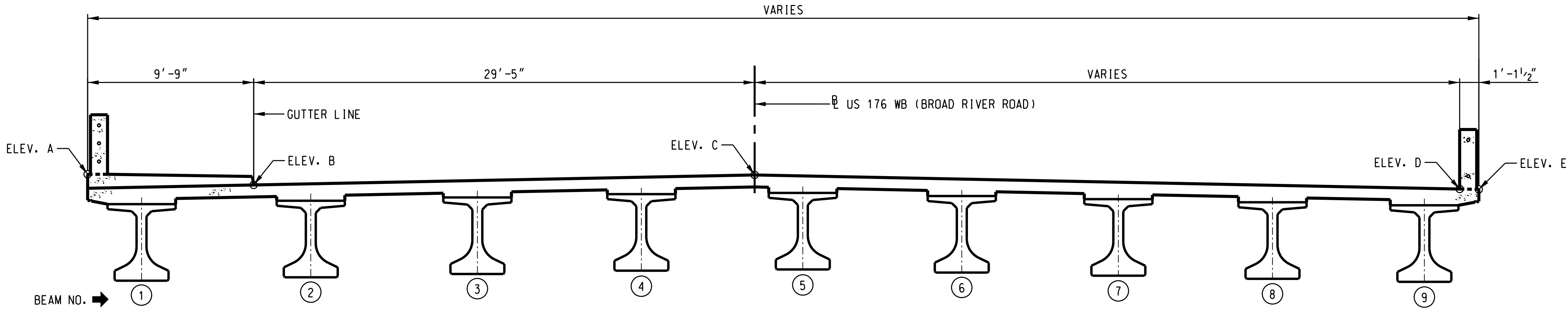
SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

STEEL INTERMEDIATE
DIAPHRAGM DETAILS

US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

COUNTY	RICHLAND	ROUTE	US 176
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TOP OF SLAB ELEVATIONS

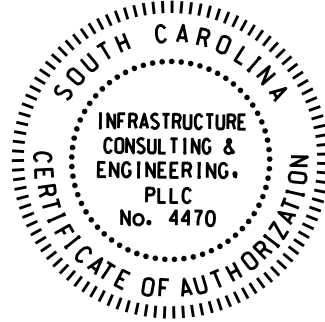
(LOOKING IN DIRECTION OF STATIONING)

TOP OF SLAB ELEVATIONS					
STATION	ELEV. A	ELEV. B	ELEV. C	ELEV. D	ELEV. E
613+05.00	—	—	—	326.501	326.478
613+10.00	—	—	—	326.709	326.686
613+15.00	—	—	—	326.921	326.898
613+20.00	—	—	—	327.131	327.109
613+25.00	—	—	—	327.342	327.319
613+27.10	—	—	328.475	327.431	327.408
613+30.00	—	—	328.590	327.553	327.530
613+35.00	—	—	328.787	327.764	327.741
613+40.00	—	—	328.984	327.974	327.952
613+45.00	328.397	328.592	329.181	328.185	328.162
613+50.00	328.594	328.789	329.378	328.396	328.373
613+55.00	328.791	328.986	329.575	328.607	328.584
613+60.00	328.988	329.183	329.772	328.817	328.795
613+65.00	329.185	329.380	329.969	329.028	329.005
613+70.00	329.382	329.577	330.166	329.239	329.216
613+75.00	329.579	329.774	330.363	329.449	329.427
613+80.00	329.776	329.971	330.560	329.660	329.638
613+85.00	329.973	330.168	330.757	329.871	329.848
613+90.00	330.170	330.365	330.954	330.082	330.059
613+95.00	330.367	330.562	331.151	330.292	330.270
614+00.00	330.564	330.759	331.348	330.503	330.480
614+05.00	330.761	330.956	331.545	330.714	330.691
614+10.00	330.965	331.160	331.748	330.932	330.909
614+15.00	331.158	331.353	331.942	331.139	331.116
614+20.00	331.348	331.543	332.131	331.342	331.319
614+25.00	331.533	331.728	332.316	331.541	331.518
614+30.00	331.714	331.909	332.497	331.736	331.713
614+35.00	331.891	332.086	332.675	331.926	331.904

STATIONS IN TABLE ARE ALONG \varnothing US 176 WB (BROAD RIVER ROAD)

TOP OF SLAB ELEVATIONS					
STATION	ELEV. A	ELEV. B	ELEV. C	ELEV. D	ELEV. E
614+40.00	332.064	332.259	332.848	332.113	332.090
614+45.00	332.233	332.428	333.017	332.296	332.273
614+50.00	332.398	332.593	333.181	332.475	332.452
614+52.60	332.482	332.677	333.266	332.566	332.543
614+55.00	332.559	332.754	333.342	332.649	332.627
614+60.00	332.716	332.911	333.499	332.820	332.797
614+65.00	332.868	333.063	333.652	332.986	332.964
614+70.00	333.017	333.212	333.800	333.149	333.126
614+75.00	333.162	333.357	333.945	333.307	333.284
614+80.00	333.302	333.497	334.086	333.461	333.439
614+85.00	333.439	333.634	334.222	333.612	333.589
614+90.00	333.571	333.766	334.354	333.758	333.735
614+95.00	333.699	333.894	334.483	333.900	333.877
615+00.00	333.824	334.019	334.607	334.038	334.015
615+05.00	333.944	334.139	334.727	334.172	334.149
615+10.00	334.060	334.255	334.843	334.302	334.279
615+15.00	334.172	334.367	334.956	334.428	334.405
615+20.00	334.280	334.475	335.064	334.549	334.527
615+25.00	334.384	334.579	335.168	334.667	334.644
615+30.00	334.484	334.679	335.267	334.781	334.758
615+35.00	334.580	334.775	335.363	334.890	334.867
615+40.00	334.672	334.867	335.455	334.996	334.973
615+45.00	334.759	334.954	335.543	335.097	335.074
615+50.00	334.843	335.038	335.626	—	—
615+55.00	334.923	335.118	335.706	—	—
615+56.60	334.947	335.142	335.731	—	—
615+60.00	334.998	335.193	—	—	—
615+65.00	335.070	335.265	—	—	—
615+70.00	335.137	335.332	—	—	—

STATIONS IN TABLE ARE ALONG \varnothing US 176 WB (BROAD RIVER ROAD)



REV.		
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REVIEWED	WRS	09-22
QUAN.		
DR.	ALP	JLJ 08-22
DES.		
BY	CHK.	DATE



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DEPARTMENT OF TRANSPORTATION

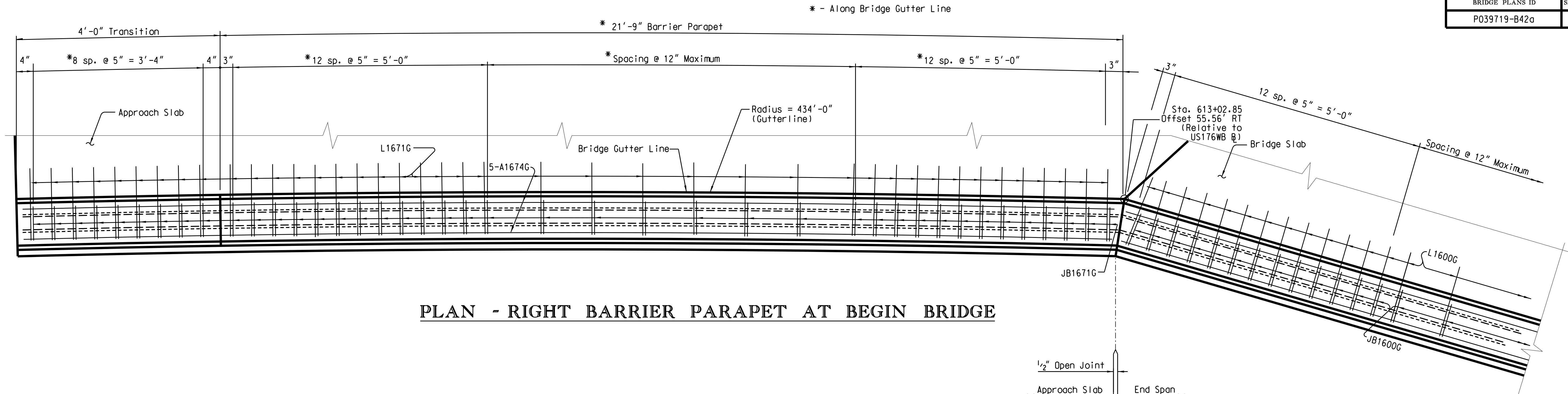
TOP OF SLAB ELEVATIONS

US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

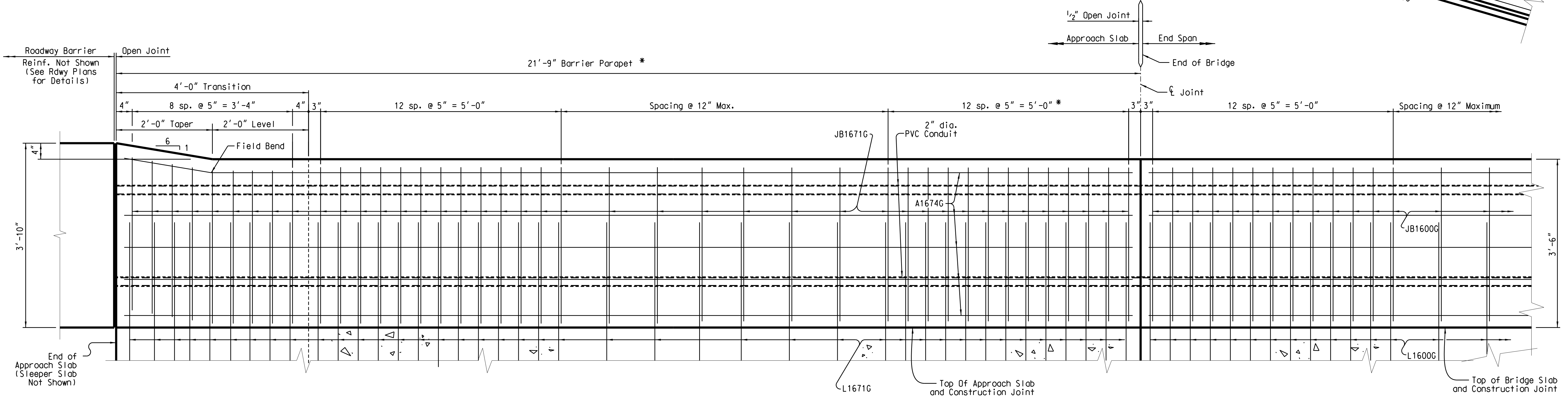
COUNTY RICHLAND ROUTE US 176

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BRIDGE PLANS ID	SHEET NO.
P039719-B42a	43

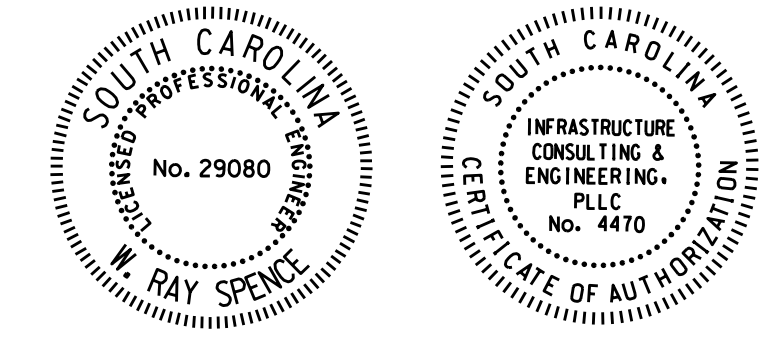


PLAN - RIGHT BARRIER PARAPET AT BEGIN BRIDGE



ELEVATION - RIGHT BARRIER PARAPET AT BEGIN BRIDGE
(ALONG GUTTER LINE)

Note:
If Contractor elects to hand form barrier parapet instead of slip forming, cast a uniform 12" thick barrier parapet. Ensure that both faces of wall are cast vertical and parallel to one another. Perform this work at no additional expense to the Department.



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DR.	ALP RMH 08-22
DES.	ALP RMH 08-22
BY	CHK. DATE

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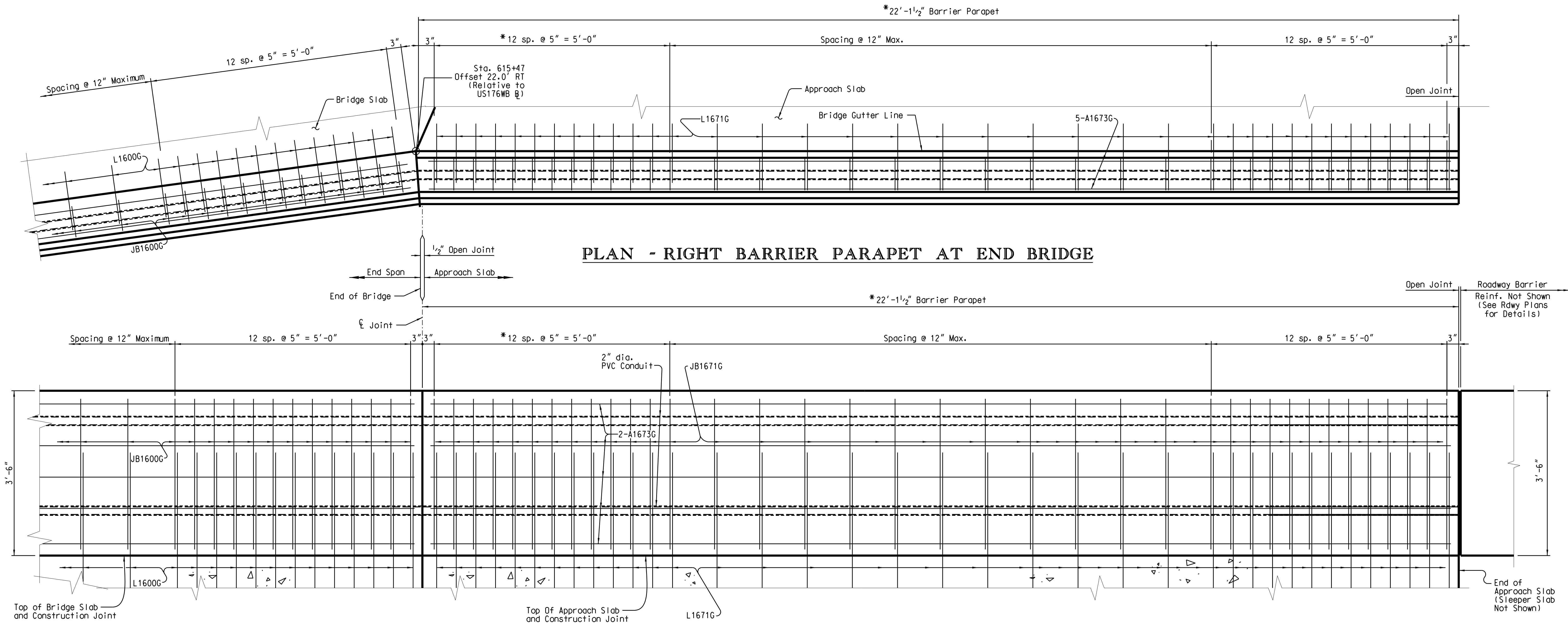
SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
MASH BARRIER PARAPET
(1 OF 2)
US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

COUNTY RICHLAND
ROUTE US 176

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* - Along Bridge Gutter Line

BRIDGE PLANS ID	SHEET NO.
P039719-B42a	44

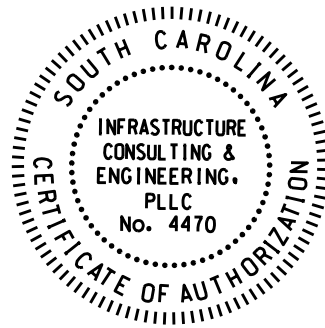


ELEVATION - RIGHT BARRIER PARAPET AT END BRIDGE

(ALONG GUTTER LINE)

Note:

If Contractor elects to hand form barrier parapet instead of slip forming, cast a uniform 12" thick barrier parapet. Ensure that both faces of wall are cast vertical and parallel to one another. Perform this work at no additional expense to the Department.



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REVIEWED	WRS	09-22	
QUAN.			
DR.	ALP	RMH	08-22
DES.	ALP	RMH	08-22
BY	CHK.	DATE	



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DEPARTMENT OF TRANSPORTATION

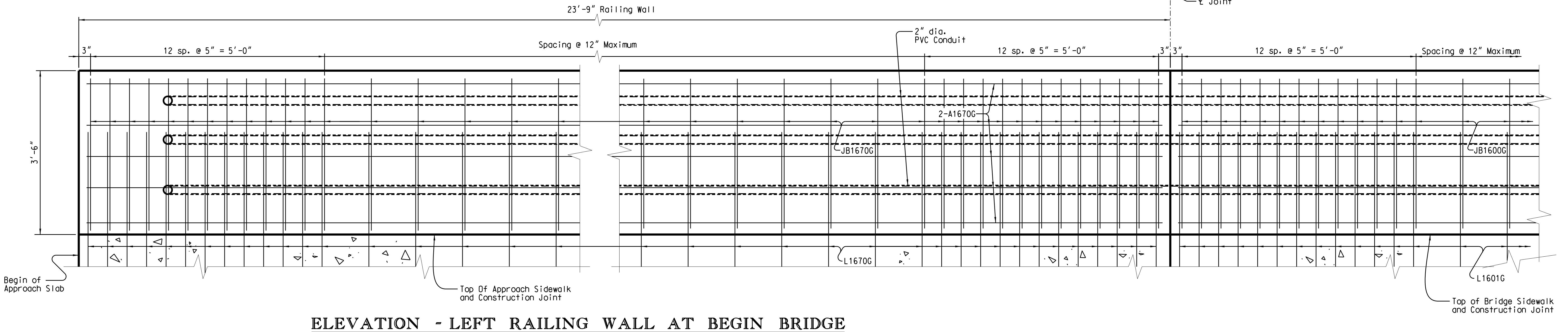
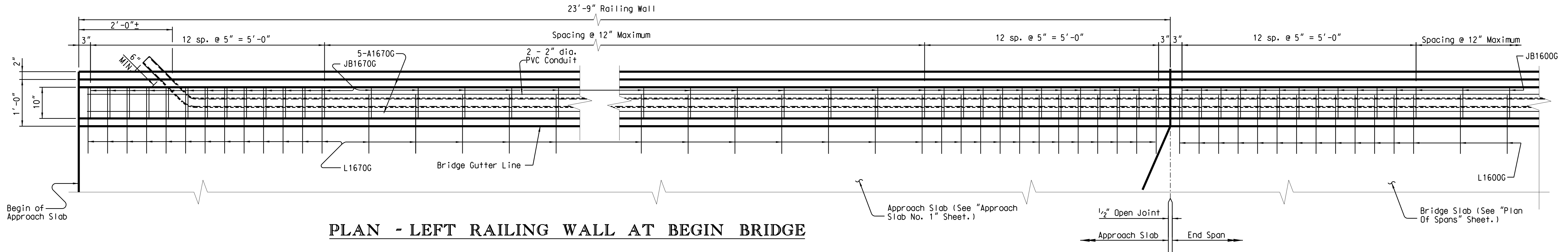
MASH BARRIER PARAPET
(2 OF 2)

US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

COUNTY
RICHLAND

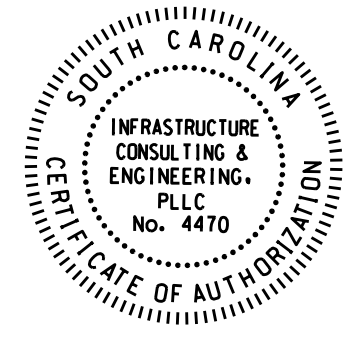
ROUTE
US 176

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Note:

If Contractor elects to hand form barrier parapet/railing wall instead of slip forming, cast a uniform 12" thick barrier parapet/railing wall. Ensure that both faces of wall are cast vertical and parallel to one another. Perform this work at no additional expense to the Department.



REV.	
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REVIEWED	WRS 09-22
QUAN.	
DR.	ALP RMH 08-22
DES.	ALP RMH 08-22
BY	CHK. DATE

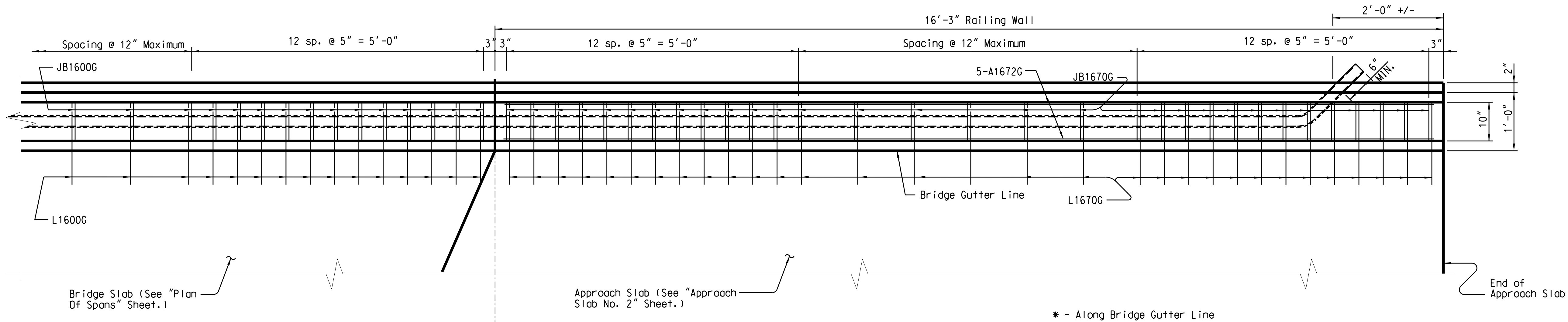
ARCHER UNITED
JOINT VENTURE
INFRASTRUCTURE
CONSULTING & ENGINEERING

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
MASH RAILING WALL
(1 OF 2)
US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

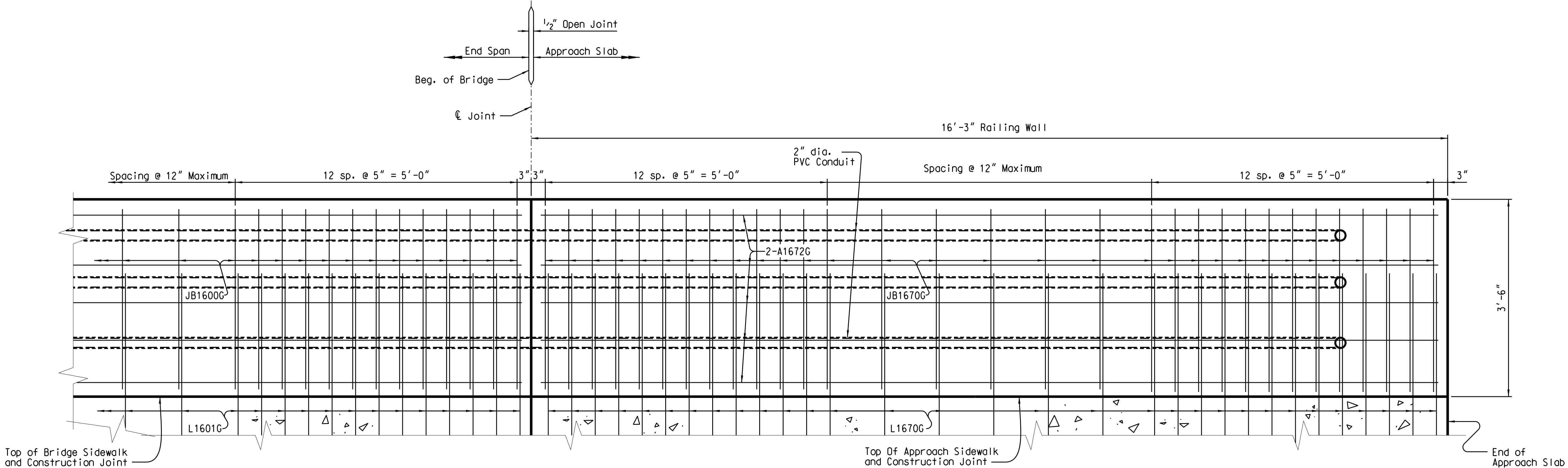
COUNTY	RICHLAND	ROUTE	US 176
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Z:\Projects\20-81CCR Ph 2\Structures\02.New Bridges\Bridge 42a\04_Final\Plans\45&46_BRIDGE 42a_MASH RAILING WALL.dgn
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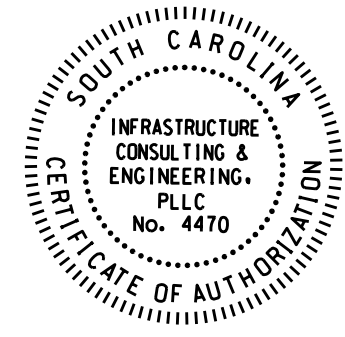
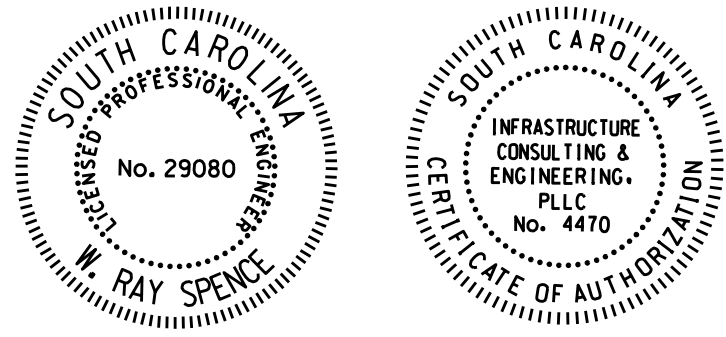
BRIDGE PLANS ID	SHEET NO.
P039719-B42a	46



PLAN - LEFT RAILING WALL AT END BRIDGE



ELEVATION - LEFT RAILING WALL AT END BRIDGE



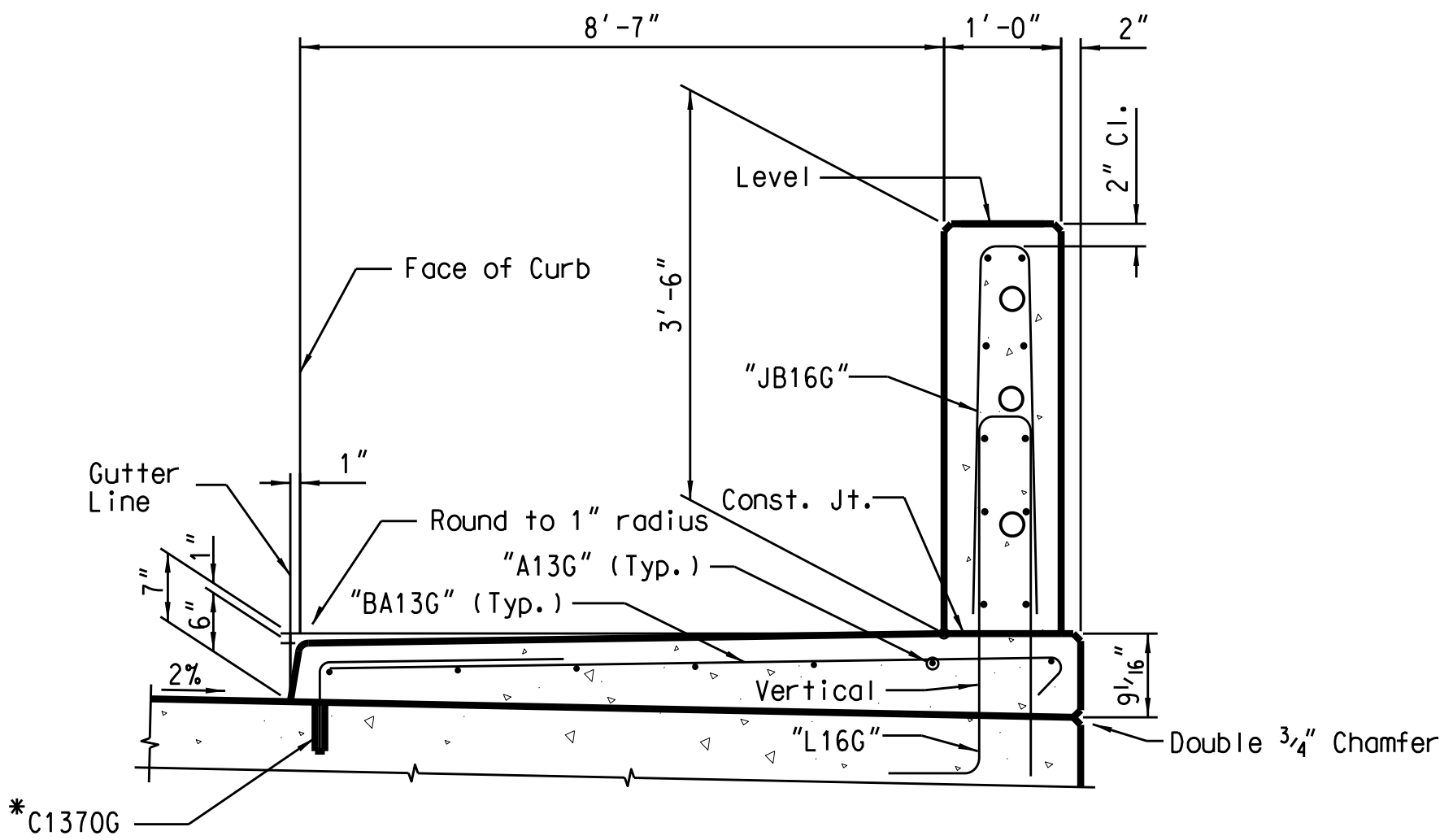
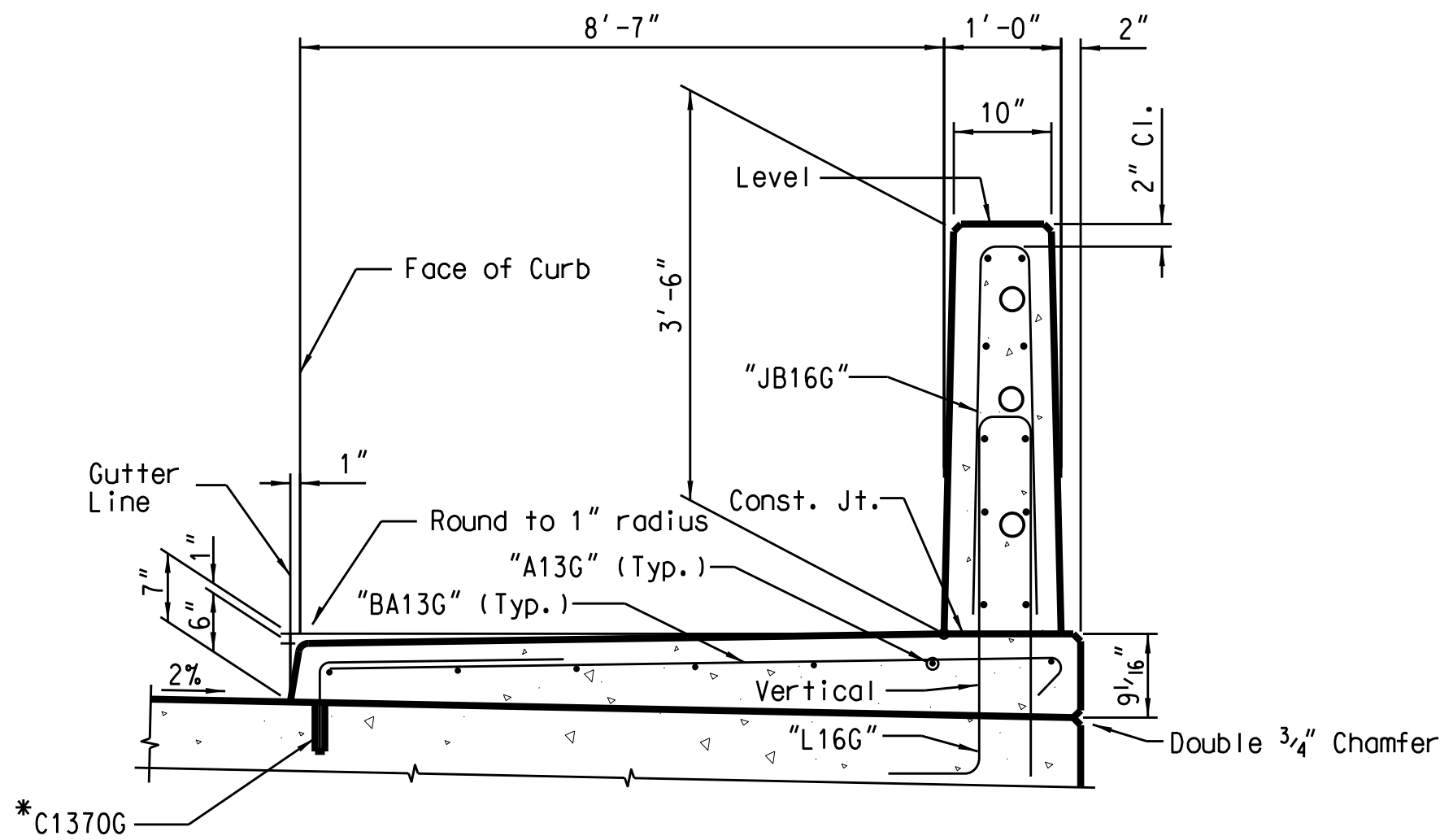
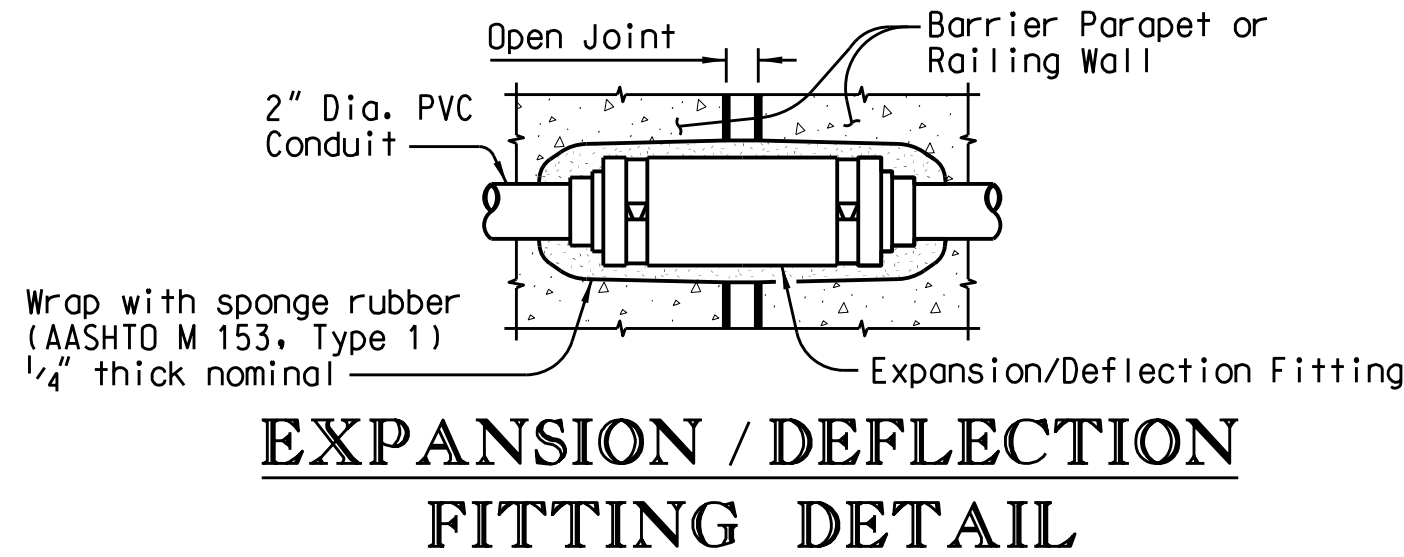
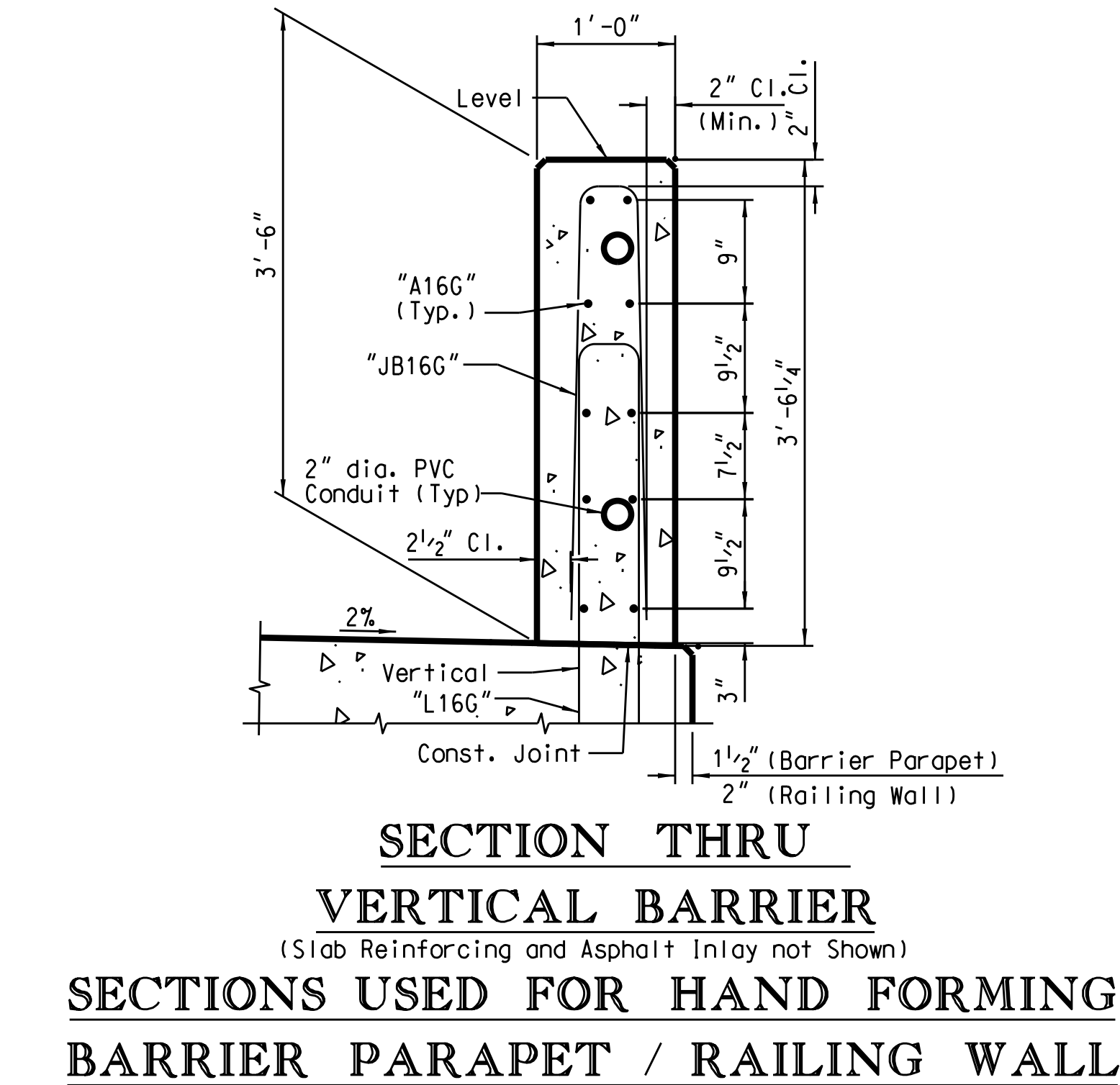
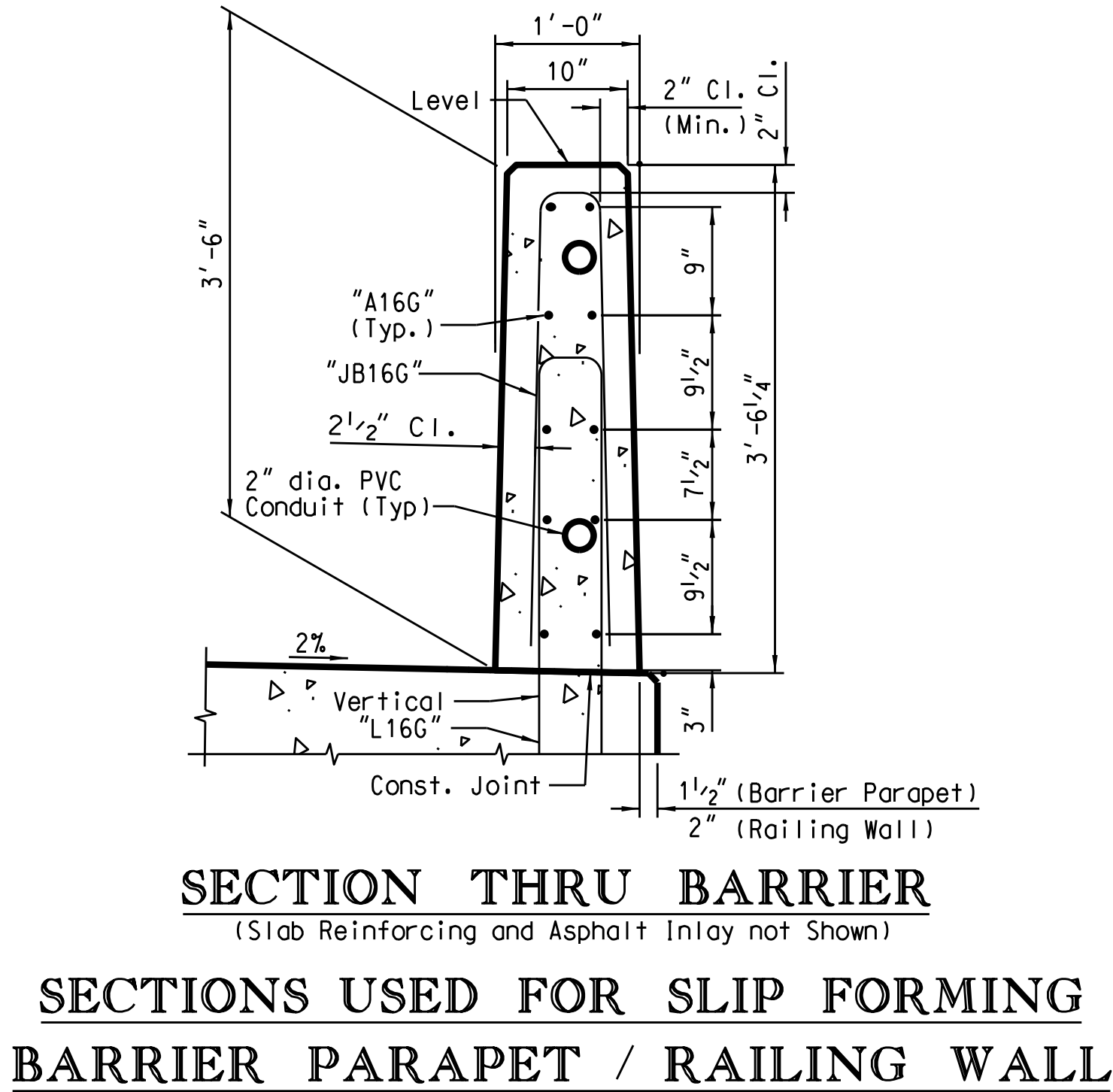
REV.	
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REVIEWED	WRS 09-22
QUAN.	
DR.	ALP RMH 08-22
DES.	ALP RMH 08-22
BY	CHK. DATE

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SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
MASH RAILING WALL
(2 OF 2)
US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

COUNTY RICHLANDROUTE US 176

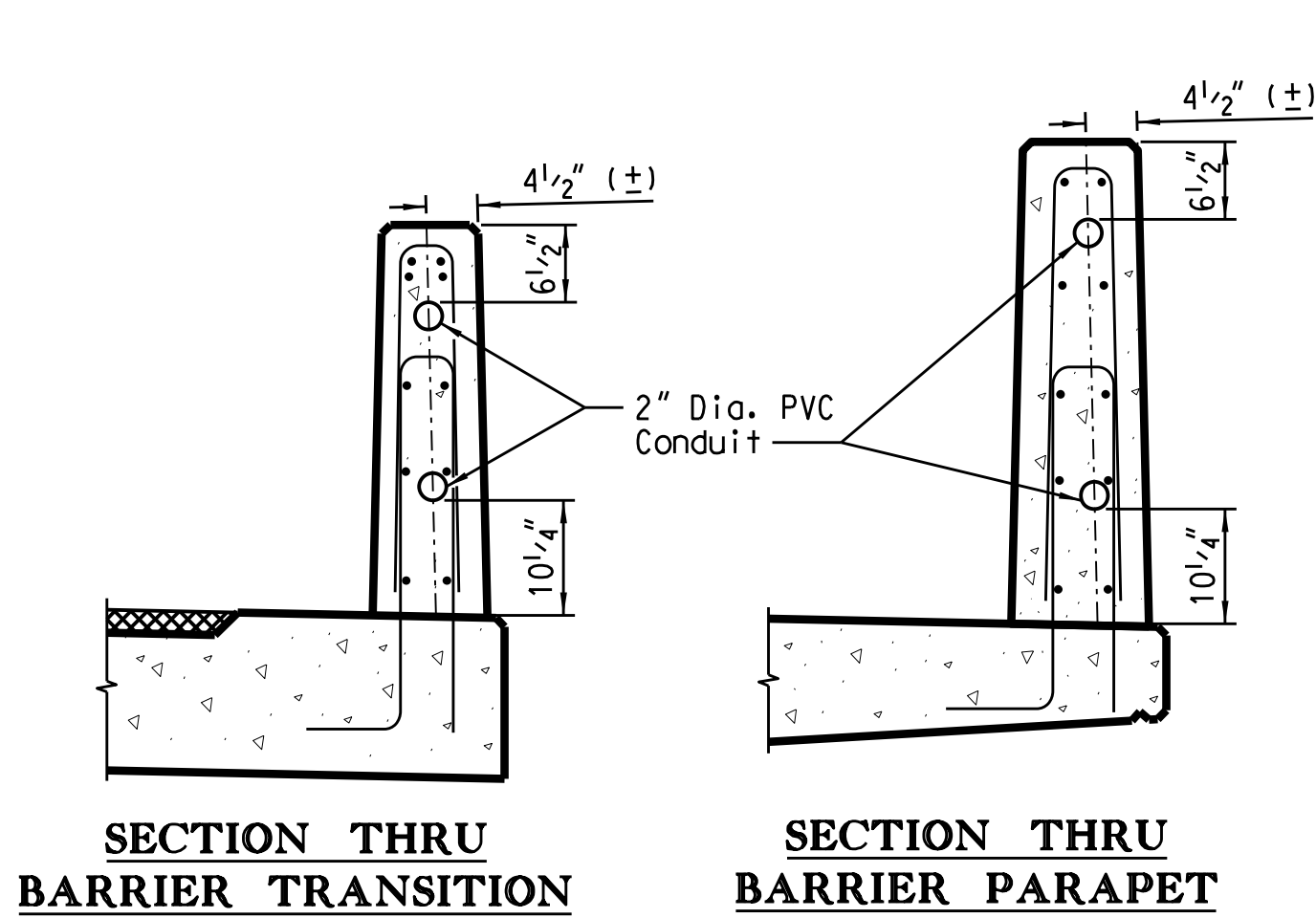
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GENERAL CONDUIT NOTES

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.



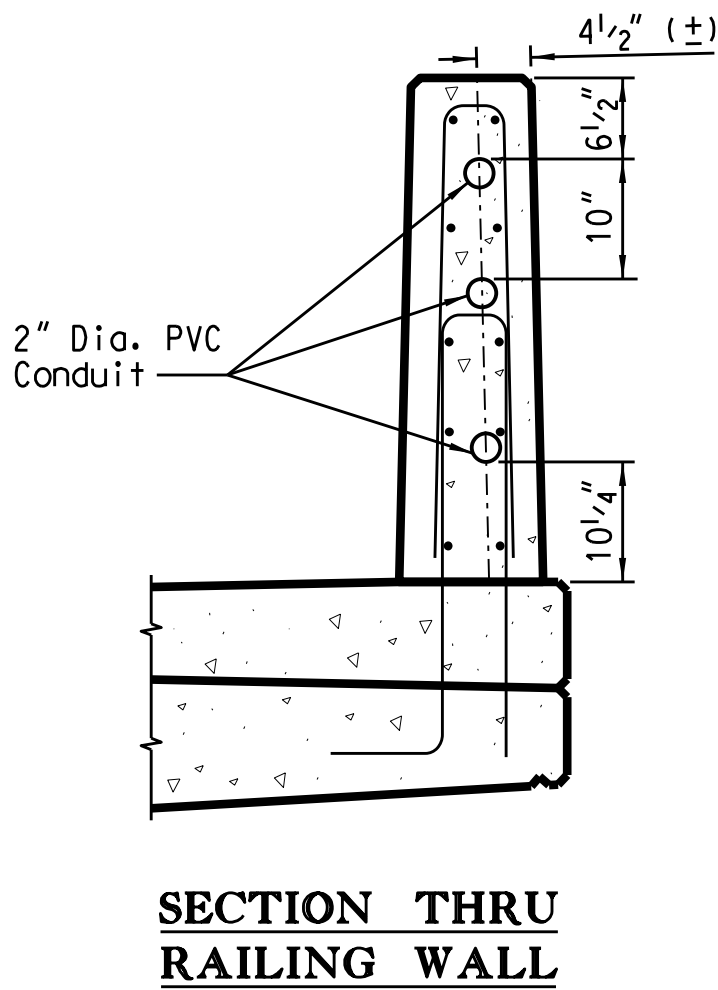
DETAILS OF CONDUIT IN BARRIER PARAPET

(Typ. left side of bridge)

Use Schedule 80 PVC nonmetallic pipe for conduit.

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

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



DETAILS OF CONDUIT IN RAILING WALL

(Typ. right side of bridge)

Use Schedule 80 PVC nonmetallic pipe for conduit.

Extend conduits 6 inches beyond the backside of the railing wall (at begin and end bridge) and cap with watertight covers.

Provide expansion/deflection fittings at all open joints in the railing wall.

Contractor to provide three 2" dia. conduits in railing wall on left side of bridge.



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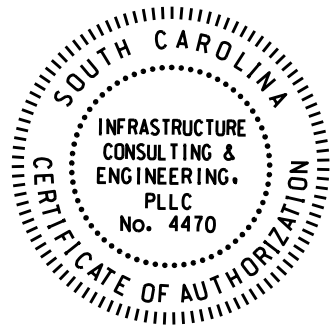
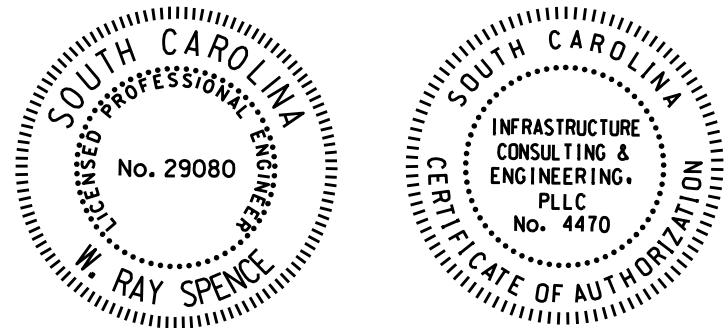
MASH BARRIER PARAPET &
RAILING WALL DETAILS

US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

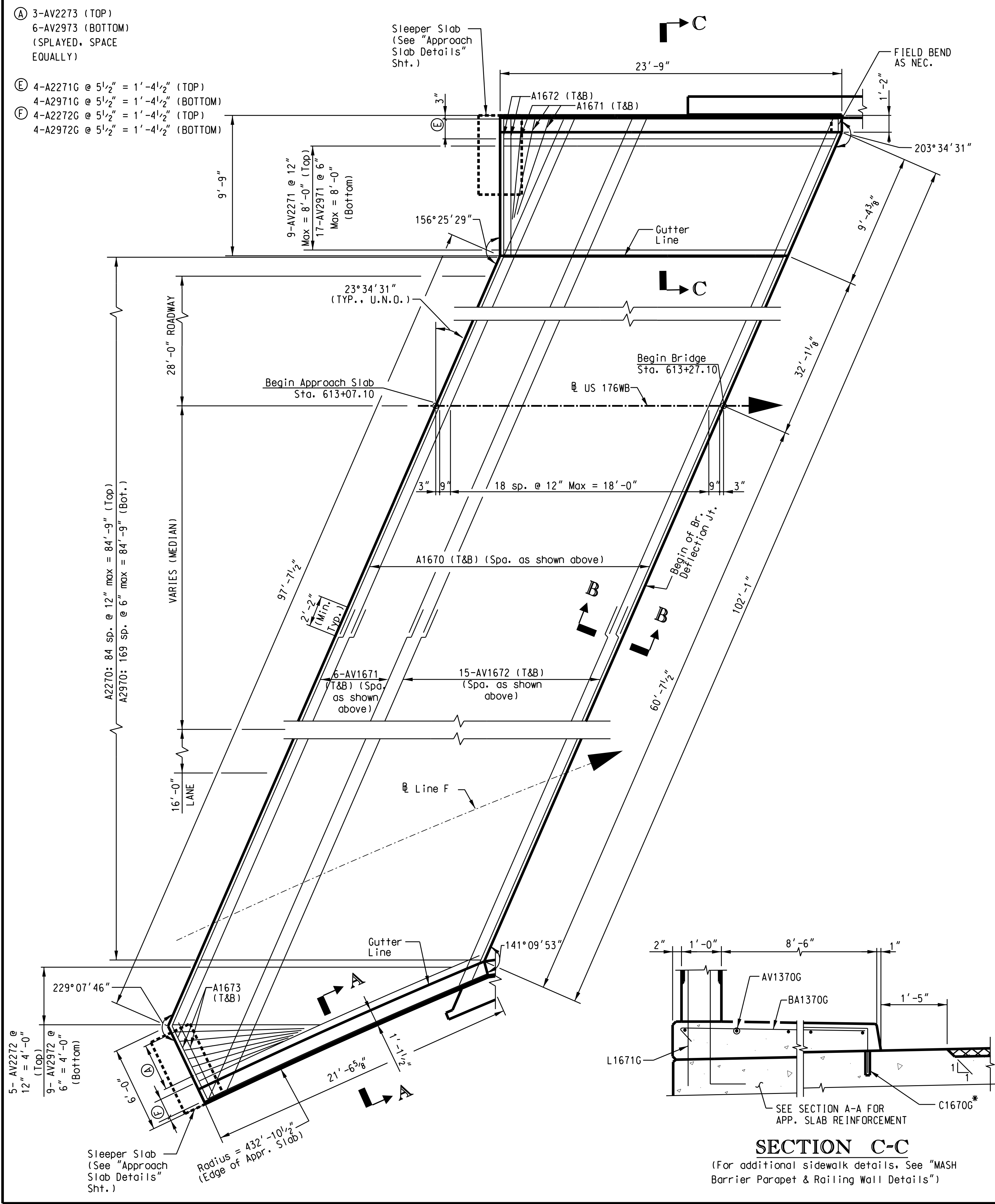
COUNTY RICHLAND

ROUTE US 176

REV.	
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REVIEWED	WRS 09-22
QUAN.	
DR.	ALP RMH 08-22
DES.	ALP RMH 08-22
BY	CHK. DATE



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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.

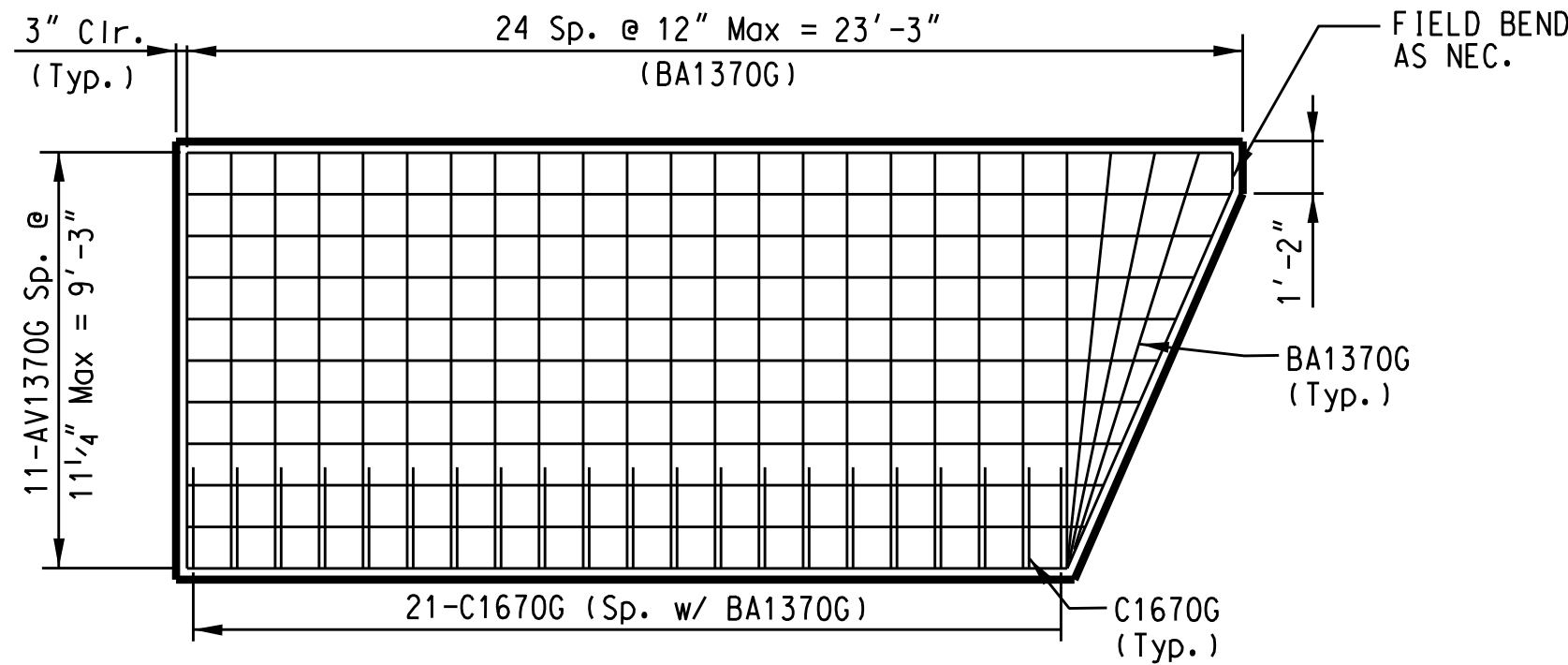
Grade fill under approach slabs to a uniform surface 1'-2" below the finished surface of roadway. Thoroughly compact fill under the approach slab in accordance with Section 208 of the Standard Specifications.

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.

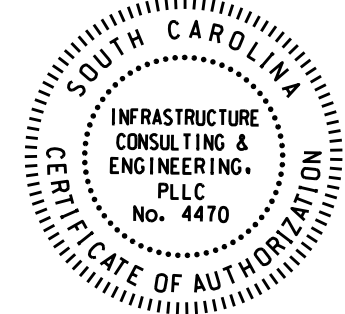
Space CHCU bolsters to provide adequate support for top reinforcing steel, approximately 2'-6" on center and parallel to centerline of approach slab. Weight of bar supports is not included in the reinforcing steel quantities.

* Adhesively bonded dowel bars, conforming to the requirements of the Supplemental Specifications. See detail on "General Details Sht."

For Section A-A & B-B, See "Approach Slab Details"



PLAN VIEW OF SIDEWALK



REV.	
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REV.	
REVIEWED	WRS 09-22
QUAN.	ALP KLC 08-22
DR.	ALP KLC 08-22
DES.	ALP KLC 08-22
BY	CHK. DATE



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SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

APPROACH SLAB NO. 1	
US 176 WB (BROAD RIVER RD.) BRIDGE OVER I-20	
COUNTY	RICHLAND
ROUTE	US 176

APPROACH SLAB NO. 1

REINFORCING STEEL SCHEDULE

LOCATION	MARK	NO. REQ'D	DIMENSION					LENGTH
			"a"	"b"	"c"	"d"	"e"	
SLAB	A1670	42	60'-0"	----	----	----	----	60'-0"
RAILING	A1670G	10	23'-4"	----	----	----	----	23'-4"
SLAB	A1671	6	7'-0"	----	----	----	----	7'-0"
SLAB	A1672	4	9'-6"	----	----	----	----	9'-6"
SLAB	A1673	4	5'-8"	----	----	----	----	5'-8"
BARRIER	A1674G	10	21'-3"	----	----	----	----	21'-3"
SLAB	A2270	85	19'-7"	----	----	----	----	19'-7"
SLAB	A2271G	4	23'-4"	----	----	----	----	23'-4"
SLAB	A2272G	4	21'-3"	----	----	----	----	21'-3"
SLAB	A2970	170	19'-7"	----	----	----	----	19'-7"
SLAB	A2971G	4	23'-4"	----	----	----	----	23'-4"
SLAB	A2972G	4	21'-3"	----	----	----	----	21'-3"

SIDEWALK	AV1370G	11	21'-6 1/2"	19'-9"	23'-4"	0'-4"	----	21'-7"
SLAB	AV1672	30	51'-1"	46'-5"	55'-3"	0'-7"	----	51'-1"
SLAB	AV1671	12	53'-2"	50'-5"	55'-3"	0'-11"	----	53'-2"
SLAB	AV2271	9	21'-4"	19'-9"	22'-11"	0'-5"	----	21'-4"
SLAB	AV2272	5	14'-0"	10'-3"	17'-8"	1'-6"	----	14'-0"
SLAB	AV2273	3	7'-9"	6'-6"	9'-0"	0'-10"	----	7'-9"
SLAB	AV2971	17	21'-4"	19'-9"	22'-11"	0'-3"	----	21'-4"
SLAB	AV2972	9	4'-0"	10'-3"	17'-8"	0'-11"	----	4'-0"
SLAB	AV2973	6	7'-9"	6'-6"	9'-0"	0'-5"	----	7'-9"

SIDEWALK	BA1370G	25	9'-3"	0'-7 1/2"	----	----	----	9'-11"

SIDEWALK	C1670G	21	2'-3"	0'-10"	----	----	----	3'-1"

BARRIER/RAILING	JB1670G	39	0'-5 3/4"	3'-2"	0'-7 1/4"	----	----	6'-10"
BARRIER	JB1671G	41	0'-5 3/4"	3'-2"	0'-7 1/4"	----	----	6'-10"

BARRIER/RAILING	L1670G	39	1'-0"	3'-3 1/2"	0'-6 1/2"	3'-3 1/2"	----	8'-2"
BARRER	L1671G	41	1'-0"	2'-7"	0'-6 1/2"	2'-7"	----	6'-9"

CHCU	3 3/4"		----	----	----	----	----	----

AS NECESSARY

QUANTITIES

ITEM	UNIT	APPROACH SLAB
2.0" SCHEDULE 80 PVC CONDUIT	L.F.	90.5
CONCRETE FOR STRUCTURES - CLASS 4000	C.Y.	83.4
REINFORCING STEEL FOR STRUCTURES (BRIDGE)	LBS.	21,817
GALVANIZED REINFORCING STEEL FOR STRUCTURES (BRIDGE)	LBS.	3,019
42" MASH CONCRETE BARRIER PARAPET/RAILING WALL	L.F.	45.3

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APPROACH SLAB NO. 2

REINFORCING STEEL SCHEDULE

LOCATION	MARK	NO. REQ'D	DIMENSION					LENGTH
			"a"	"b"	"c"	"d"	"e"	
SLAB	A1670	72	34'-11"	-----	-----	-----	-----	34'-11"
SLAB	A1671	8	5'-9"	-----	-----	-----	-----	5'-9"
BARRIER/RAILING	A1672G	10	15'-11"	-----	-----	-----	-----	15'-11"
BARRIER	A1673G	10	21'-9"	-----	-----	-----	-----	21'-9"
SLAB	A2270	48	19'-7"	-----	-----	-----	-----	19'-7"
SLAB	A2271G	4	15'-9"	-----	-----	-----	-----	15'-9"
SLAB	A2272G	4	21'-5"	-----	-----	-----	-----	21'-5"
SLAB	A2970	95	19'-7"	-----	-----	-----	-----	19'-7"
SLAB	A2971G	4	15'-9"	-----	-----	-----	-----	15'-9"
SLAB	A2972G	4	21'-5"	-----	-----	-----	-----	21'-5"
SIDEWALK	AV1370G	11	17'-7"	15'-11"	19'-4"	0'-4"	-----	17'-7"
SLAB	AV1670	12	29'-4"	34'-0"	24'-8"	1'-7"	-----	29'-4"
SLAB	AV2270	4	20'-9"	19'-8"	21'-4"	0'-5"	-----	20'-9"
SLAB	AV2271	8	17'-9"	16'-3"	19'-3"	0'-5"	-----	17'-9"
SLAB	AV2970	8	20'-6"	19'-8"	21'-4"	0'-3"	-----	20'-6"
SLAB	AV2971	15	17'-9"	16'-3"	19'-3"	0'-3"	-----	17'-9"
SIDEWALK	BA1370G	21	9'-3"	0'-7 1/2"	-----	-----	-----	9'-11"
SIDEWALK	C1670G	21	2'-3"	0'-10"	-----	-----	-----	3'-1"
BARRIER/RAILING	JB1670G	31	0'-5 3/4"	3'-2"	0'-7 1/4"	-----	-----	6'-10"
BARRIER	JB1671G	37	0'-5 3/4"	3'-0"	0'-7 1/4"	-----	-----	6'-6"
BARRIER/RAILING	L1670G	31	1'-0"	3'-3 1/2"	0'-6 1/2"	3'-3 1/2"	-----	8'-2"
BARRIER	L1671G	37	1'-0"	2'-7"	0'-6 1/2"	2'-7"	-----	6'-9"
CHCU	3 3/4"	AS NECESSARY						

QUANTITIES

ITEM	UNIT	APPROACH SLAB
2.0" SCHEDULE 80 PVC CONDUIT	L.F.	78.5
CONCRETE FOR STRUCTURES - CLASS 4000	C.Y.	50.5
REINFORCING STEEL FOR STRUCTURES (BRIDGE)	LBS.	13,207
GALVANIZED REINFORCING STEEL FOR STRUCTURES (BRIDGE)	LBS.	2,534
42" MASH CONCRETE BARRIER PARAPET/RAILING WALL	L.F.	38.3

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.

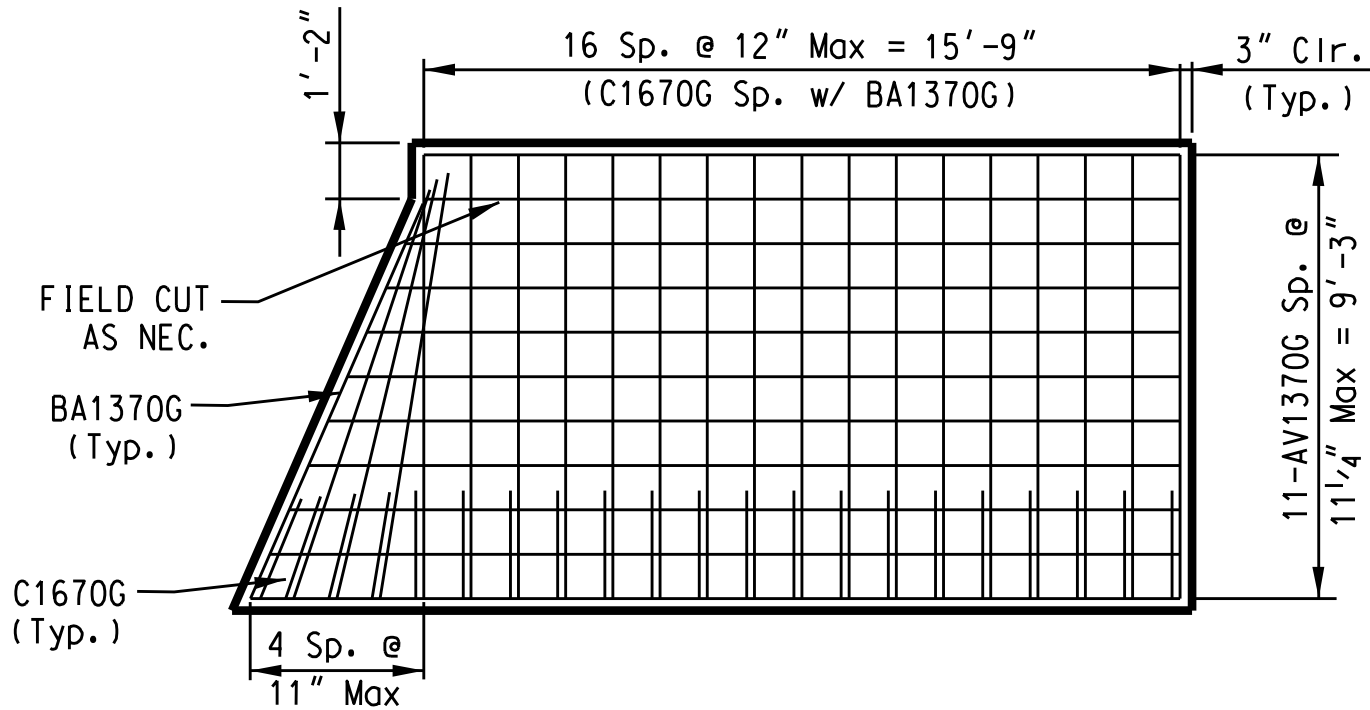
Support the bottom mat of reinforcing steel using concrete block or similar material. Provide a minimum concrete cover of 3" below the bottom reinforcing steel.

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.

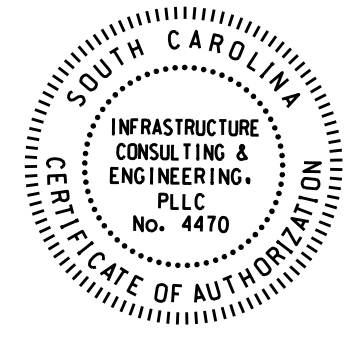
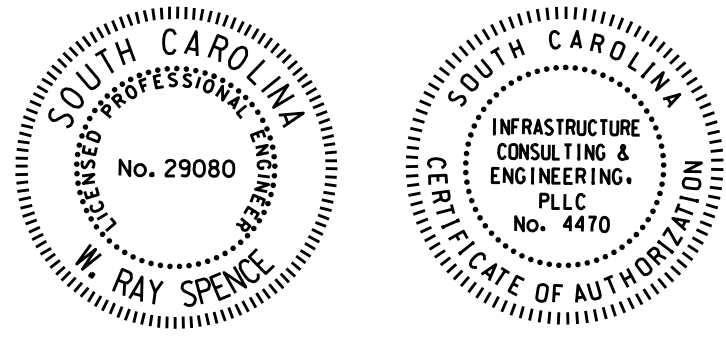
For Deflection Joint Detail, Sections A-A & B-B, See "Approach Slab Details"

For Sidewalk Section, See Sht. "Mash Barrier Parapet & Railing Wall Details"

For Section C-C, see "Approach Slab 1"



PLAN VIEW OF SIDEWALK



REV.		
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REV.		
REVIEWED	WRS	09-22
QUAN.	ALP	KLC 08-22
DR.	ALP	KLC 08-22
DES.	ALP	KLC 08-22
BY	CHK.	DATE



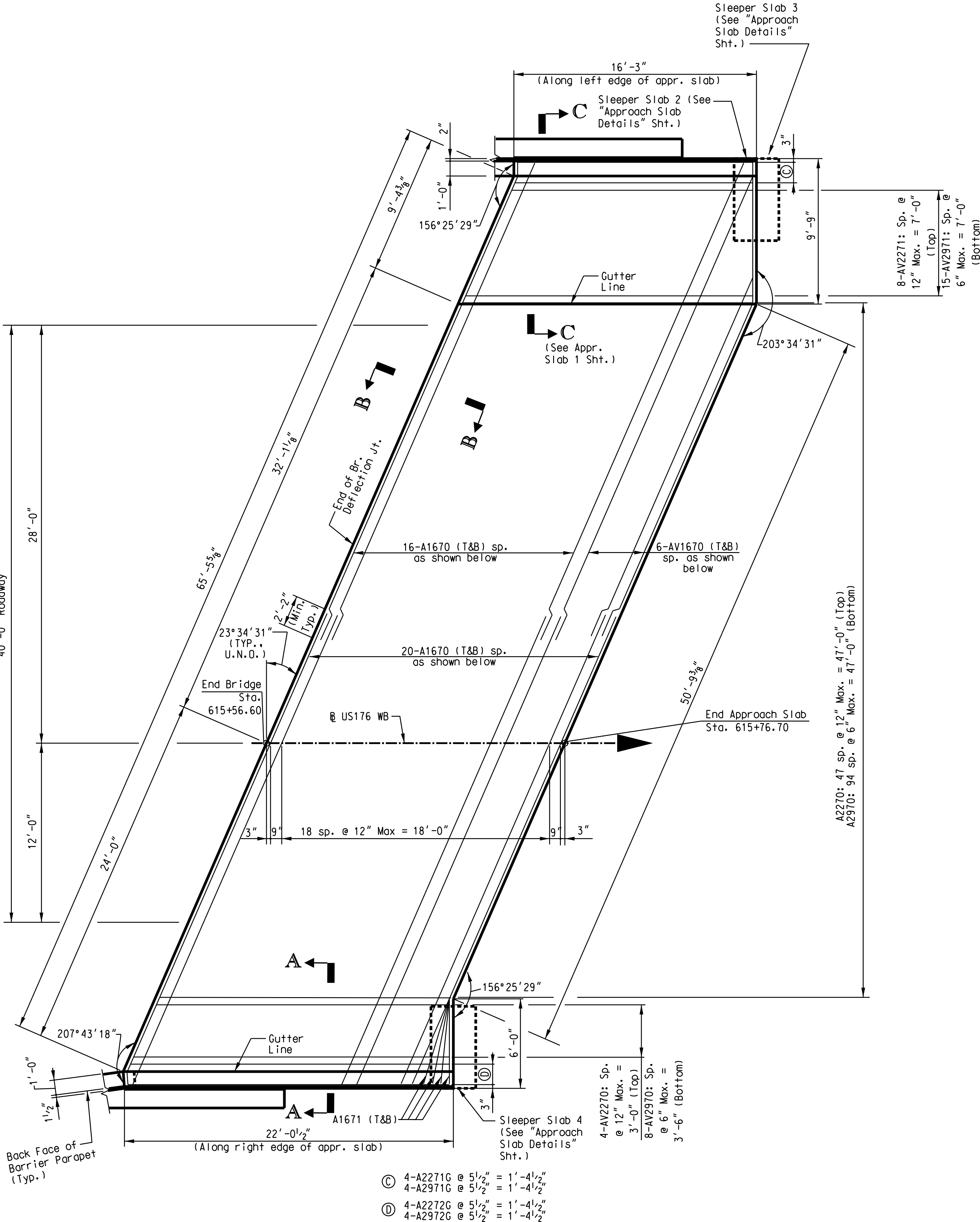
INFRASTRUCTURE CONSULTING & ENGINEERING

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

APPROACH SLAB NO. 2

US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

COUNTY RICHLAND ROUTE US 176





DEFLECTION JOINT DETAIL

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.

- SECTION C-C**



NOTES:

LENGTH OF ALL 4 SLEEPER SLABS SHALL MATCH WIDTH OF
MOMENT SLAB (5'-6").

CONCRETE FOR THE SLEEPER SLAB SHALL BE CLASS 4000.

CAREFULLY EXCAVATE FOR SLEEPER SLABS AFTER COMPACTED END BENT
EMBANKMENT IS IN PLACE. FOUND THE SLABS ON UNDISTURBED COMPACTED
MATERIAL OR RECOMPACTED MATERIAL. DO NOT PERMIT LOOSE BACKFILL.

SUPPORT THE BOTTOM MAT OF REINFORCING STEEL USING CONCRETE BLOCK
OR SIMILAR MATERIAL. PROVIDE A MINIMUM CONCRETE COVER AT 3" BELOW
THE BOTTOM REINFORCING STEEL.



TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE SLEEPER SLAB FROM
TEMPORARY LOADINGS OR ANY CONDITION WHICH COULD CAUSE MOVEMENTS OR
UNEVEN SETTLEMENT OF THE SLEEPER SLAB.

SPACE CHCU BAR SUPPORTS TO PROVIDE ADEQUATE SUPPORT FOR TOP
REINFORCING STEEL, APPROXIMATELY 2'-6" ON CENTER. WEIGHT OF BAR
SUPPORTS IS NOT INCLUDED IN THE REINFORCING STEEL QUANTITIES.

PLACE 2 LAYERS OF 30 LB. ROOFING FELT PAPER BETWEEN APPROACH SLAB,
MOMENT SLAB, AND SLEEPER SLAB.

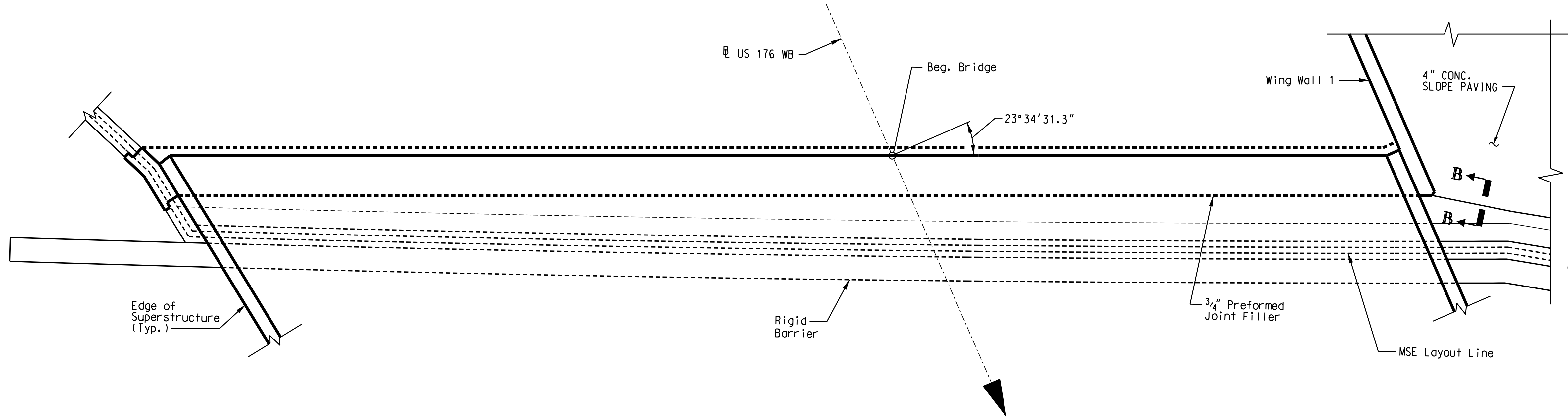
LIMITS OF ROOFING FELT PAPER.

SLEEPER SLAB QUANTITIES (FOR ONE)		
ITEM	UNIT	SLEEPER SLAB QUANTITY
CONCRETE FOR STRUCTURES - CLASS 4000	C.Y.	0.6
REINFORCING STEEL FOR STRUCTURES (BRIDGE)	LBS.	107

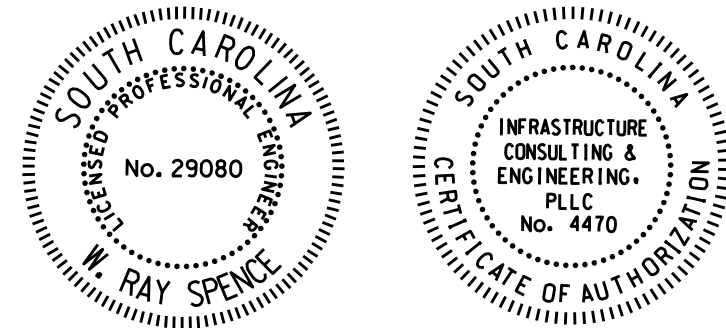
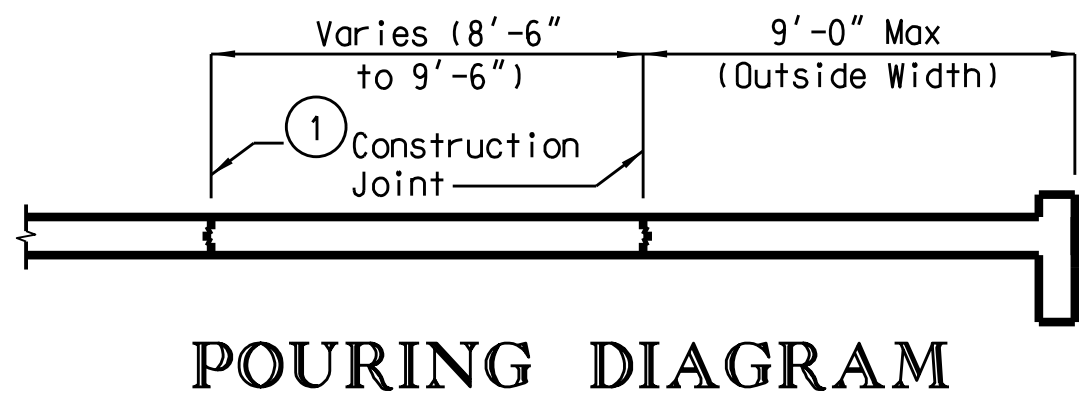
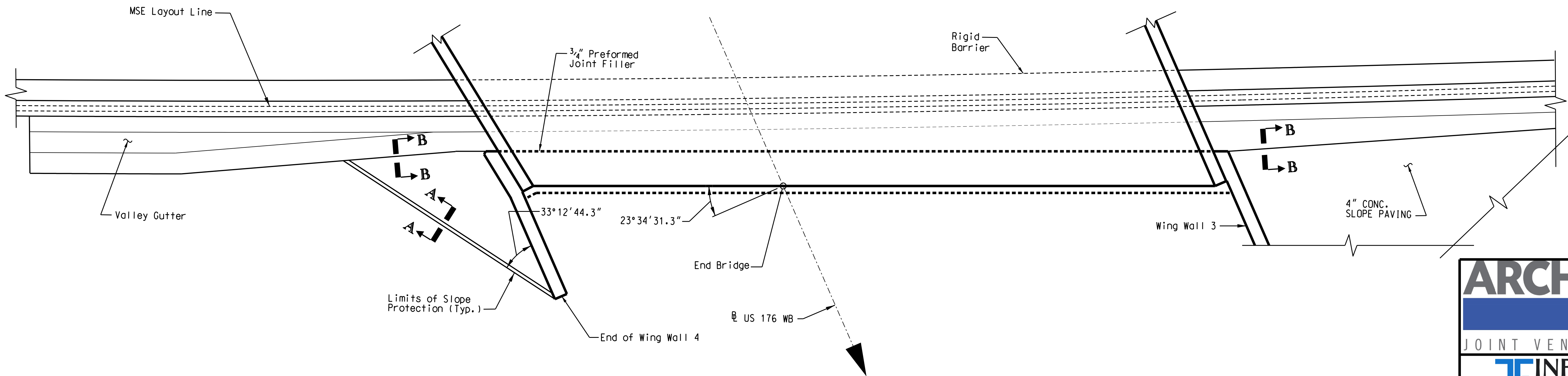
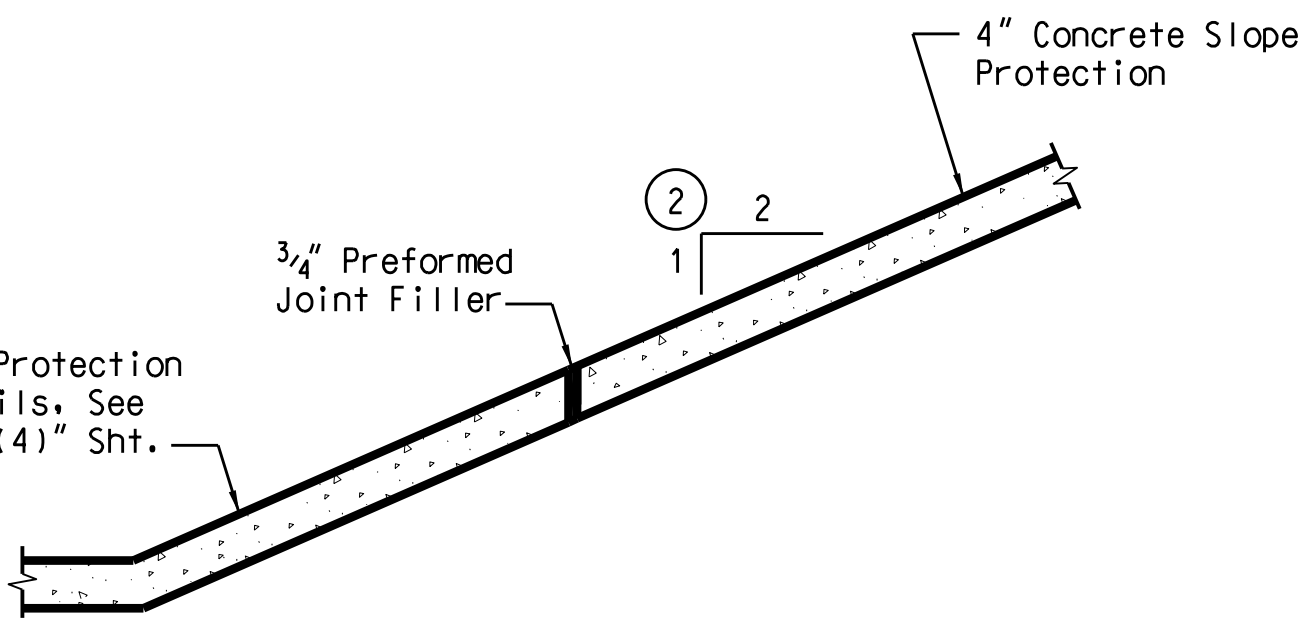
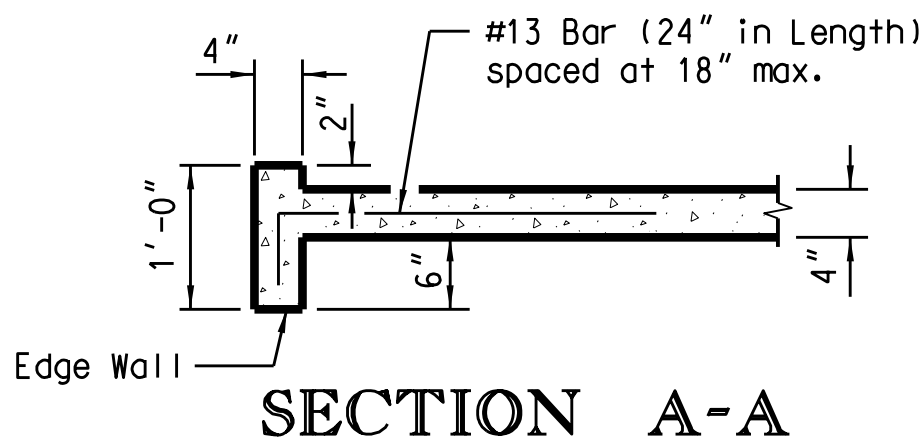
 	REV.				SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	APPROACH SLAB DETAILS US 176 WB (BROAD RIVER RD.) BRIDGE OVER I-20	COUNTY RICHLAND ROUTE US 176	
	REV.							
	REV.							
	REVIEWED	WRS	09-22					
	QUAN.	ALP	KLC	08-22				
	DR.	ALP	KLC	08-22				
	DES.	ALP	KLC	08-22				
	BY	CHK.	DATE					

Z:\Projects\20-8\CCR Ph 2\Structures\02.New Bridges\Bridge 42a\04_FinalPlans\51.BRIDGE 42a.FIBER REINF. SLOPE PROTECTION DETAILS.dgn
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BRIDGE PLANS ID	SHEET NO.
P039719-B42a	51



- Notes:
- Shape and firmly compact the fill slopes immediately prior to placing the slope protection. Remove any organic material prior to placing concrete. Finish the surface of the paving in true planes where practical and as directed by the RCE. Select planes that result in minimum excavation and provide an aesthetically pleasing appearance. In case of any dispute, the RCE's decision is final.
- Place 4" concrete slope protection on fill slopes at the ends of the bridge. Provide Class 2500 (Fiber Reinforced) concrete with 4" nominal thickness according to the details and limits shown on this drawing. Add the fiber reinforcement, in accordance with the approved submittals (minimum rate of 1.5 lbs/CY), directly to the concrete at the time of batching. Mix the concrete according to the fiber manufacturer's recommendations. Coarse aggregate meeting the requirements of Class 3000 concrete may be used in the concrete mix instead of that specified for Class 2500 concrete.
- Form construction joints using Key-Loc Joint system as manufactured by Form-A-Key Products or approved equivalent. A Minimum 24 hour interval is required between adjacent pours.
 - Normal to End Bent



REV.		
REV.	RMH	WRS 07-22
		P039719-B42a
REV.	JXY	SAN 4-14
		New Border
REVIEWED	WRS	09-22
QUAN.		
DR.	PNP	SAN 12-08
DES.		
BY	CHK.	DATE



INFRASTRUCTURE CONSULTING & ENGINEERING

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

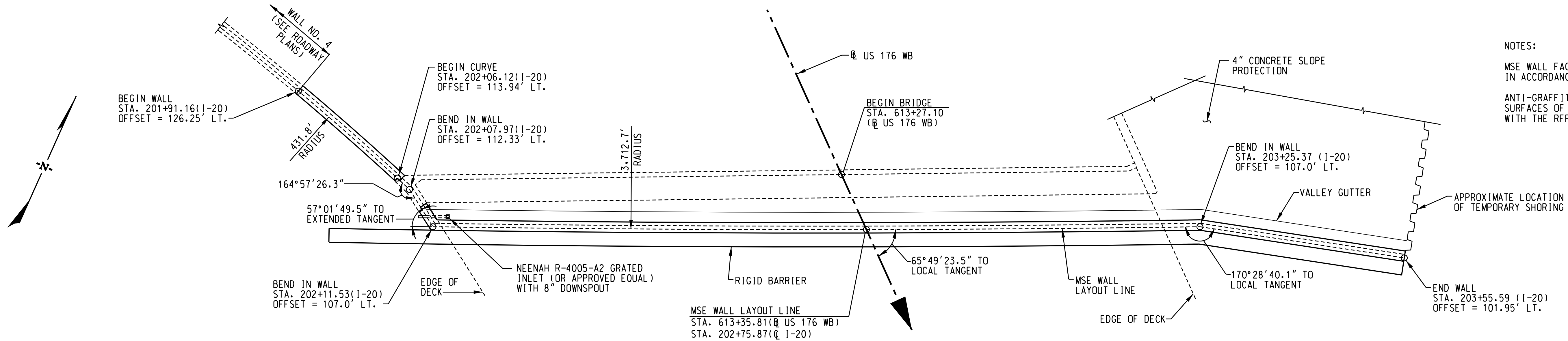
FIBER REINFORCED SLOPE
PROTECTION DETAILS

US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

COUNTY RICHLAND ROUTE US 176

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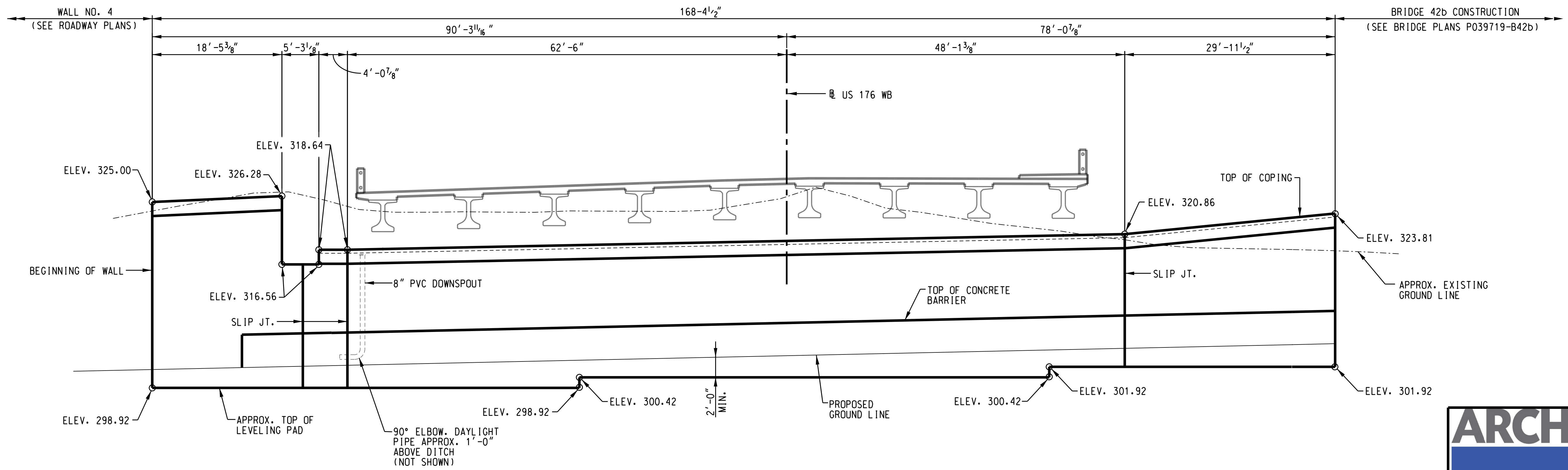
BRIDGE PLANS ID	SHEET NO.
P039719-B42a	52



NOTES:

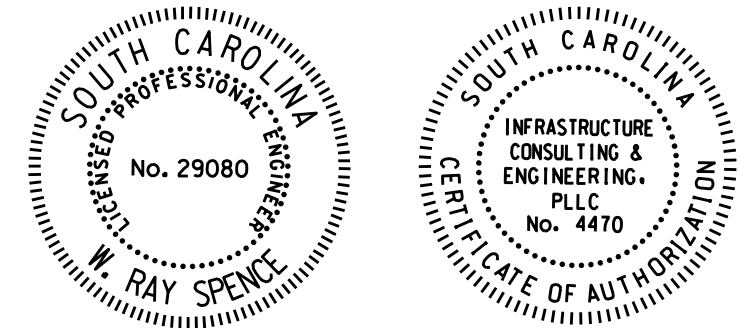
MSE WALL FACING SHALL BE A DEEP FRACTURED FIN FINISH IN ACCORDANCE WITH STANDARD DRAWING 701-950-01.

ANTI-GRAFFITI COATING SHALL BE APPLIED TO ALL EXPOSED SURFACES OF MSE WALL PANELS AND COPING IN ACCORDANCE WITH THE RFP.

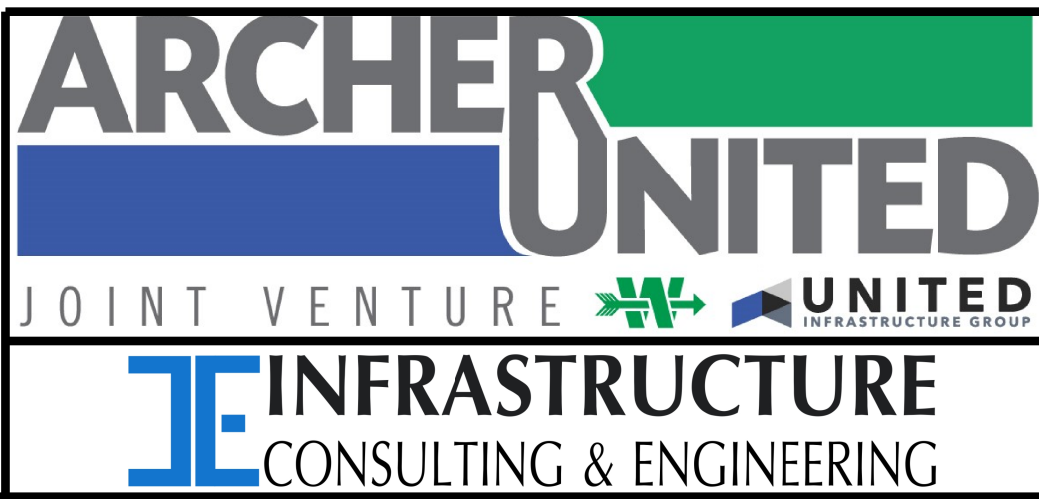


ESTIMATED QUANTITIES - MSE WALL 1		
ITEM	UNIT	QUANTITY
STRUCTURE EXCAVATION FOR RETAINING WALL	CY	5.000
MSE RETAINING WALL BACKFILL (STONE)	CY	4.315
MSE RETAINING WALL (PANEL FACING) BRIDGE	SF	3.452
COPING FOR FOR MSE RETAINING WALL (BRIDGE)	LF	164
SLOPE PROTECTION 4" CONCRETE	SY	61*

* INCLUDES 43 SY FOR VALLEY GUTTER.

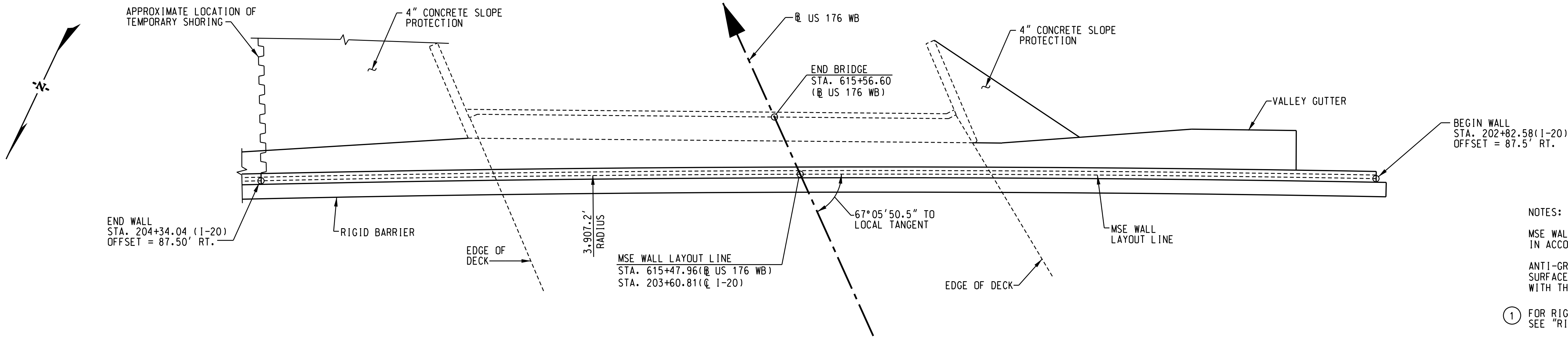


REV.	
REV.	
REV.	
QUAN.	WRS 09-22
DR.	RMH WRS 07-22
DES.	KLC WRS 11-21
BY	CHK. DATE



SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	
MSE WALL NO. 1 PLAN AND ELEVATION US 176 WB (BROAD RIVER RD.) BRIDGE OVER I-20	
COUNTY	RICHLAND
ROUTE	US 176

Z:\Projects\20-8\CCR Ph 2\Structures\02-New Bridges\Bridge 42a\04_FinalPlans\53_BRIDGE 42a_MSE WALL NO.2 PLAN AND ELEVATION.dgn
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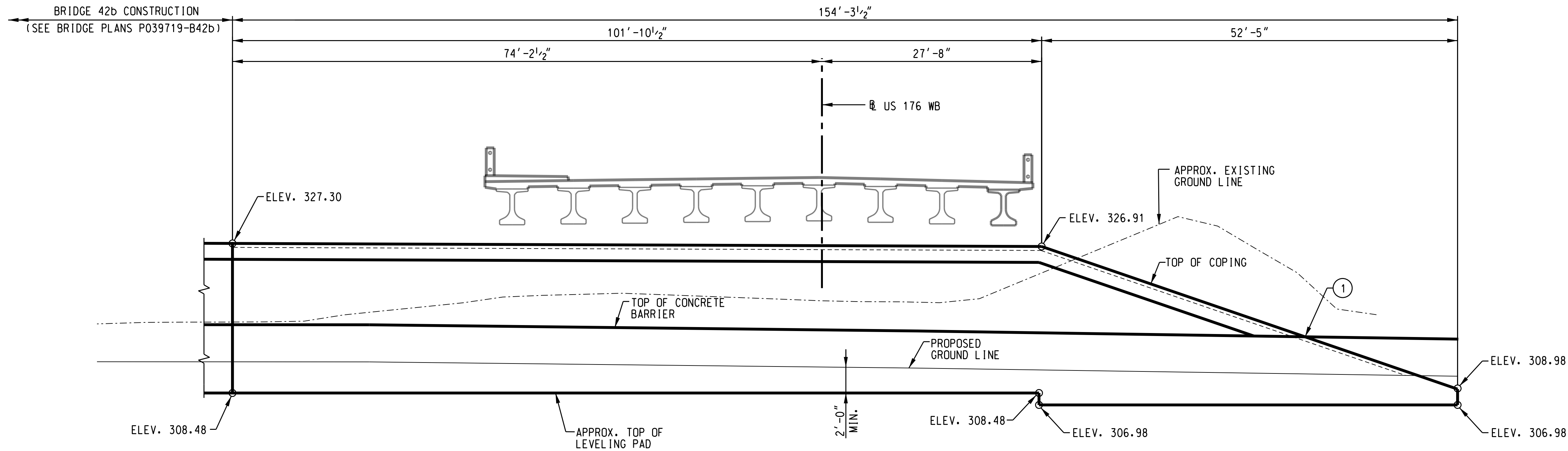
PLAN

NOTES:

MSE WALL FACING SHALL BE A DEEP FRACTURED FIN FINISH IN ACCORDANCE WITH STANDARD DRAWING 701-950-01.

ANTI-GRAFFITI COATING SHALL BE APPLIED TO ALL EXPOSED SURFACES OF MSE WALL PANELS AND COPING IN ACCORDANCE WITH THE RFP.

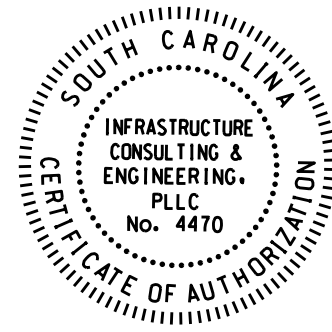
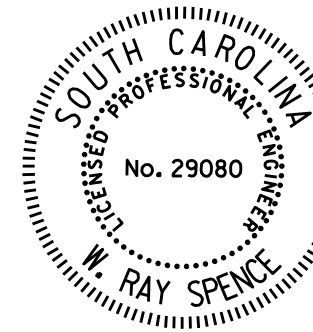
- ① FOR RIGID BARRIER AND COPING TERMINATION SEE "RIGID BARRIER DETAILS" SHEET.



MSE WALL NO. 2
ELEVATION ALONG LAYOUT LINE
(LOOKING IN DIRECTION OF STATIONING)

ESTIMATED QUANTITIES - MSE WALL 2		
ITEM	UNIT	QUANTITY
STRUCTURE EXCAVATION FOR RETAINING WALL	CY	2.635
MSE RETAINING WALL BACKFILL (STONE)	CY	2.450
MSE RETAINING WALL (PANEL FACING) BRIDGE	SF	2.471
COPING FOR FOR MSE RETAINING WALL (BRIDGE)	LF	137
SLOPE PROTECTION 4" CONCRETE	SY	94 *

*INCLUDES 71 SY FOR VALLEY GUTTER.



REV.	
REV.	
REV.	
REVIEWED	WRS 09-22
QUAN.	
DR.	RMH WRS 07-22
DES.	KLC WRS 11-21
BY	CHK. DATE

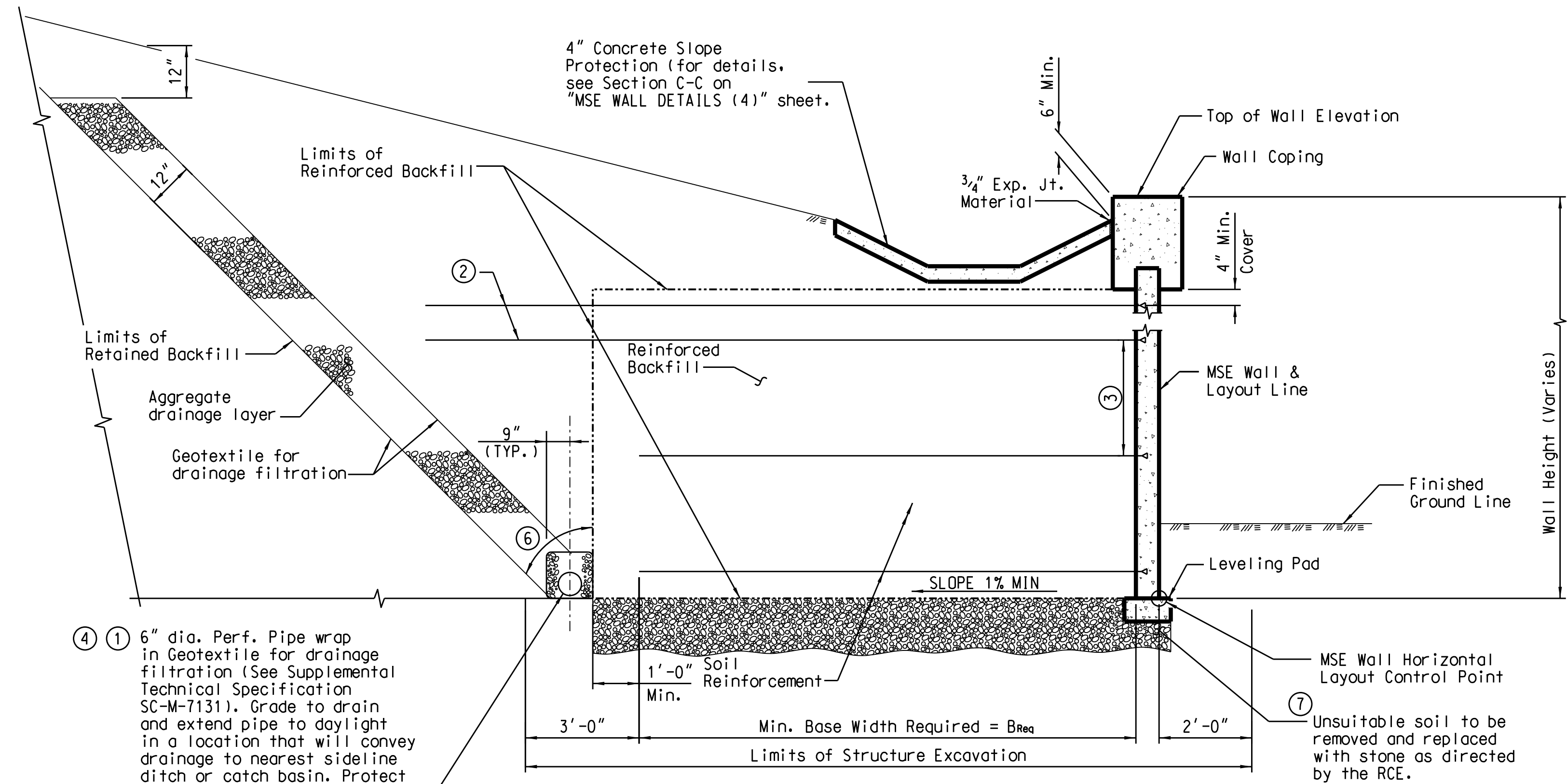


INFRASTRUCTURE
CONSULTING & ENGINEERING

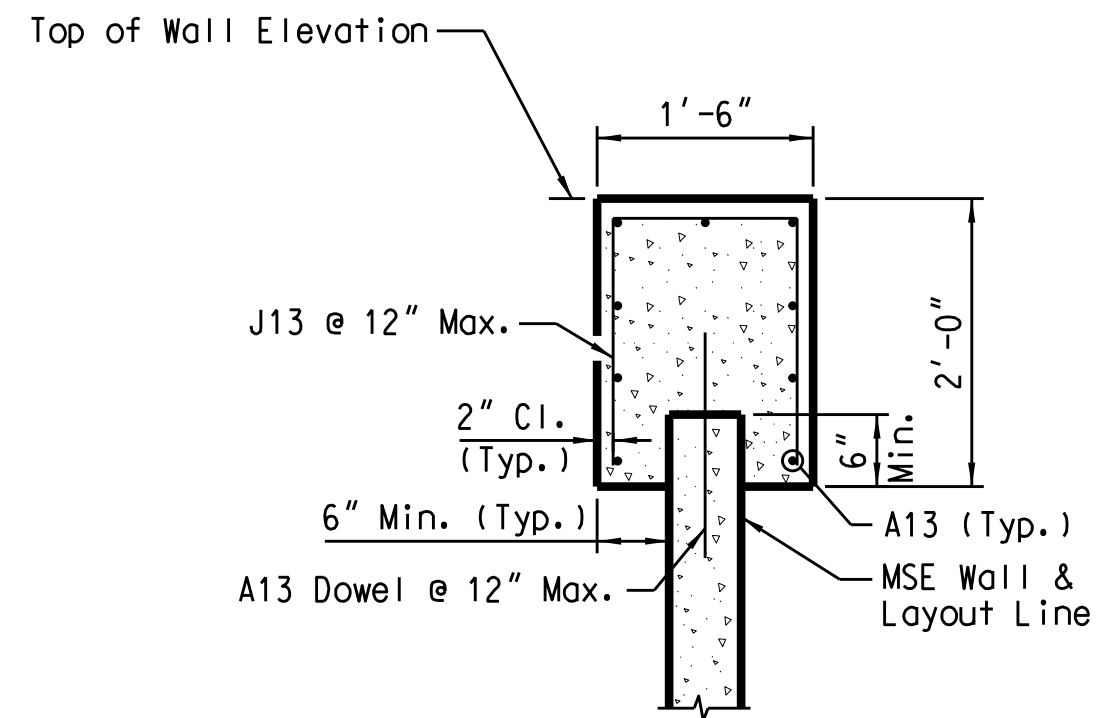
SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MSE WALL NO. 2
PLAN AND ELEVATION
US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

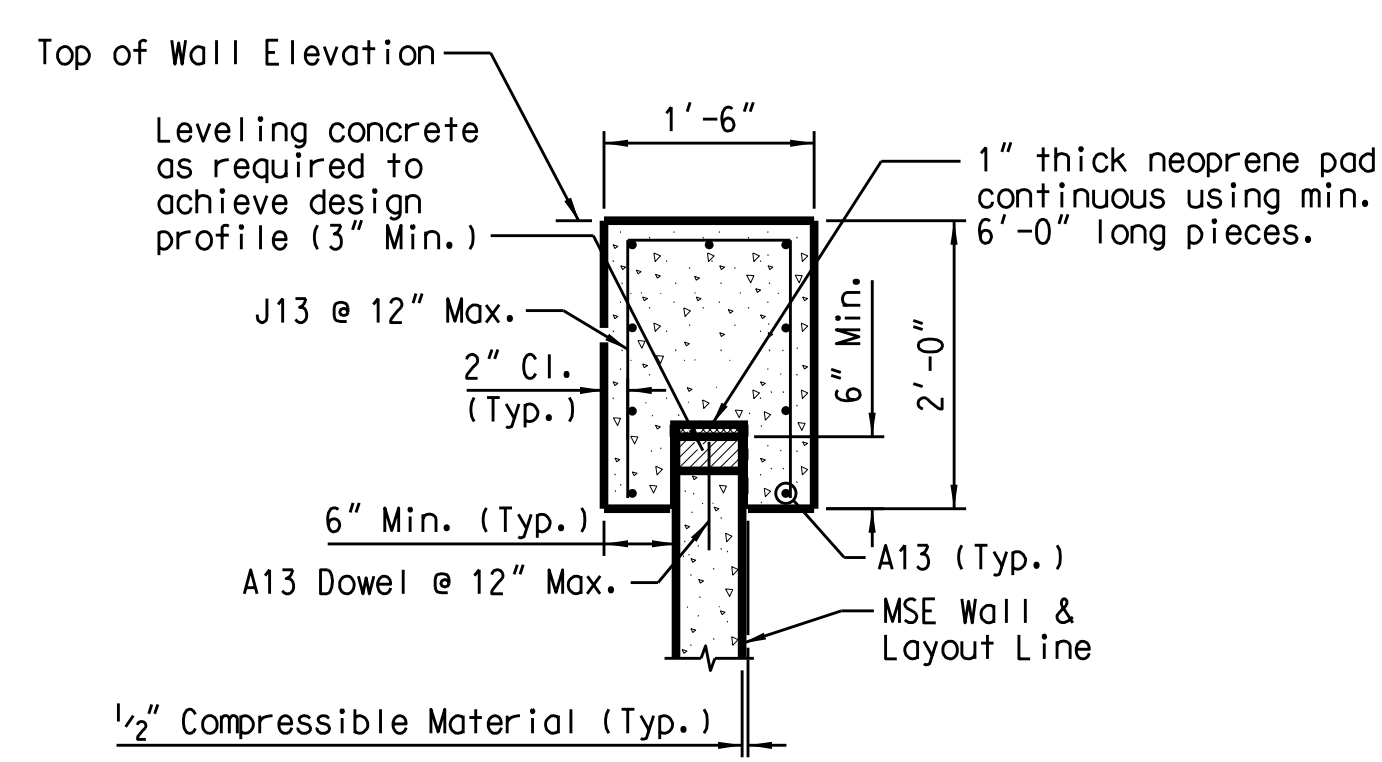
COUNTY RICHLAND ROUTE US 176



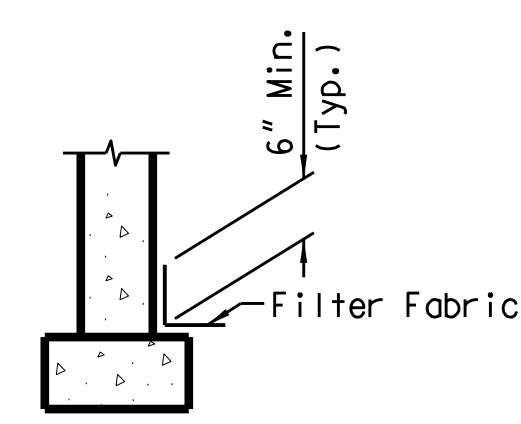
TYPICAL SECTION



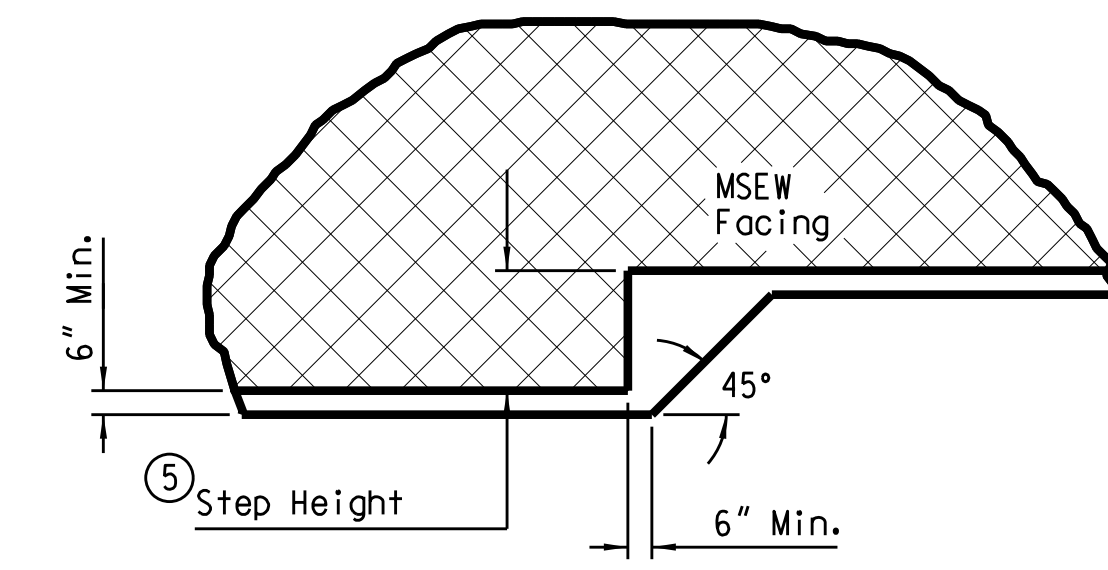
SECTION THRU
CAST-IN-PLACE WALL COPING



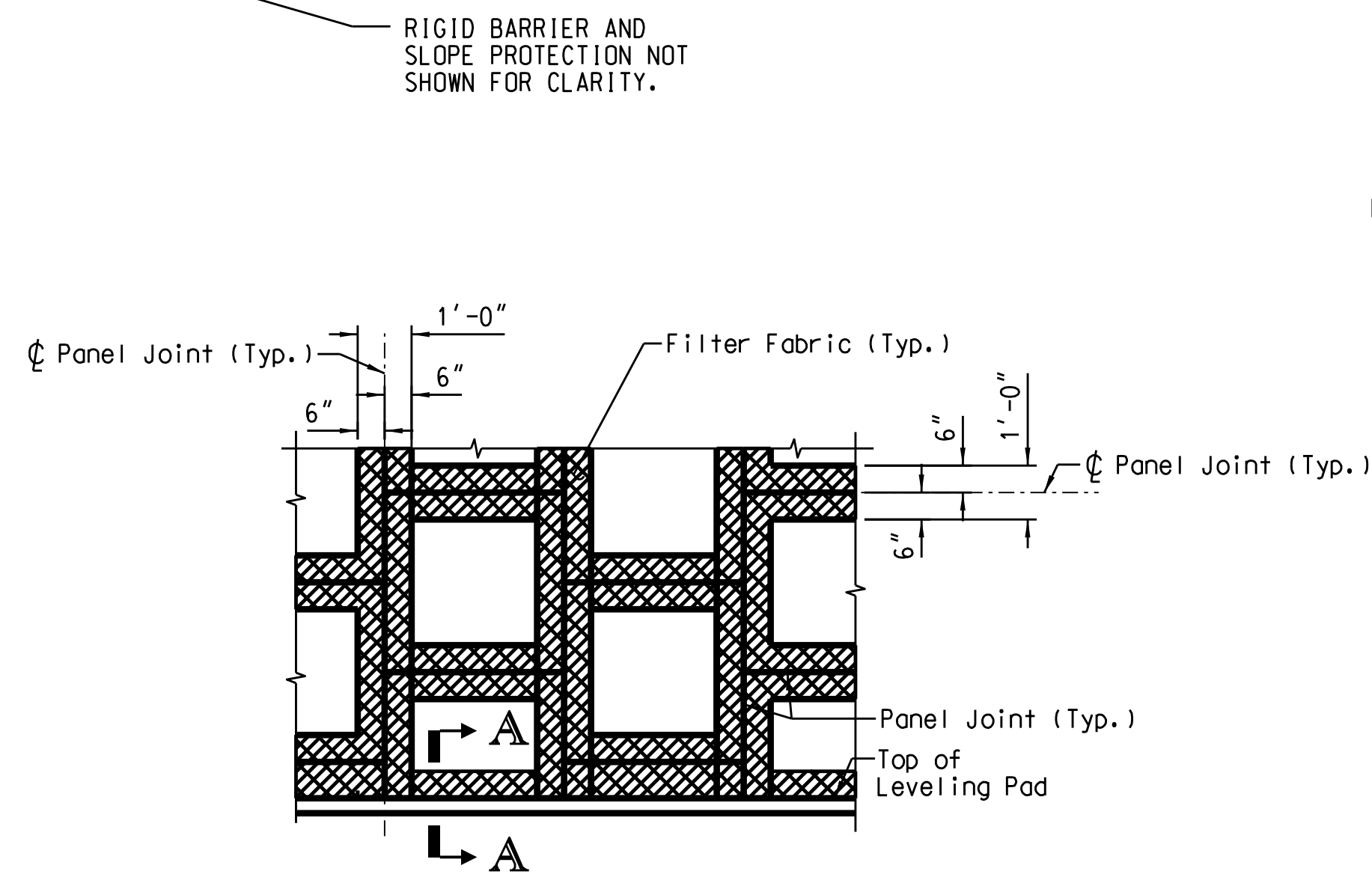
SECTION THRU PRECAST WALL COPING



SECTION A-A

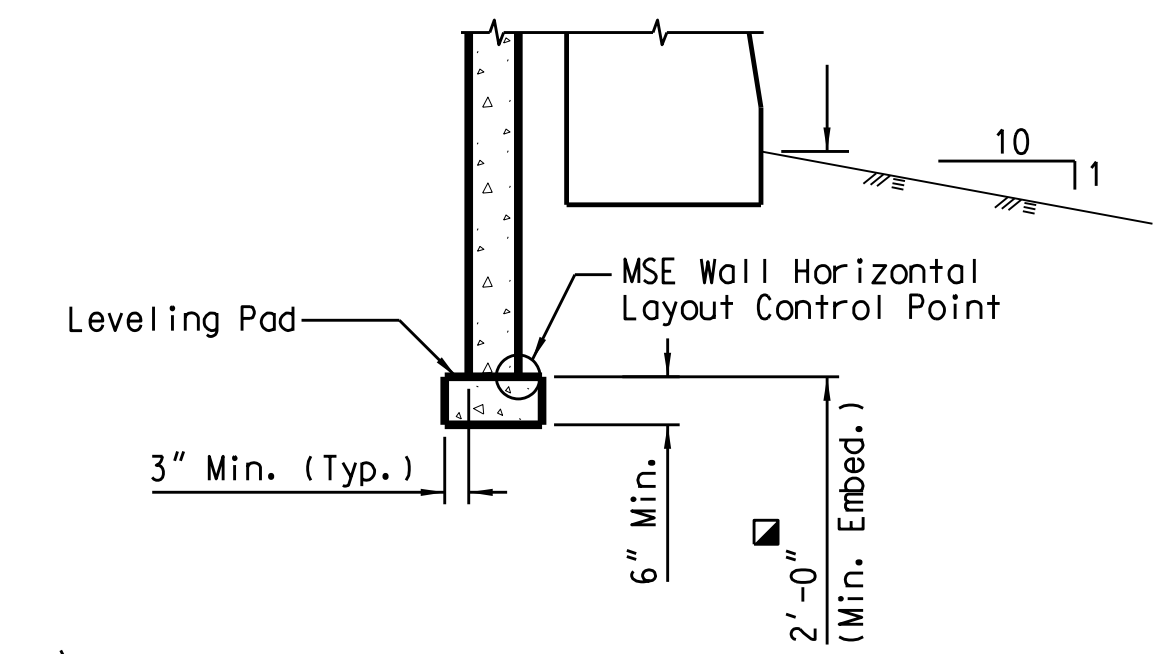


LEVELING PAD STEP DETAIL



LAYOUT OF FILTER FABRIC AT
FILL FACE OF PANEL JOINTS

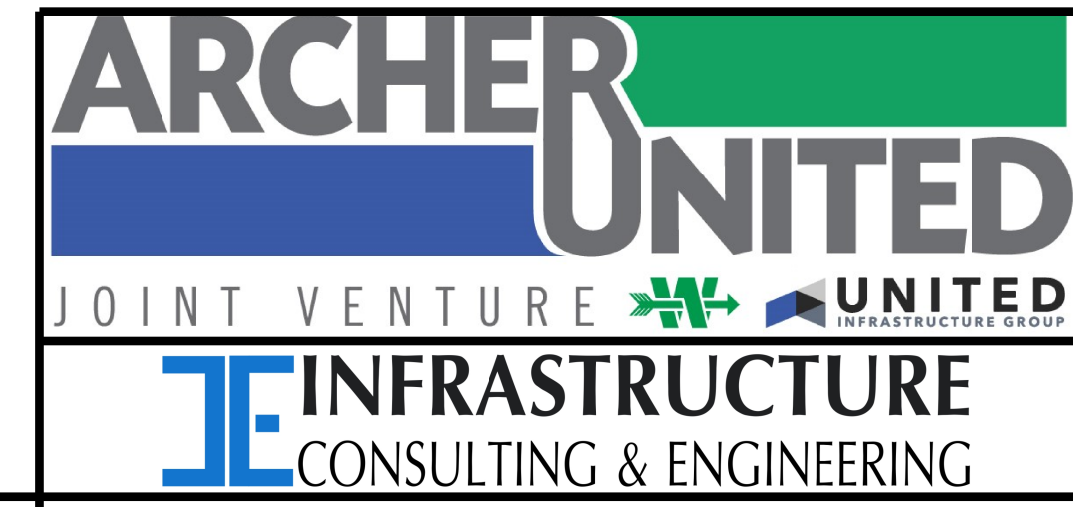
- Construct 1'-6" x 1'-6" aggregate drain using 6" dia. perforated pipe. Provide aggregate, other than Macadam, that meets the requirements for stone backfill in Supplemental Technical Specification SC-M-713. Wrap geotextile for drainage filtration (see Supplemental Technical Specification SC-M-713) completely around aggregate drain and overlap 1'-0". Design MSE Wall drainage system to drain the aggregate drain.
- Extend top two layers of soil reinforcement 5 feet beyond the end of the lower layers of soil reinforcement.
- Maximum vertical spacing of soil reinforcement is 36".
- Provide rodent screen manufactured from T304 stainless steel or galvanized steel with a minimum wire diameter of 0.050". Provide rodent screen with minimum of 2 openings per inch and a maximum of 4 openings per inch.
- Limit step height for panel facing to 1/2 of the full panel height.
- Angle to be determined by the Contractor based on site conditions and the method of construction used. Excavation and/or shoring of retained backfill to permit construction of the MSE wall is considered incidental to the MSE wall construction and is not paid for as a separate item.
- Provide aggregate, other than Macadam, that meets the requirements for stone backfill in the Supplemental Technical Specification SC-M-713.



LEVELING PAD DETAIL

Minimum MSE Wall Embedment Depth	
Slope of Ground in front of Wall	Minimum Embedment Depth *
Horizontal** (Walls)	Wall Height/20
Horizontal** (Abutments)	Wall Height/10
3H:1V	Wall Height/10
2H:1V	Wall Height/7
1.5H:1V	Wall Height/5

* If table results in embedment depth less than 2'-0", use 2'-0".
** or slopes flatter than 3H:1V



SOUTH CAROLINA

DEPARTMENT OF TRANSPORTATION

MSE WALL DETAILS (2)

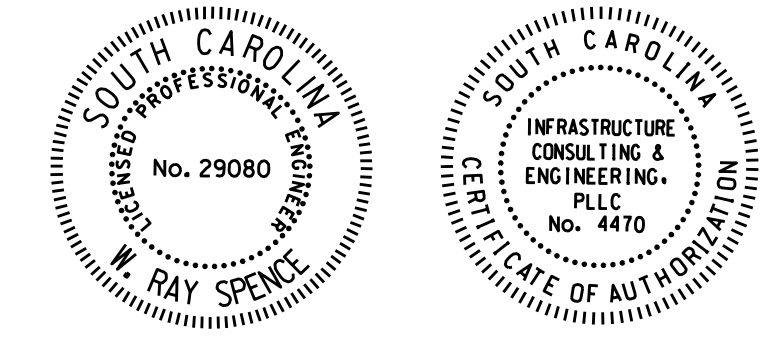
US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

COUNTY

RICHLAND

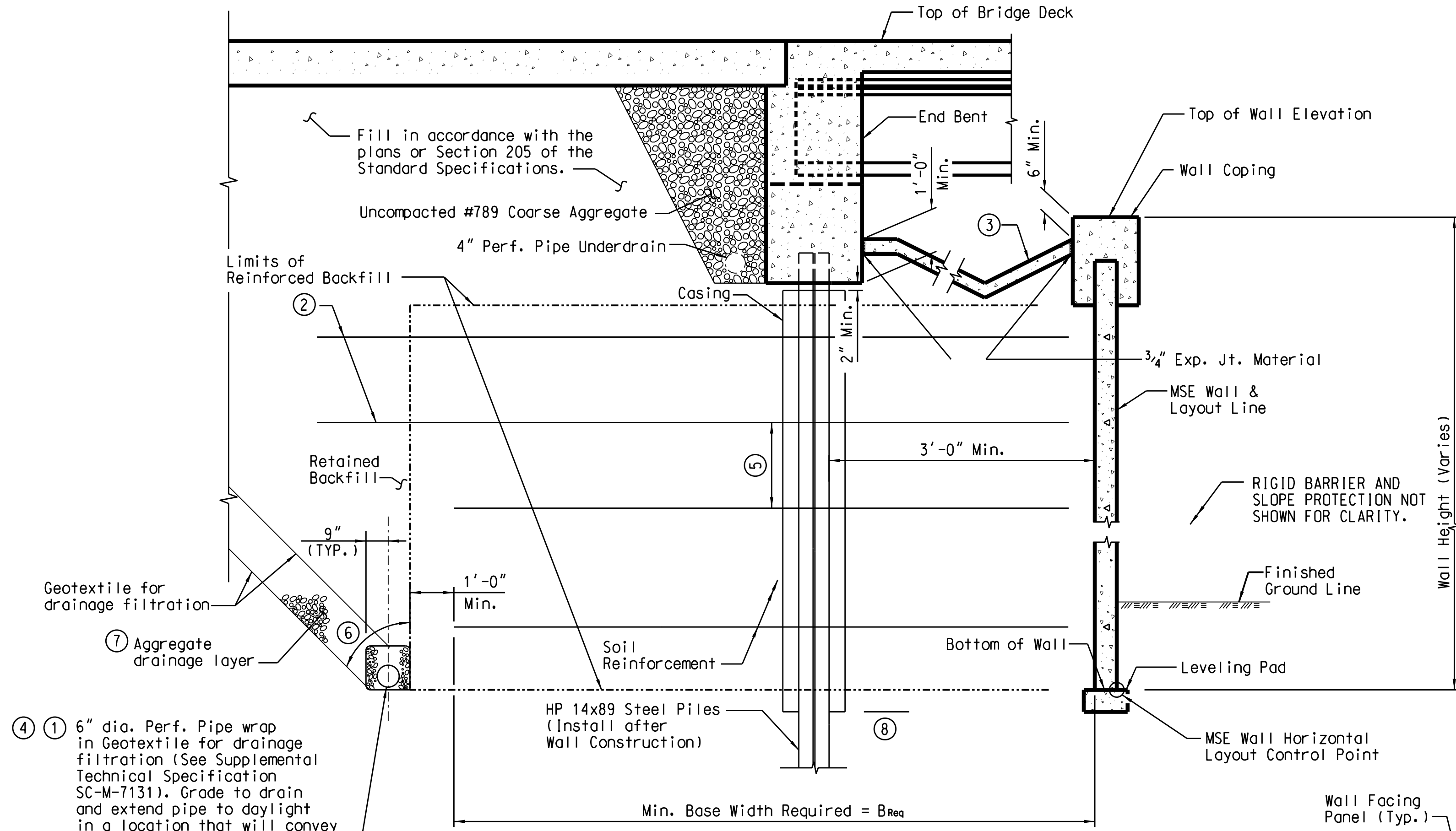
ROUTE

US 176

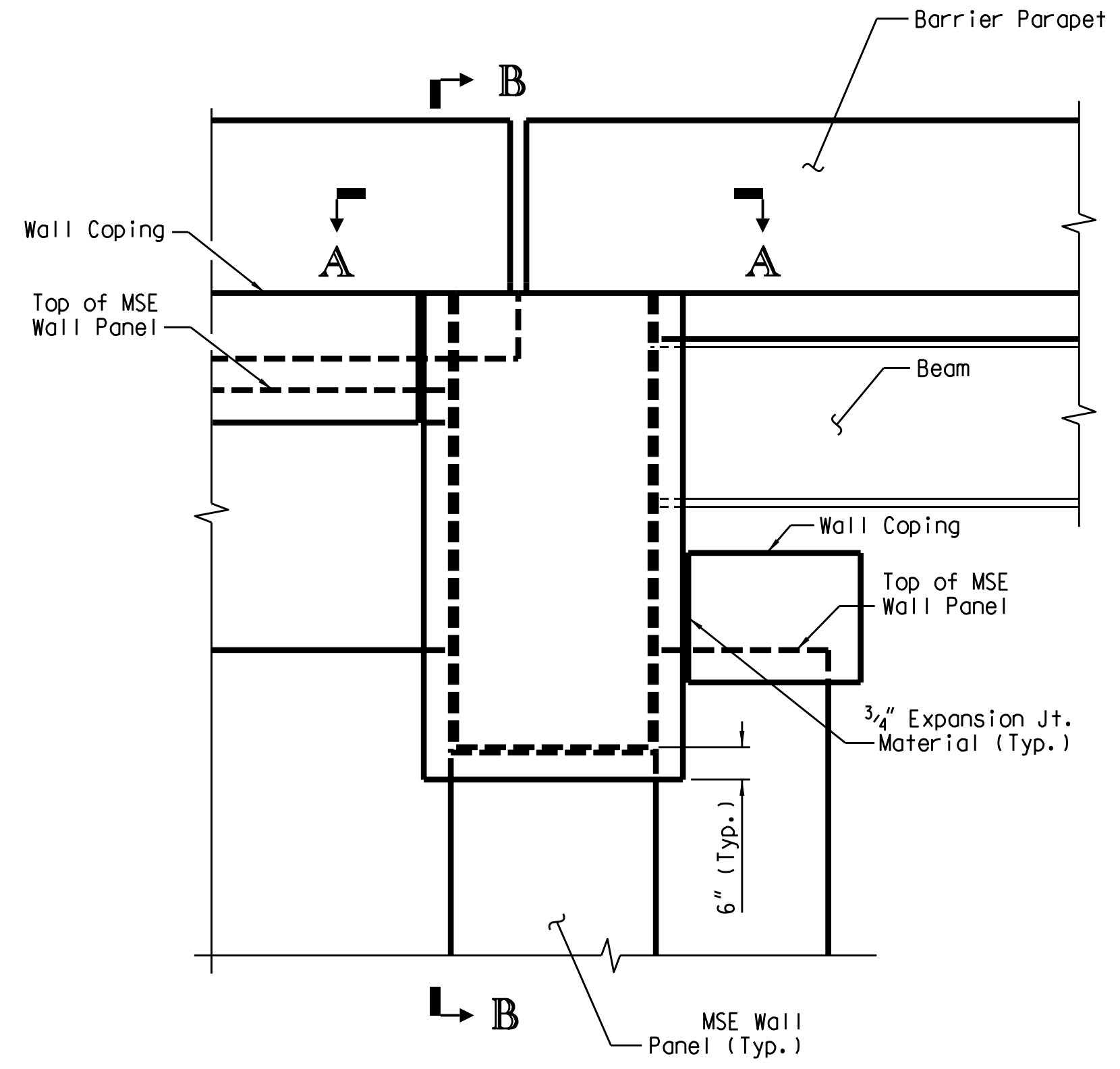


REV.		
REV.	RMH WRS	7-22 Updated for Bridge
REV.	JXY SAN	3-14 New Border
REVIEWED	WRS	09-22
QUAN.		
DR.	MRW	SAN 2-12
DES.		
BY	CHK.	DATE

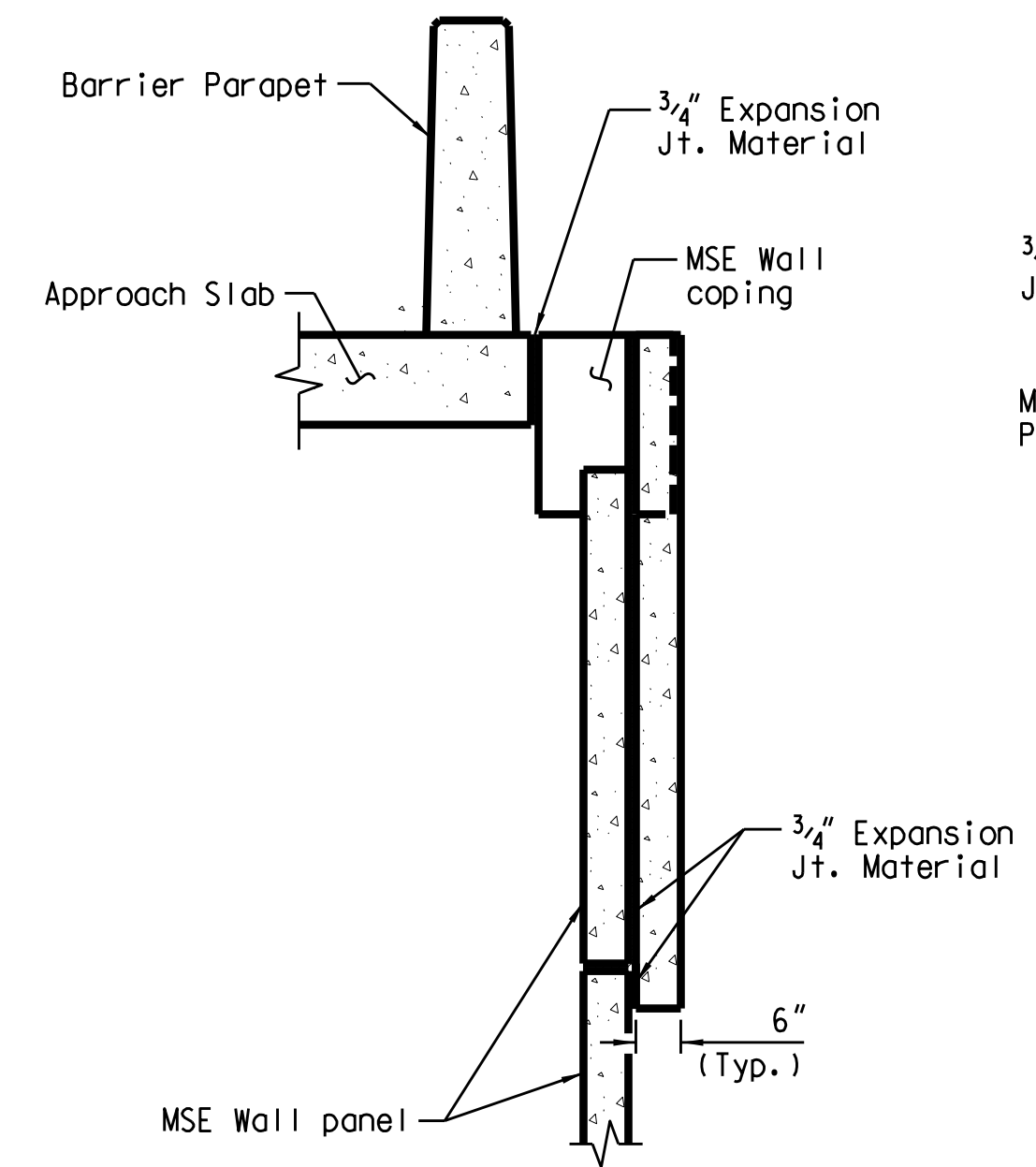
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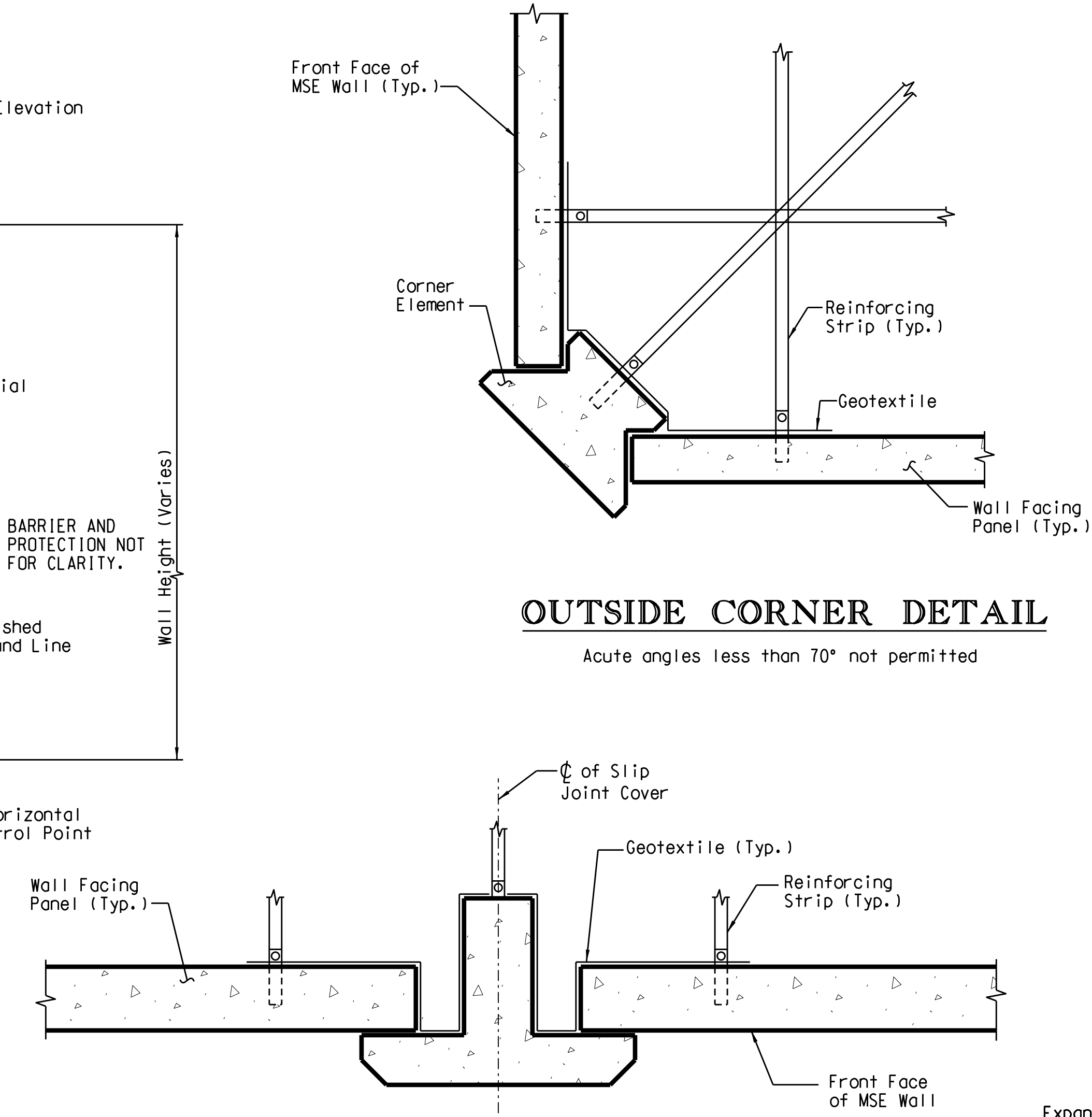
TYPICAL SECTION AT END BENTS



ELEVATION - END OF END BENT

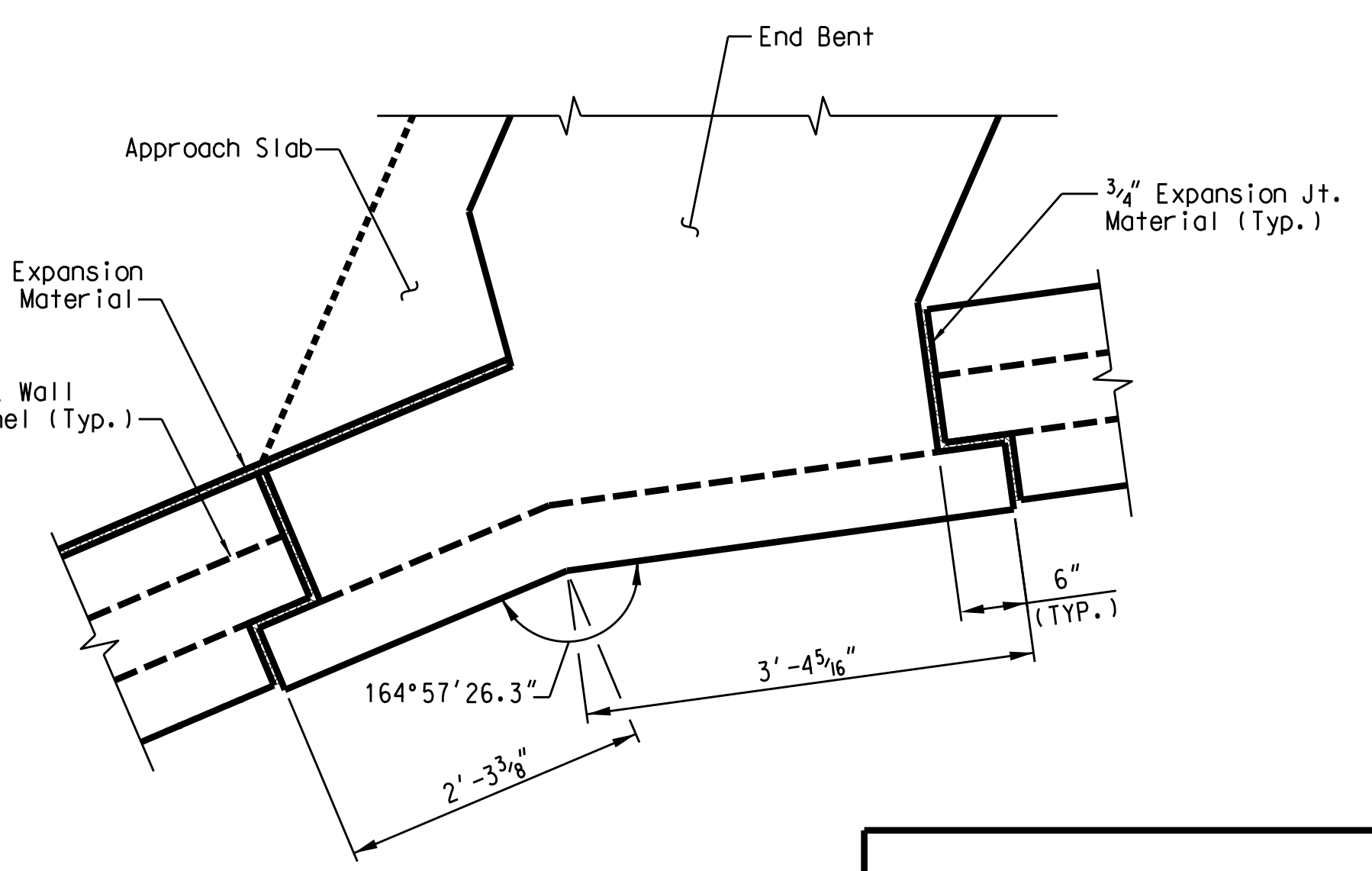


SECTION B-B

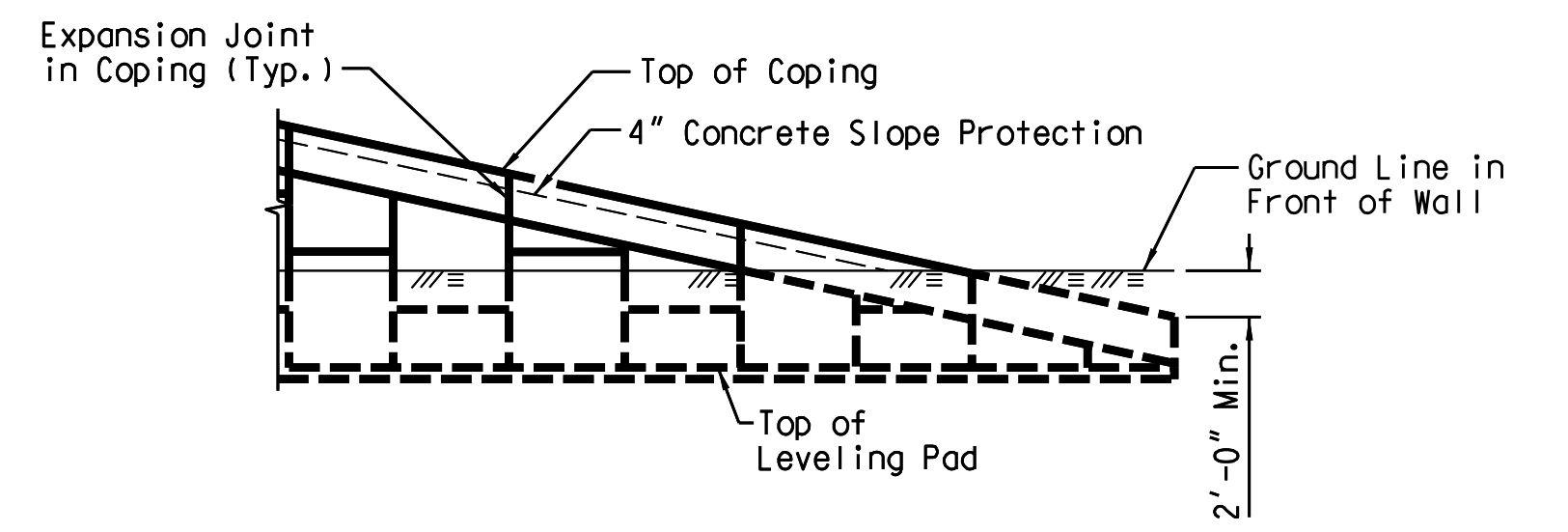


OUTSIDE CORNER DETAIL

SLIP JOINT DETAIL - PRECAST PANELS

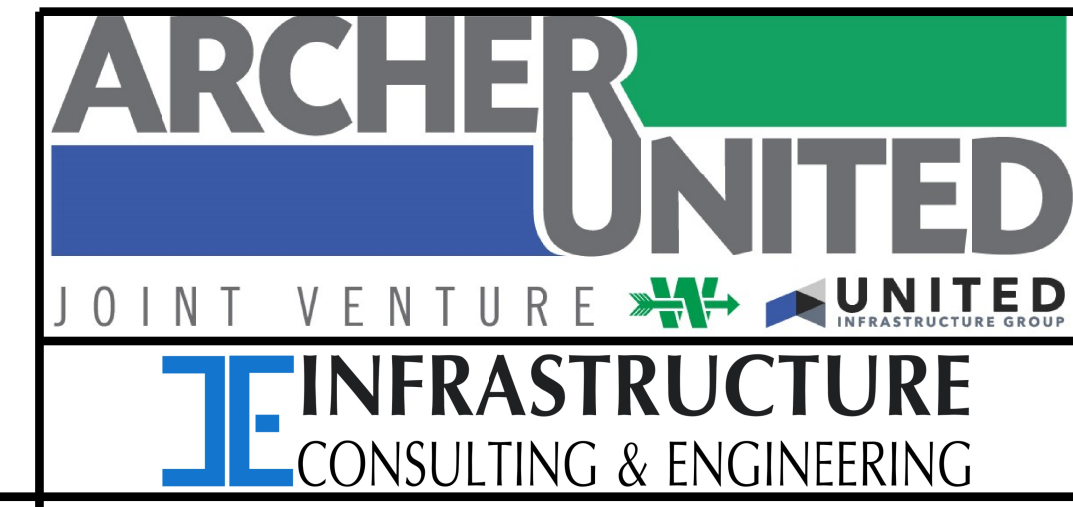


SECTION A-A
(Slab not Shown)

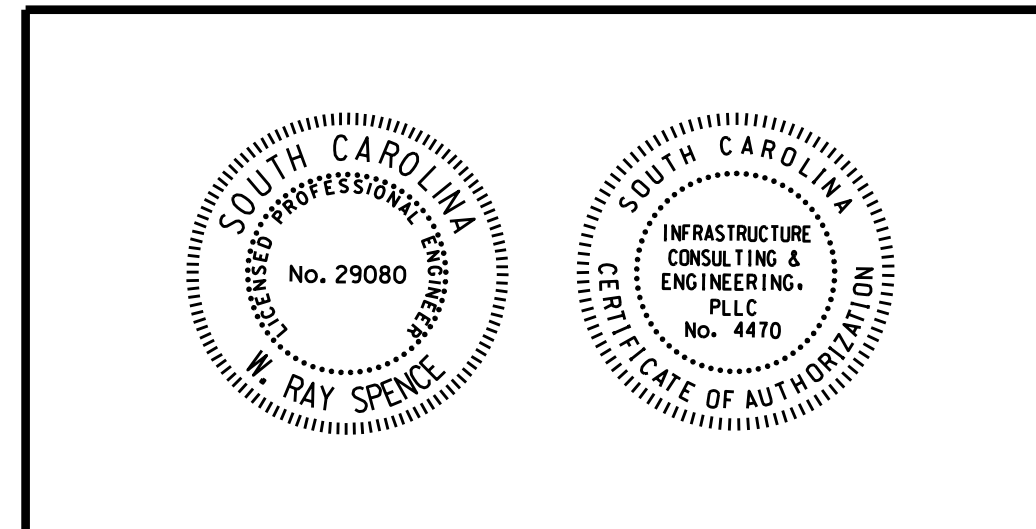


WALL TERMINATION DETAIL

- Notes:
- Do not attach soil reinforcement to end bent caps, end walls, wing walls, or other bridge elements.
 - Provide geotextile for drainage filtration (see Supplemental Technical Specification SC-M-713) at all horizontal and vertical joints.
 - For Wall Copping details, see "MSE Wall Details (2)" Sht.
 - For Leveling Pad details, see "MSE Wall Details (2)" Sht.
 - For Expansion Joint details, see "MSE Wall Details (4)" Sht.
 - For Concrete Slope Protection details, see "Fiber Reinforced Slope Protection Details" Sht.
- Construct 1'-6" x 1'-6" aggregate drain using 6" dia. perforated pipe. Provide aggregate, other than Macadam, that meets the requirements for stone backfill in Supplemental Technical Specification SC-M-713. Wrap geotextile for drainage filtration (see Supplemental Technical Specification SC-M-713) completely around aggregate drain and overlap 1'-0". Design MSE Wall drainage system to drain the aggregate drain.
 - Extend top two layers of soil reinforcement 5 feet beyond the end of the lower layers of soil reinforcement.
 - 4" Concrete Slope Protection in ditch. For details, see Section A-A on "MSE Wall Details (4)" Sht.
 - Provide rodent screen manufactured from T304 stainless steel or galvanized steel with a minimum wire diameter of 0.050". Provide rodent screen with minimum of 2 openings per inch and a maximum of 4 openings per inch at end of pipe (daylight point).
 - Maximum vertical spacing of soil reinforcement is 36".
 - Angle to be determined by the Contractor based on site conditions and the method of construction used. Excavation and/or shoring of retained backfill to permit construction of the MSE wall is considered incidental to the MSE wall construction and is not paid for as a separate item.
 - Provide aggregate, other than Macadam, that meets the requirements for stone backfill in Supplemental Technical Specification SC-M-713.
 - Extend casing to bottom of leveling pad elevation.

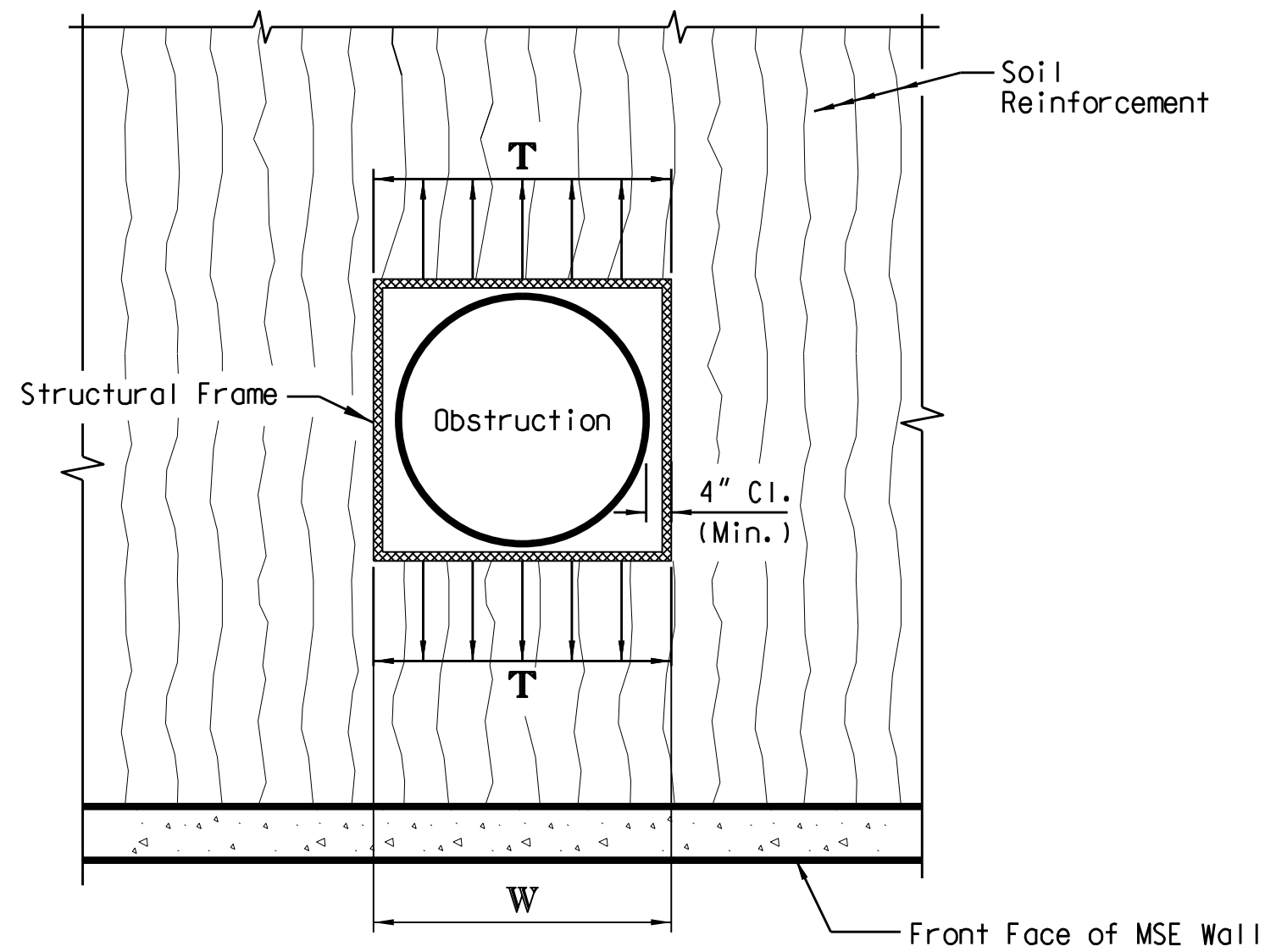


SOUTH CAROLINA	
DEPARTMENT OF TRANSPORTATION	
MSE WALL DETAILS (3)	
US 176 WB (BROAD RIVER RD.) BRIDGE OVER I-20	
COUNTY	RICHLAND
ROUTE	US 176



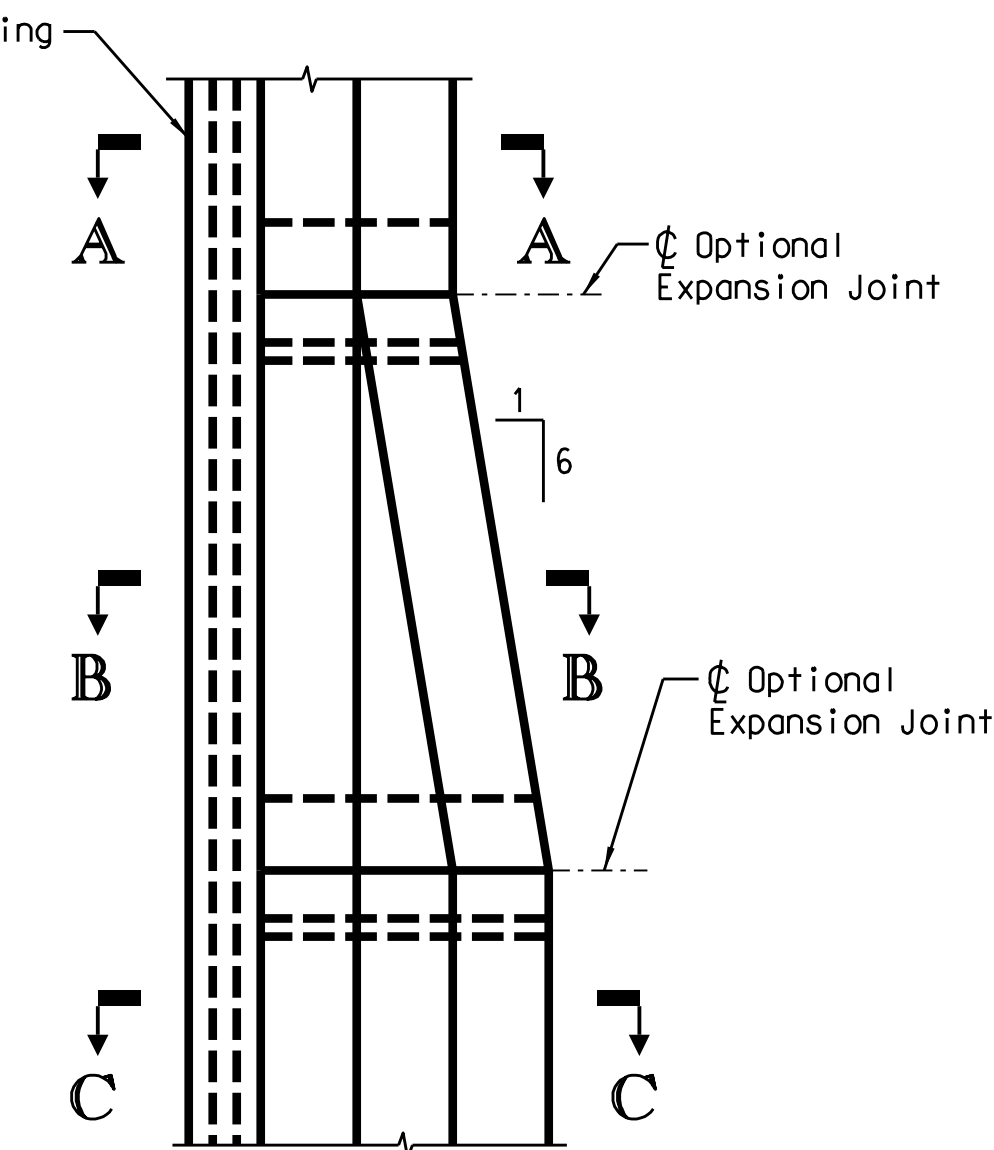
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	Updated for Bridge		
REV.	JXY	SAN	3-14
	New Border		
REV.	SAN	BMH	4-13
	Designer Note		
REVIEWED	WRS	09-22	
QUAN.			
DR.	MRW	SAN	2-12
DES.			
BY	CHK.	DATE	

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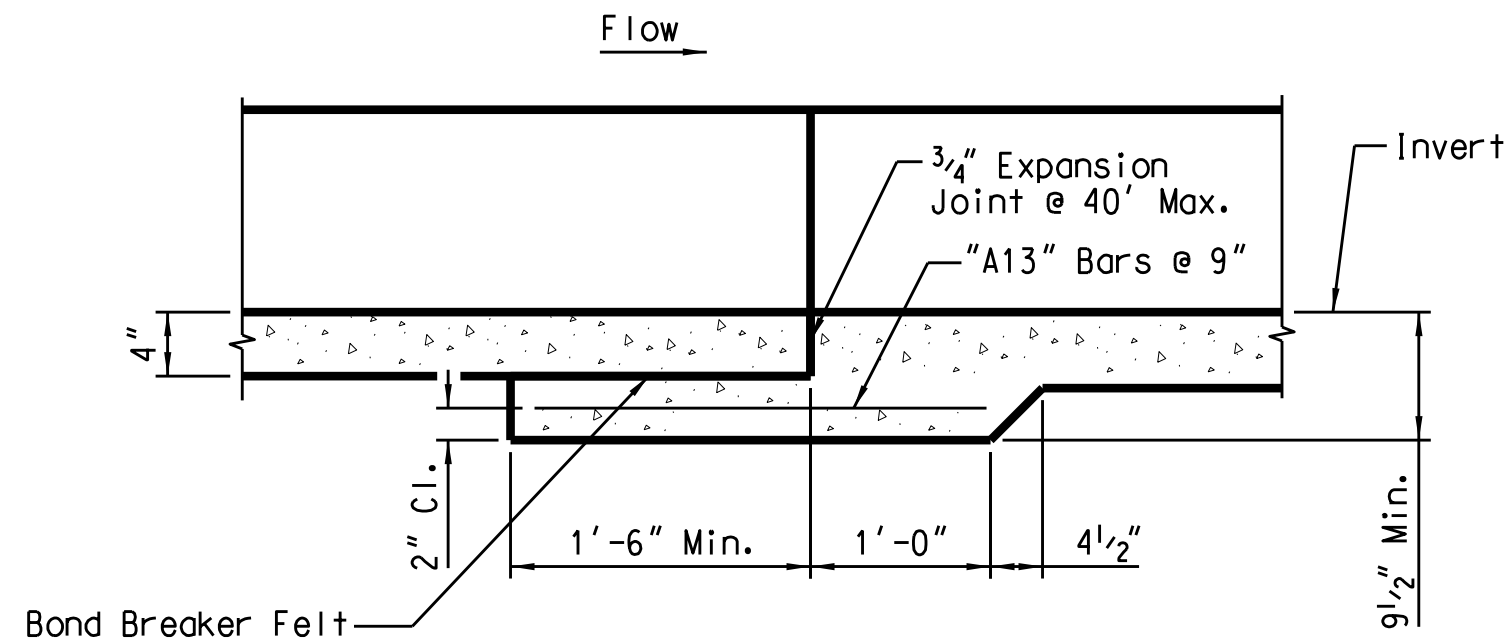


**MSE WALL OBSTRUCTION
(VERTICAL) WITH STRUCTURAL FRAME**^①
(Plan View)

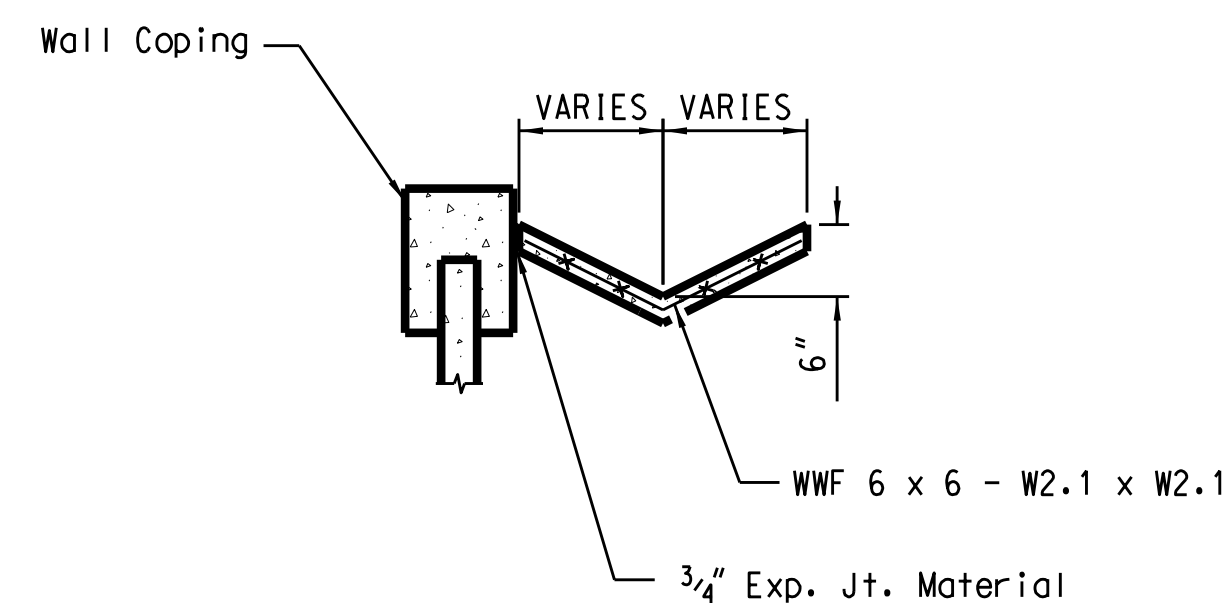
T = Total Load Which Structural Frame Must Carry = T_{max} X W
T_{max} = Max. Reinforcement Unit Tensile Load



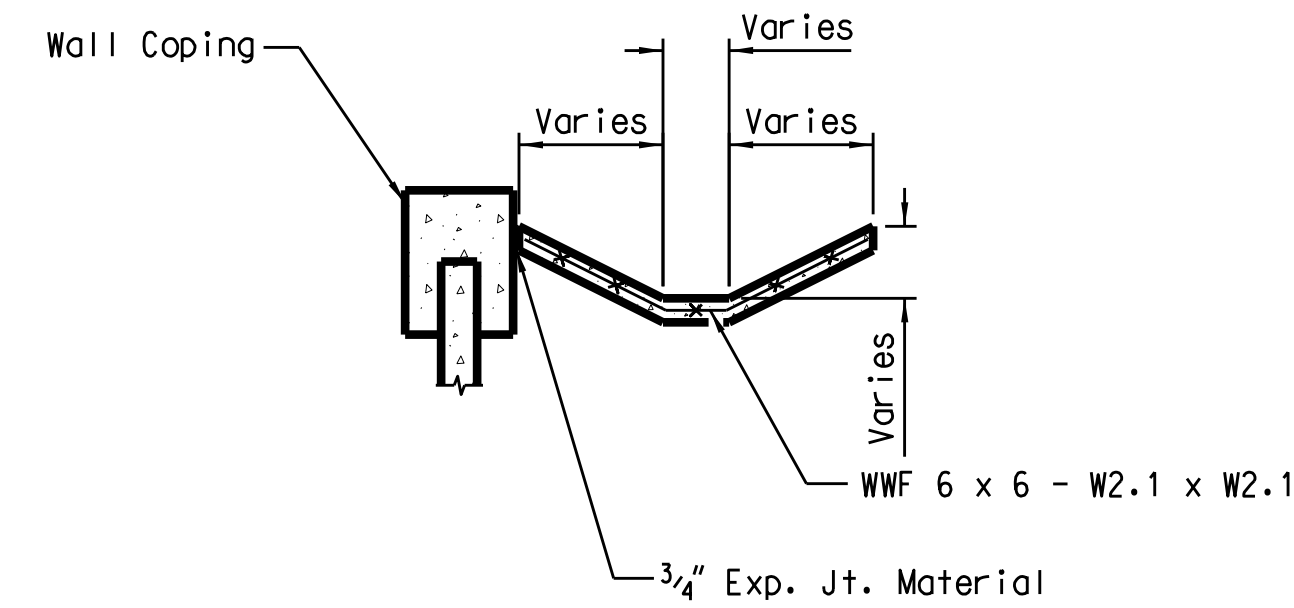
DITCH TRANSITION



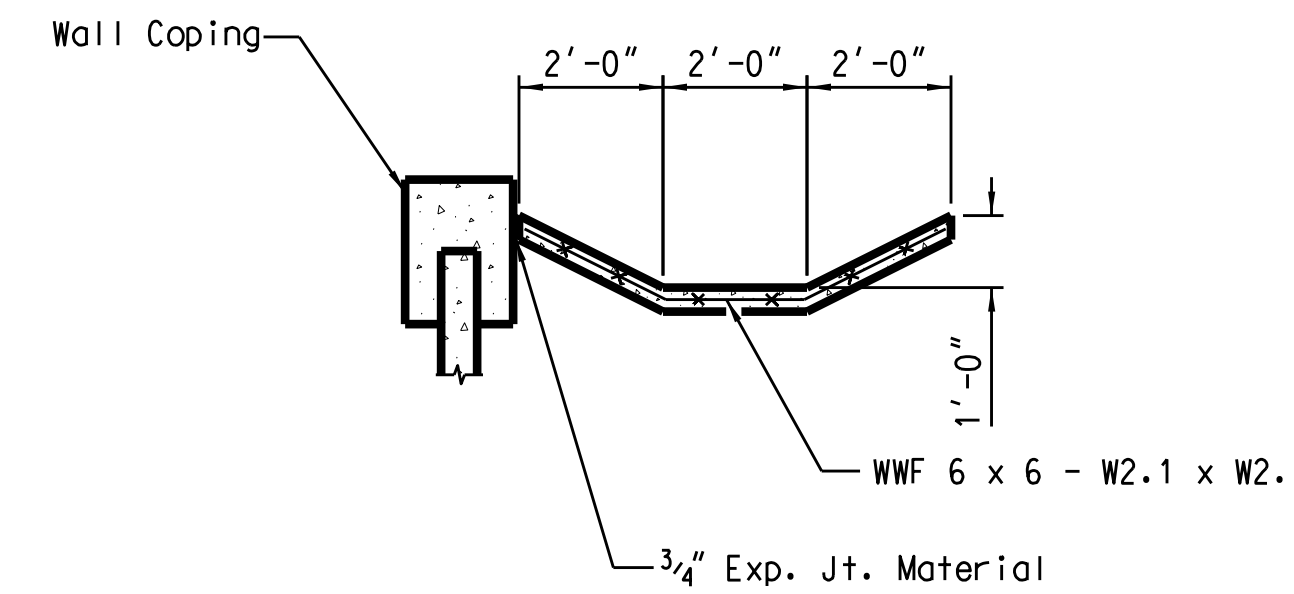
**SECTION THRU DITCH
AT EXPANSION JOINT**



SECTION A-A

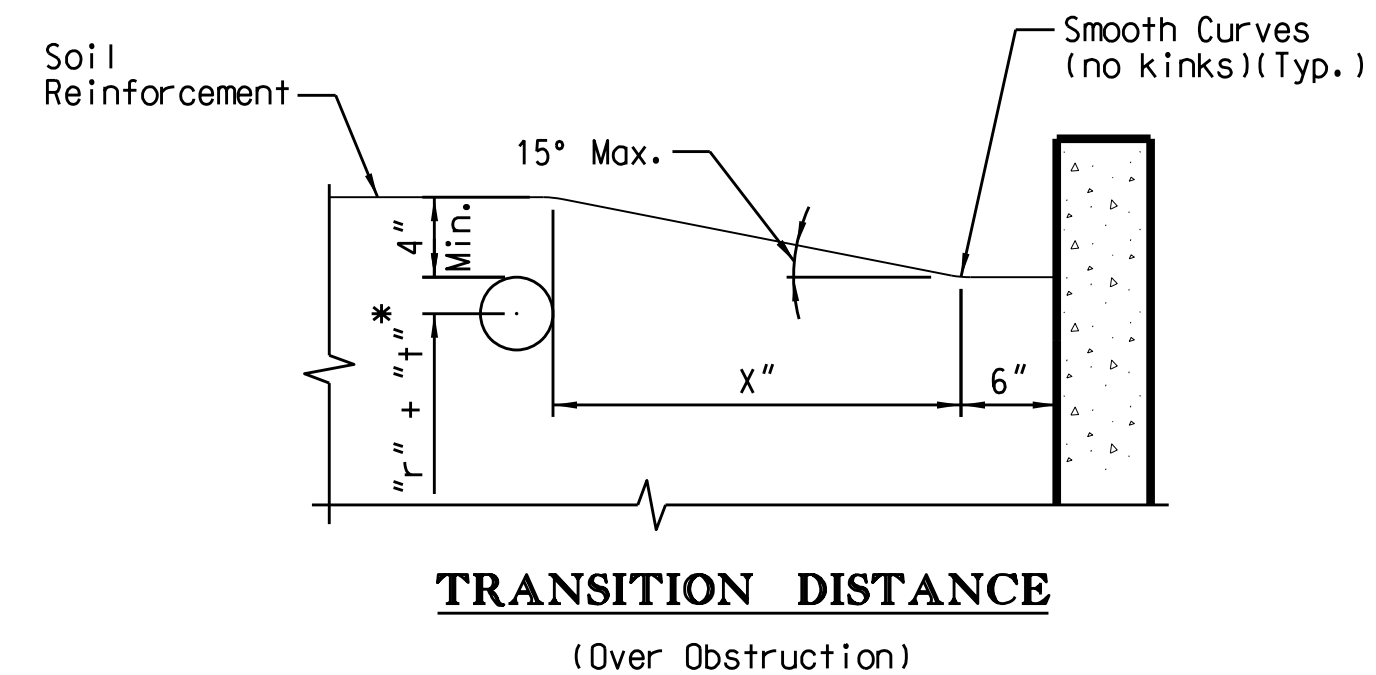
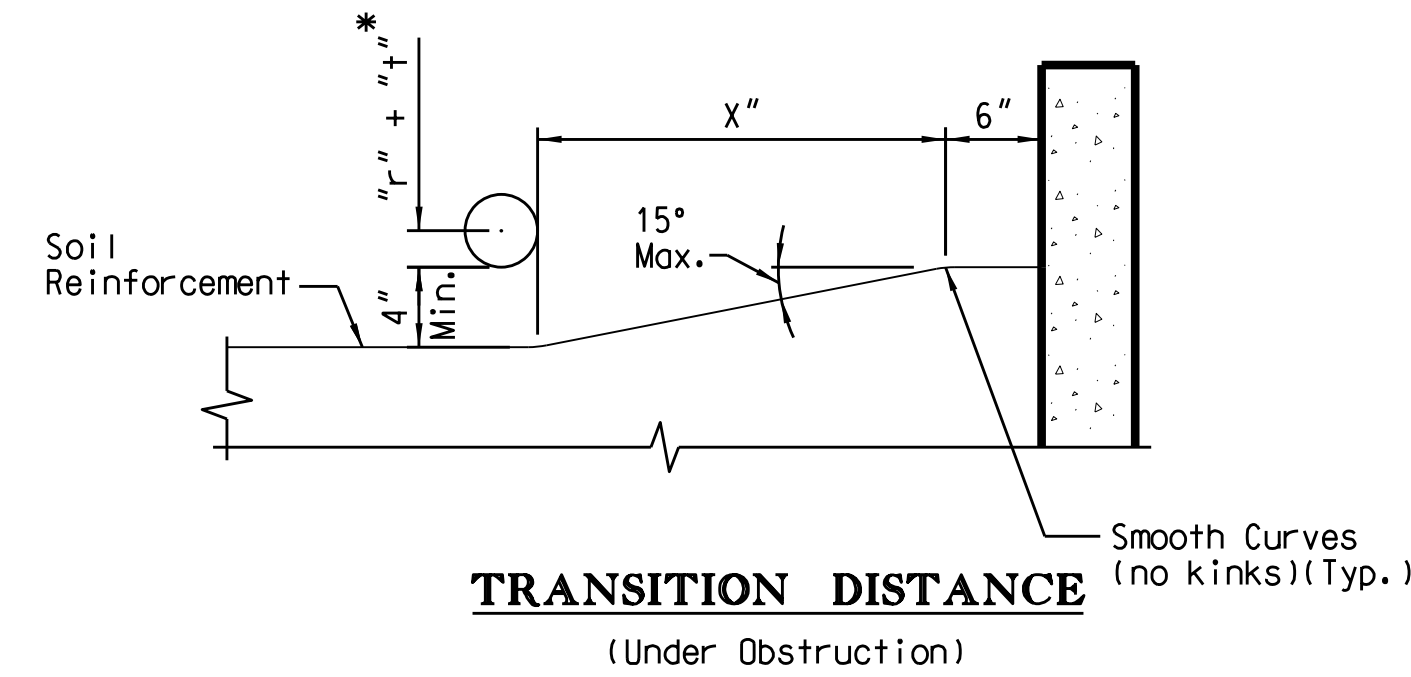


SECTION B-B



SECTION C-C

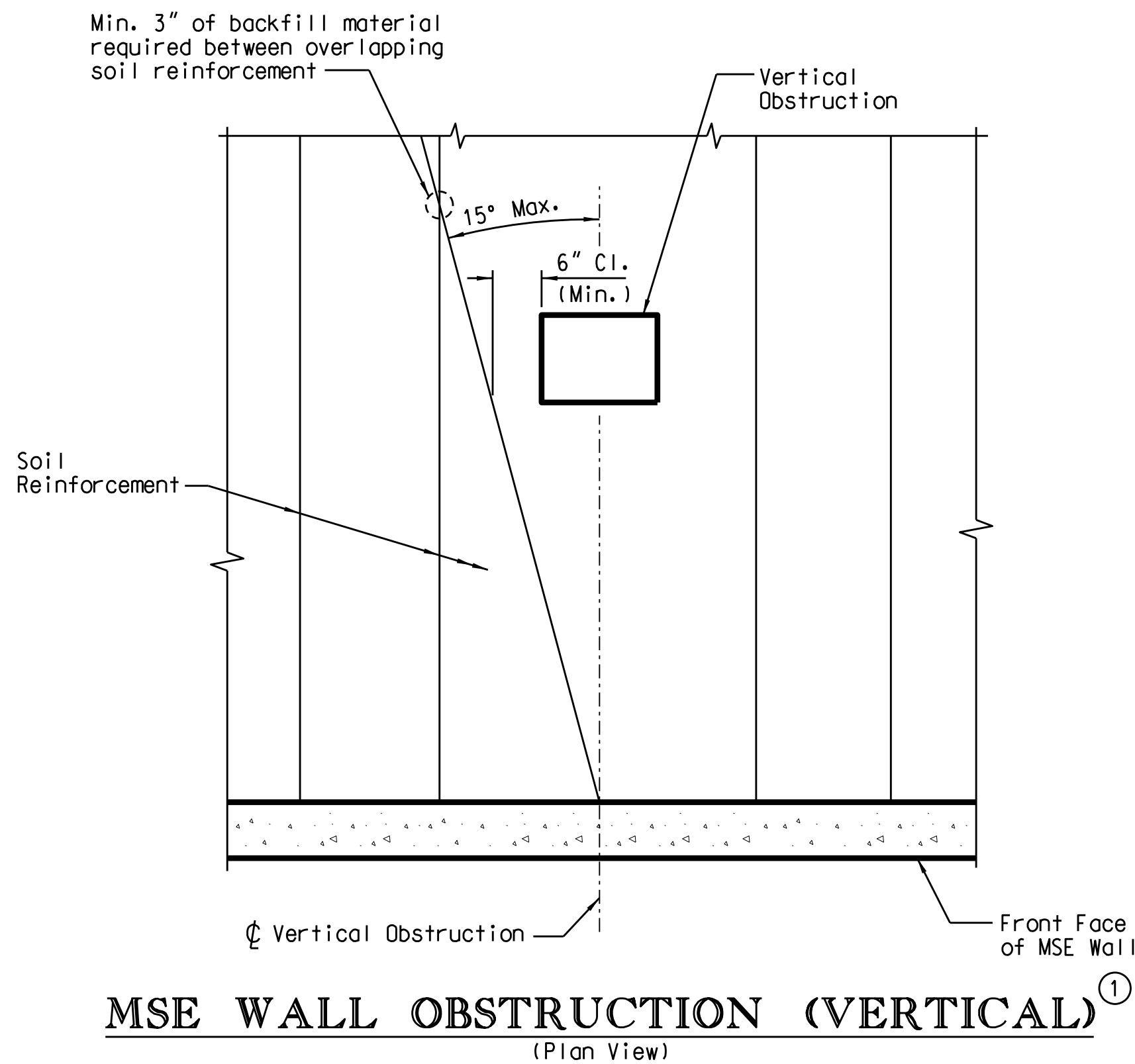
Notes:
① MSE Wall Supplier to design and provide additional soil reinforcement on each side of obstruction or a structural frame around the obstruction to transfer the load from the soil reinforcement on one side of the obstruction to the other. Design and detailing of either method is the MSE Wall Supplier's responsibility.



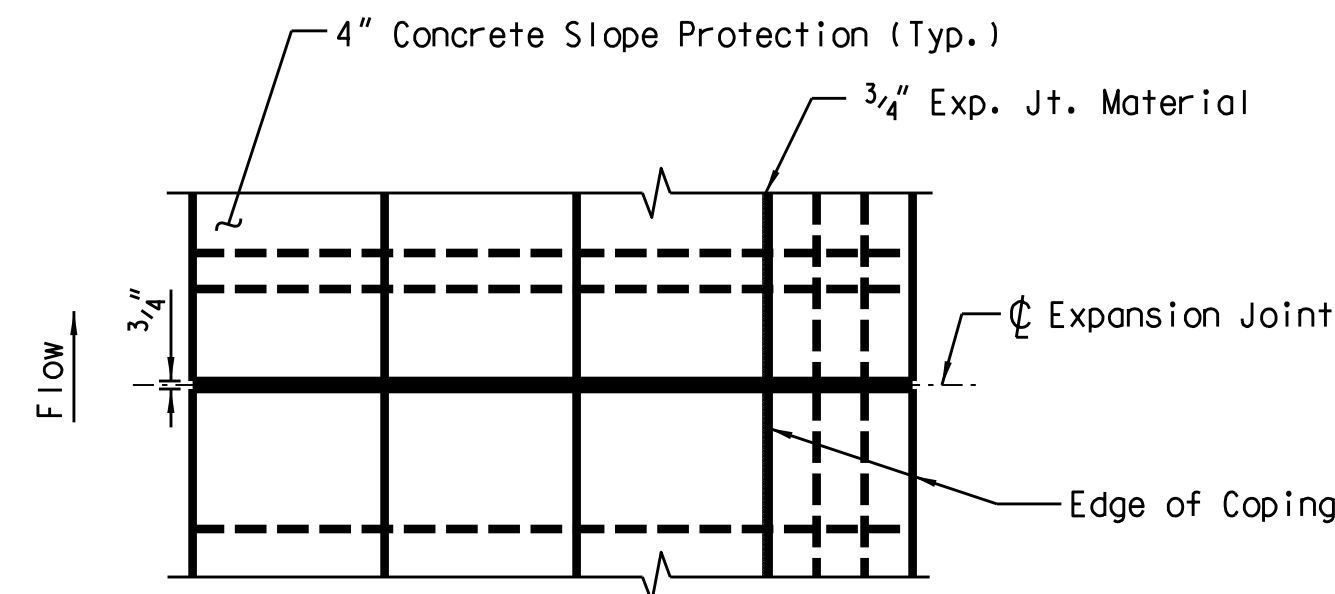
Pipe Inside Diameter	Pipe Radius "r"	"X" ¹	"X" ²
6"	3"	27"	34"
12"	6"	38"	49"
18"	9"	49"	58"
24"	12"	60"	73"
30"	15"	71"	84"

* - "t" denotes pipe wall thickness
1 - Use for all pipe material except concrete
2 - Use for concrete pipe

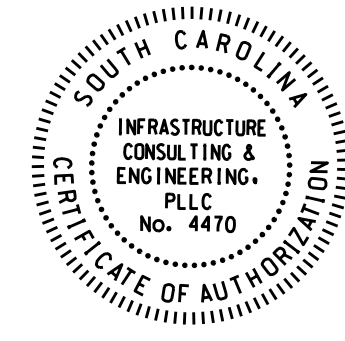
**MSE WALL OBSTRUCTION
(HORIZONTAL)**



MSE WALL OBSTRUCTION (VERTICAL)^①
(Plan View)



**PART. PLAN OF DITCH
AT EXPANSION JOINT**



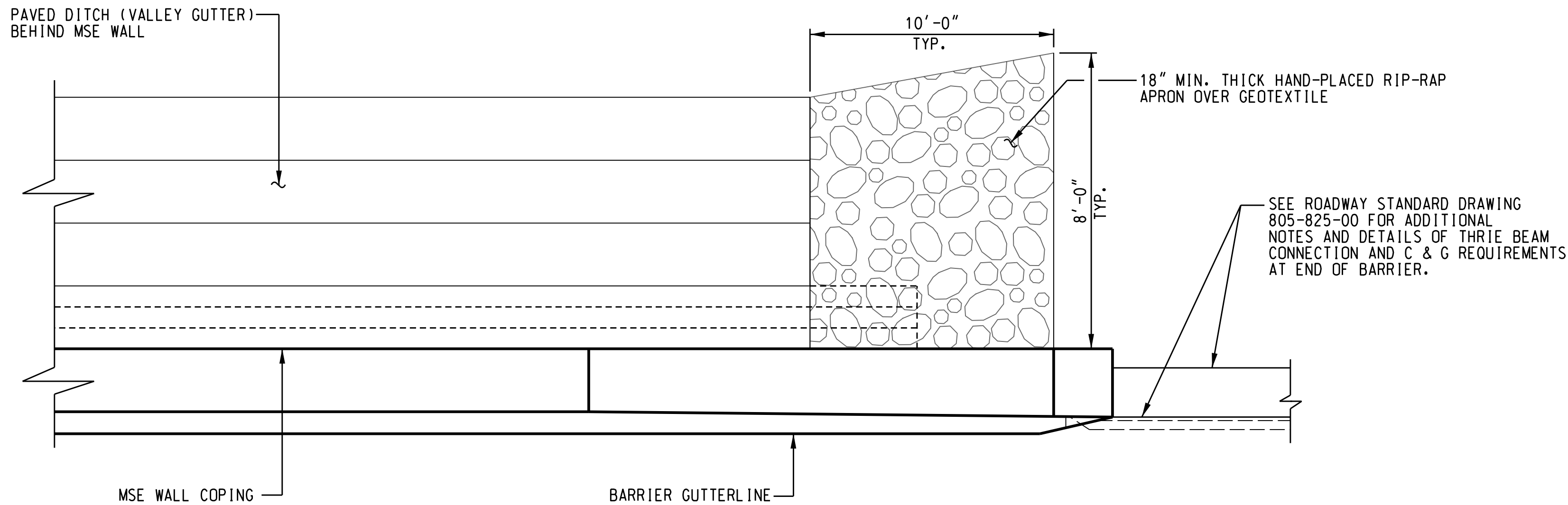
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REV.	RMH WRS	7-22 Updated for Bridge
REV.	JXY SAN	3-14 New Border
REVIEWED	WRS	09-22
QUAN.		
DR.	MRW SAN	2-12
DES.		
BY	CHK.	DATE

ARCHER UNITED
JOINT VENTURE
INFRASTRUCTURE
CONSULTING & ENGINEERING

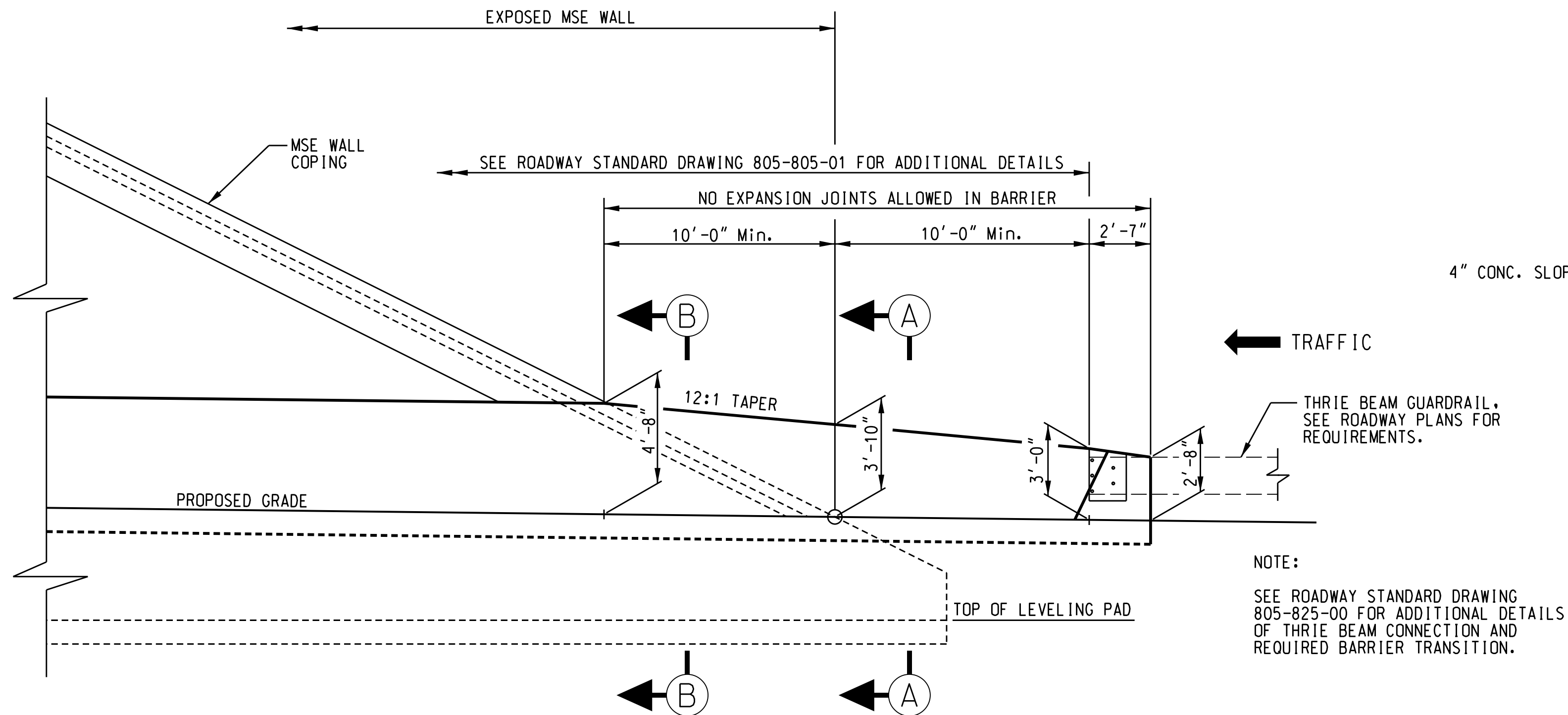
SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
MSE WALL DETAILS (4)
US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

COUNTY	RICHLAND	ROUTE	US 176
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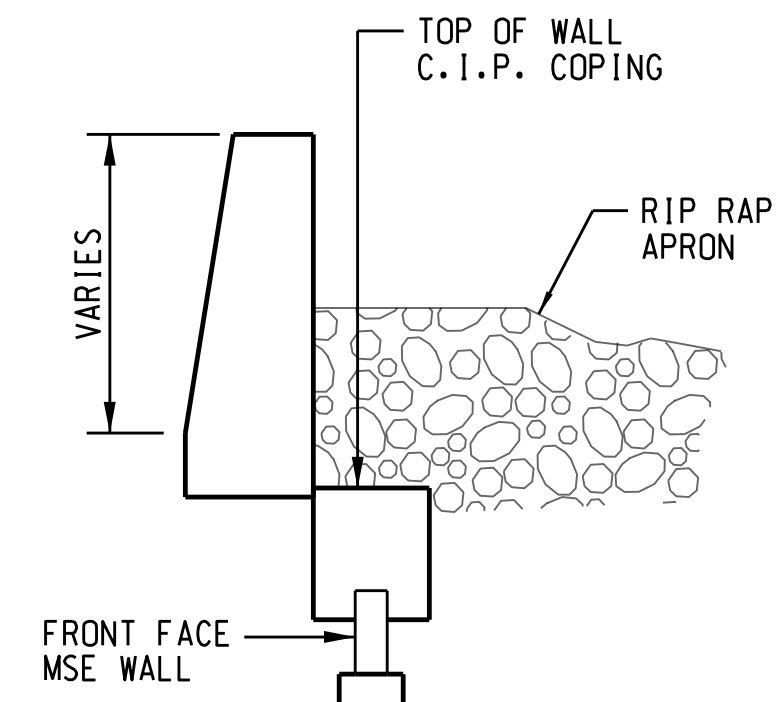
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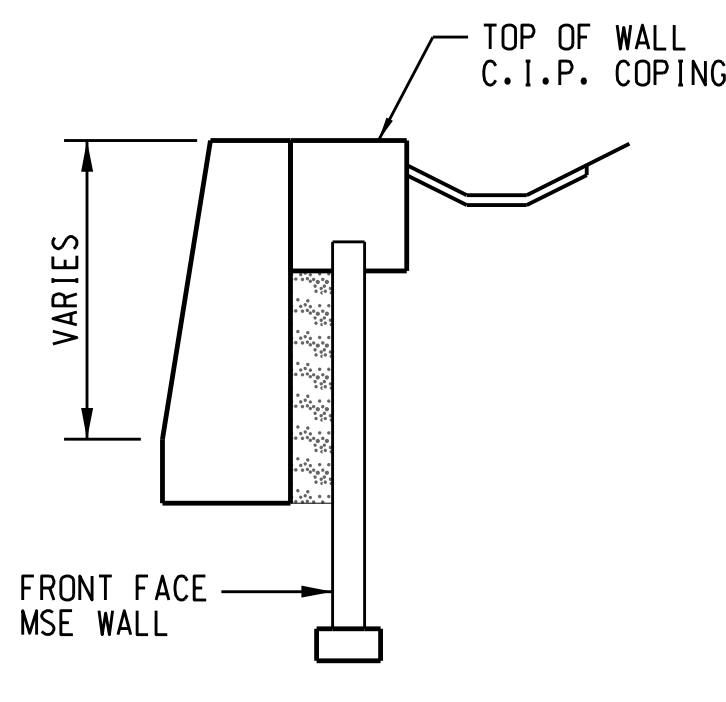
PARTIAL PLAN OF RIGID BARRIER - MSE WALL



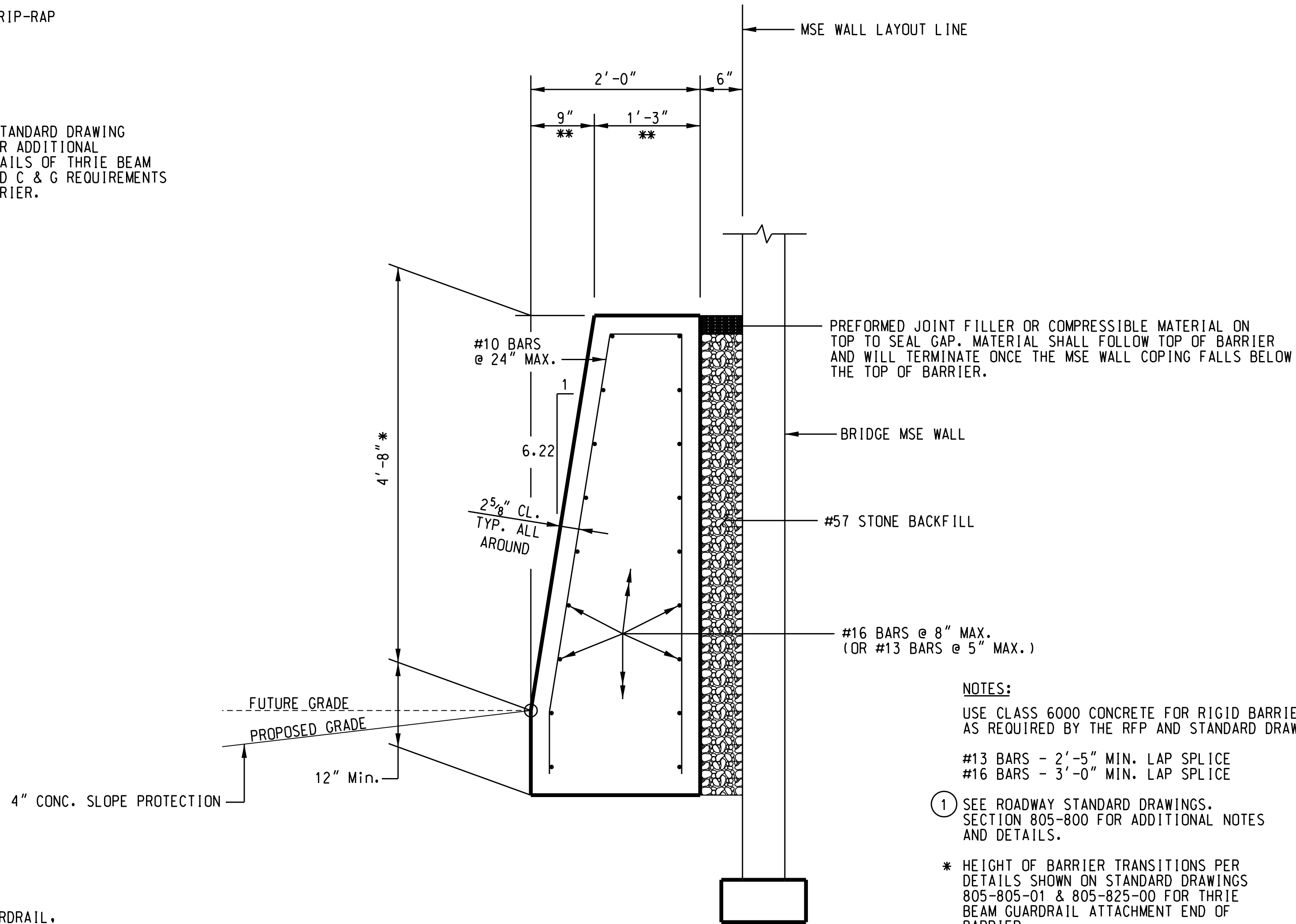
PARTIAL ELEVATION OF RIGID BARRIER



SECTION A-A



SECTION B-B



- NOTES:
- USE CLASS 6000 CONCRETE FOR RIGID BARRIER AS REQUIRED BY THE RFP AND STANDARD DRAWING.
- #13 BARS - 2'-5" MIN. LAP SPLICE
- #16 BARS - 3'-0" MIN. LAP SPLICE
- ① SEE ROADWAY STANDARD DRAWINGS. SECTION 805-800 FOR ADDITIONAL NOTES AND DETAILS.
- * HEIGHT OF BARRIER TRANSITIONS PER DETAILS SHOWN ON STANDARD DRAWINGS 805-805-01 & 805-825-00 FOR THRIE BEAM GUARDRAIL ATTACHMENT END OF BARRIER.
- ** DIMENSIONS VARY AS HEIGHT REDUCES. SEE STANDARD DRAWINGS 805-805-01 & 805-825-00 FOR HEIGHT TRANSITION REQUIRED FOR THRIE BEAM CONNECTOR.
- PROVIDE CONTRACTION AND EXPANSION JOINTS IN RIGID BARRIER PER NOTES AND DETAILS SHOWN ON STANDARD DRAWING 805-805-02.
- FOR ADDITIONAL DETAILS AND LAYOUT OF RIGID BARRIER. SEE MSE WALL DETAIL SHEETS.

① CONCRETE RIGID BARRIER SECTION
(PER RFP)



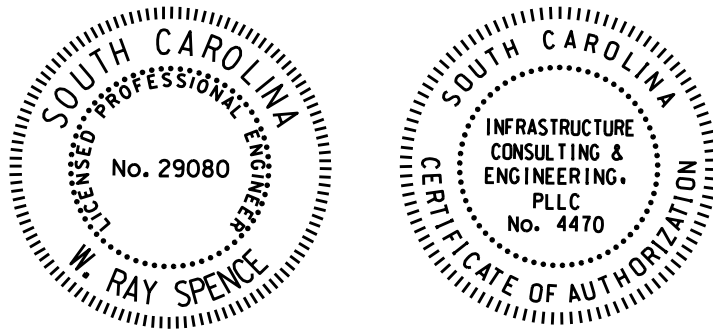
INFRASTRUCTURE
CONSULTING & ENGINEERING

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

RIGID BARRIER DETAILS

US 176 WB (BROAD RIVER RD.)
BRIDGE OVER I-20

COUNTY RICHLAND ROUTE US 176



REV.			
REV.			
REV.			
REVIEWED WRS 09-22			
QUAN.			
DR.	RMH	WRS	07-22
DES.			
	BY	CHK.	DATE

INDEX OF SHEETS

- SHEET NO. 1 TITLE SHEET
2 TRAFFIC CONTROL DEVICES
3 ~~FLARED CURBS AND GUTTER~~ BLANK
4 ~~SCOPE DRAINS~~ BLANK
5 WELDING STANDARD
6 STANDARD NOTES
7 STANDARD DETAILS
8 INTERCHANGE LAYOUT
9 ROAD PLAN AND PROFILE
10 ROAD PLAN AND PROFILE
11 BRIDGE PLAN AND PROFILE
12 END BENTS 1 AND 5
13 INTERIOR BENTS 2, 3 AND 4
14 63' END AND INTERIOR SPANS
15 SUPERSTRUCTURE DETAILS
16 DETAILS - 63' PRESTRESSED BEAMS
16 " " "
17 DETAILS - ALUMINUM PIPE RAILING

SOUTH CAROLINA
STATE HIGHWAY DEPARTMENT
COLUMBIA

PLAN AND PROFILE OF PROPOSED
STATE HIGHWAY

FED. AID PROJECT NO. I-16-20-2(3)

DOCKET NO. 40.565.1

RICHLAND COUNTY

ROUTE I-20

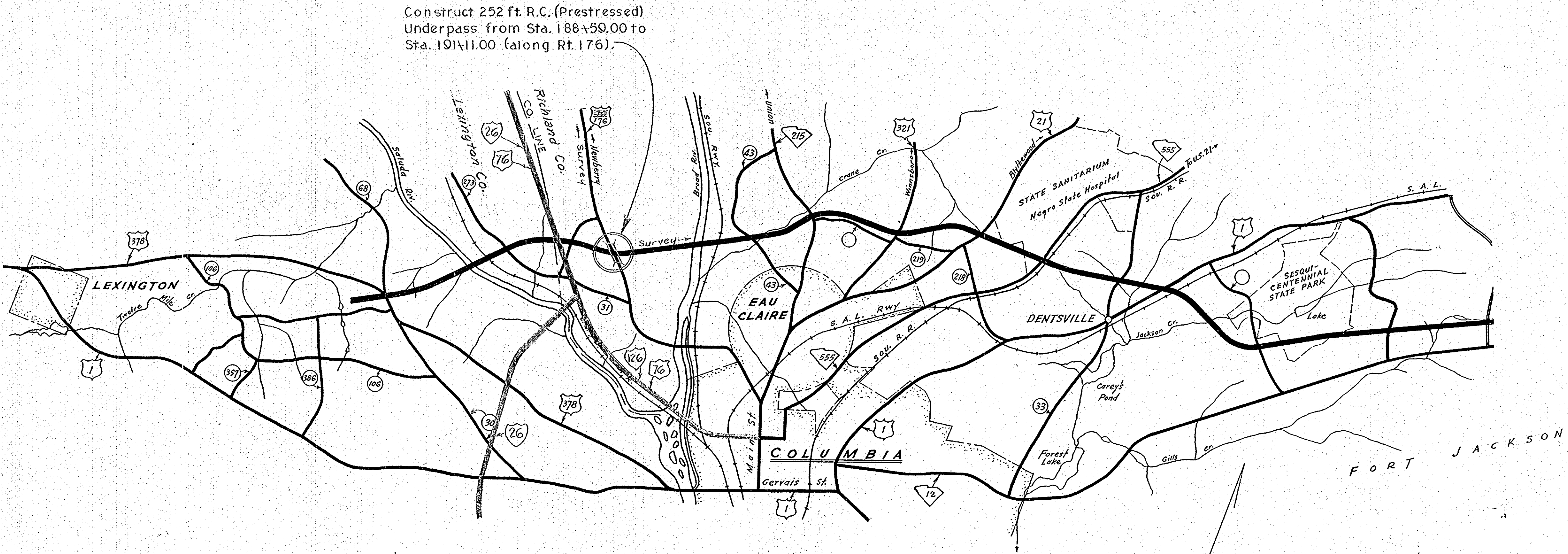
UNDERPASS UNDER ROUTE 176 (OLD U.S. 76)

FED. ROAD DIV. NO.	STATE	COUNTY	DOCKET NO.	F. A. PROJ. NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
3	S. C.	RICHLAND	40.565.1	I-16-20-2(3)	I-20	E1	E16

SUMMARY OF ESTIMATED QUANTITIES

WET AND DRY EXCAVATION	415 C.Y.
CONCRETE, CLASS "A"	806.9 C.Y.
REINFORCING STEEL	179,821 LBS.
CREOSOTED TIMBER PILING	800 L.F.
8" GALV. C.M. PIPE SLOPE DRAINS	
INTAKE SPILLWAY ASSEMBLY	
63' PRESTRESSED CONCRETE BEAMS	40 EA.
FABRICATED, METAL HANDRAIL (ALUMINUM)	504 L.F.

INFORMATION ONLY



CONVENTIONAL SIGNS

State Line	Trolley Poles
County Line	Power Poles
City or Town Limits	Telephone or Telegraph Poles
Property Line	Marsh
Fence	Trees
Retaining Wall	Brush
Existing Road	Stumps
Q and R.O.W. Lines of	Buildings
Proposed Road	Bridge
Railroad	Concrete Box Culvert
Levee or Embankment	Pipe Culvert
Guard Rail	Drop Inlet and Culvert
Point of Intersection (P. I.)	Hub on Center Line

LEGEND

PROPOSED PROJECT
OTHER ROADS

Net Length of Roadway	0.000 Miles
Net Length of Bridges	0.000 Miles
Net Length of Project	0.000 Miles
Length of Exceptions	0.000 Miles
Gross Length of Project	0.000 Miles

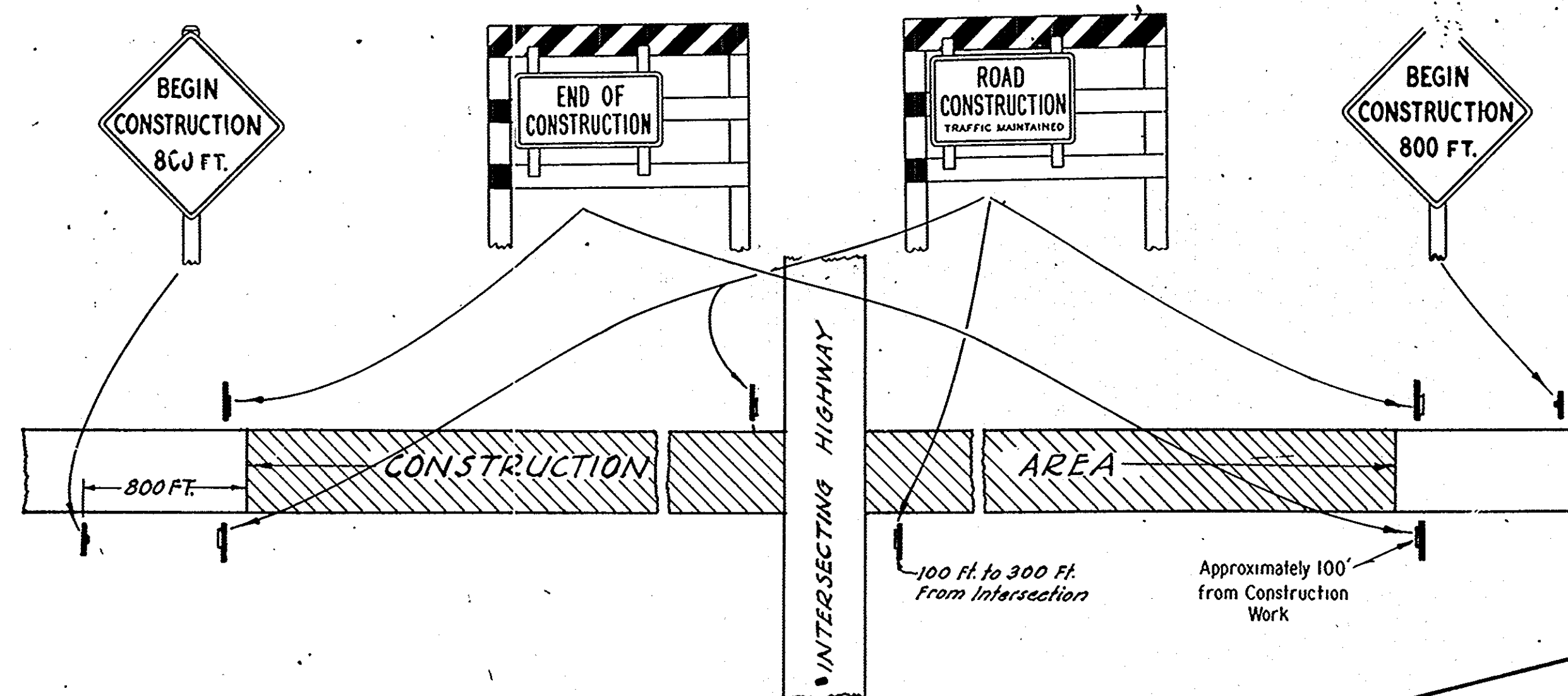
Equalities in Stationing

Note: All workmanship and material on this project to conform with South Carolina State Highway Department Standard Specifications for Highway Construction dated Nov. 1, 1955.

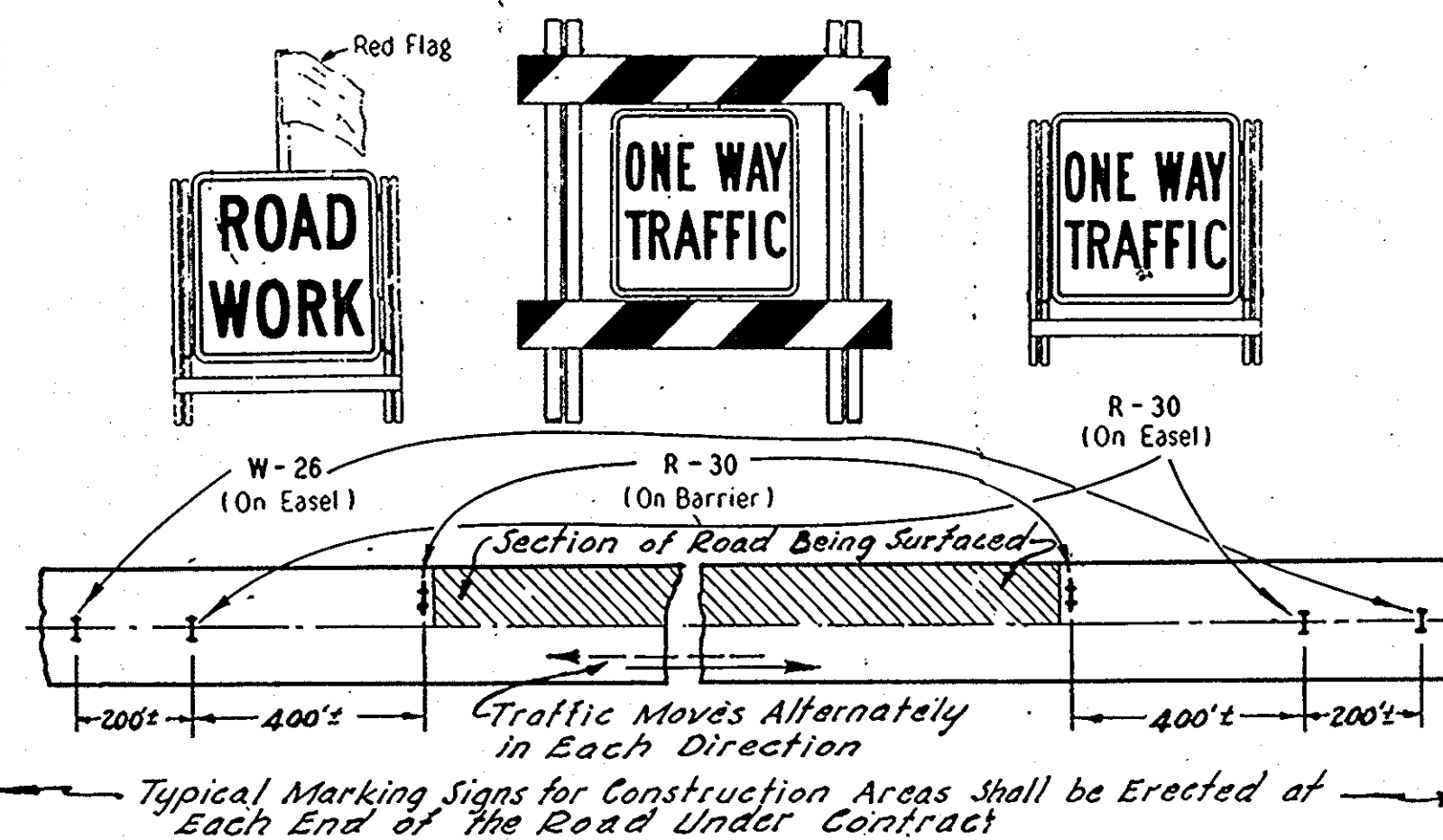
APPROVED: *[Signature]* 3/26/63
STATE HIGHWAY ENGINEER DATE

DEPARTMENT OF COMMERCE
BUREAU OF PUBLIC ROADS
APPROVED: *[Signature]*
DISTRICT ENGINEER DATE

TYPICAL MARKING FOR CONSTRUCTION AREAS

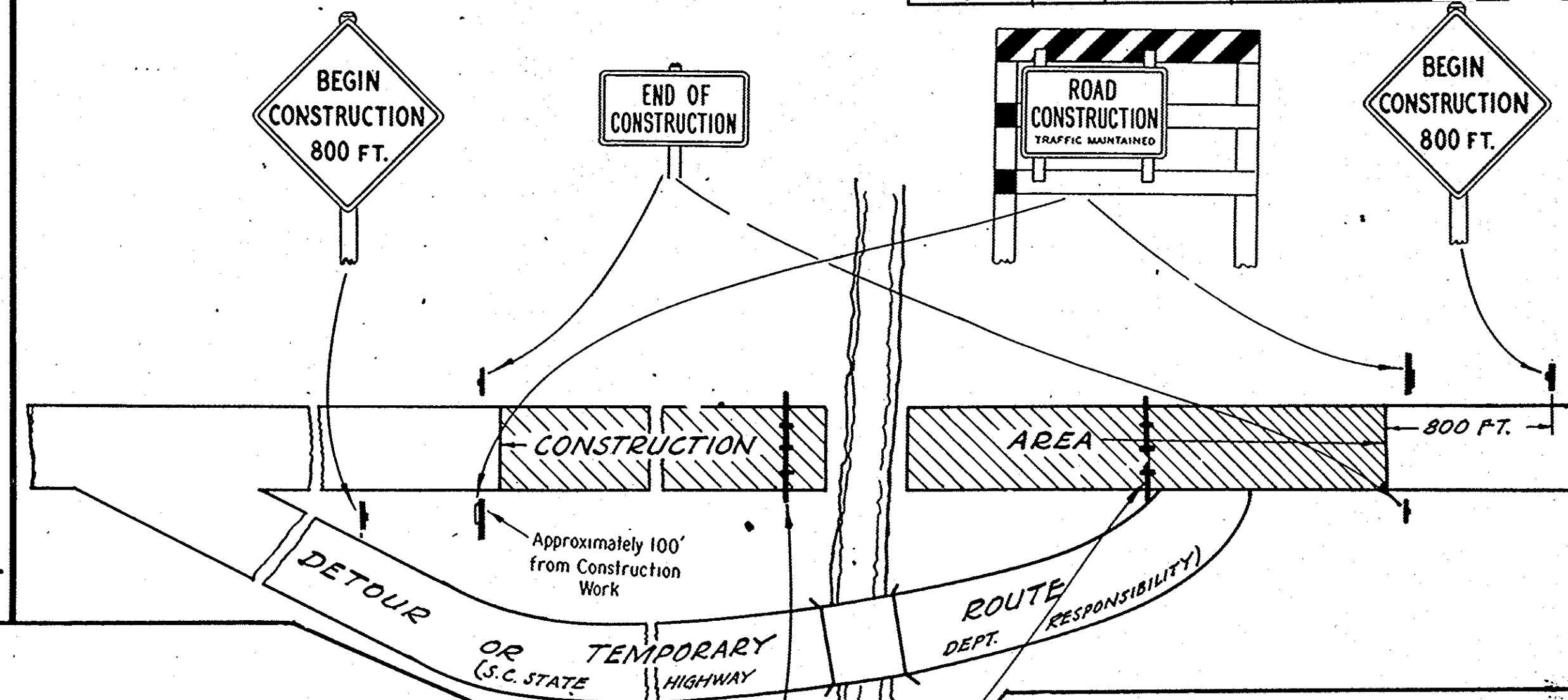


APPLICATION OF STANDARD SIGNS WHEN ROADWAY IS BEING SURFACED

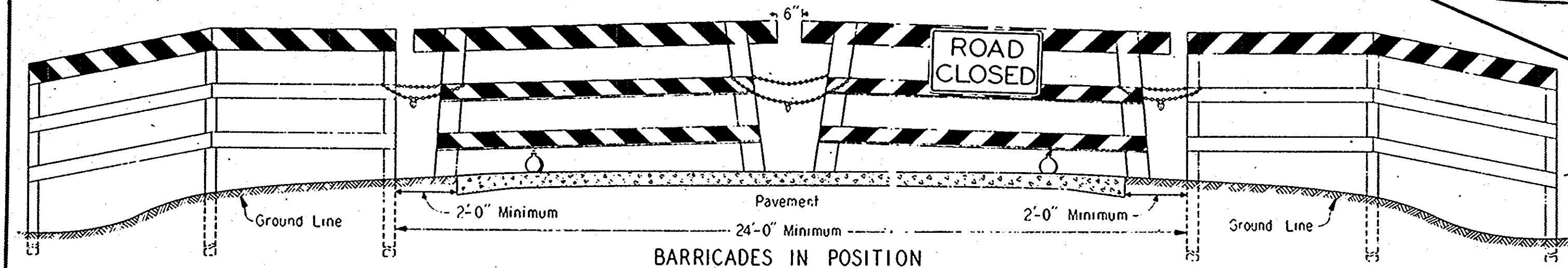


TYPICAL MARKING FOR CONSTRUCTION AREAS

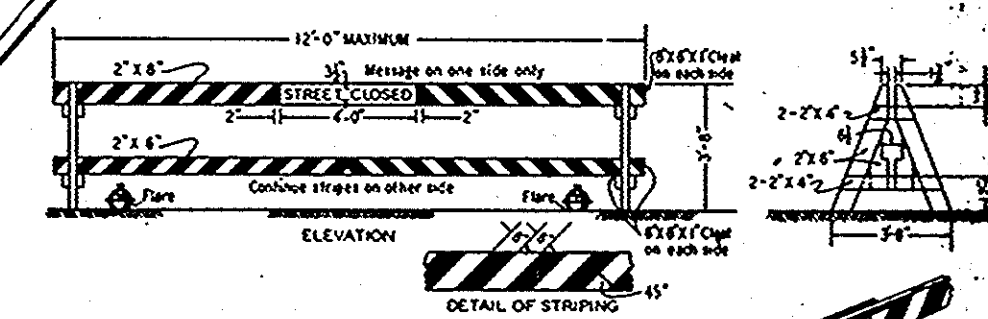
Sheet No.	State	County	Project No.	Sheet No.	Total Sheets
3	S.C.	Richland	405651	E-20	E16



STANDARD BARRICADES

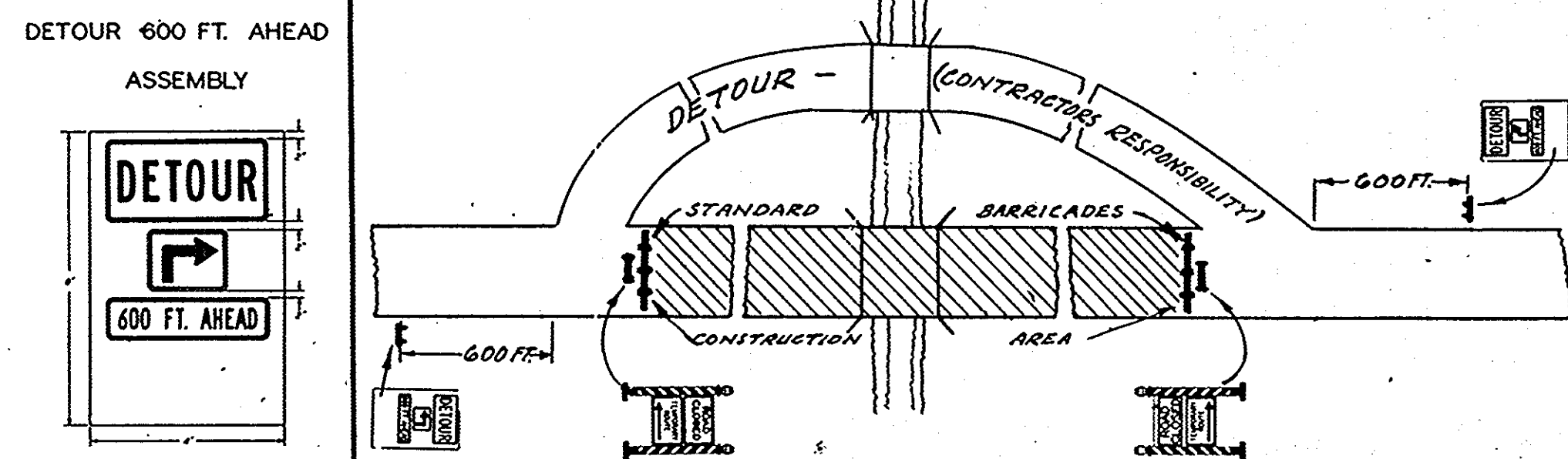


MOVABLE BARRICADE FOR USE IN CITIES

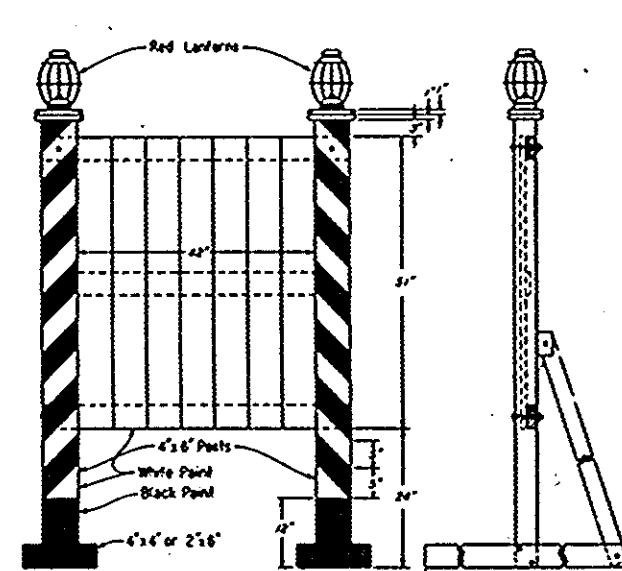


NOTE: This movable barricade should be used on streets which are closed to traffic. A sufficient number of barricades should be used to close the entire street width. The barricade may also be used when traffic is confined to one side of the street for the protection of the workmen, repair, joint trenches, etc., in which case the message "STREET CLOSED" should be on the back.

TYPICAL MARKING FOR CONSTRUCTION AREAS

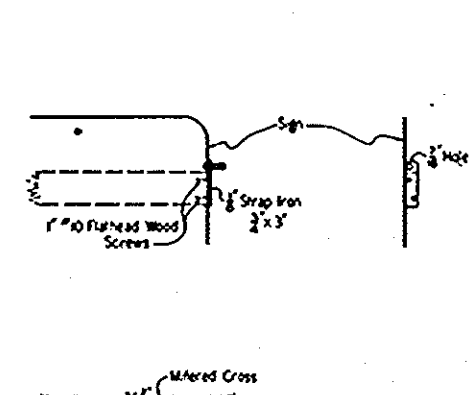


ROAD CLOSED STANDARD

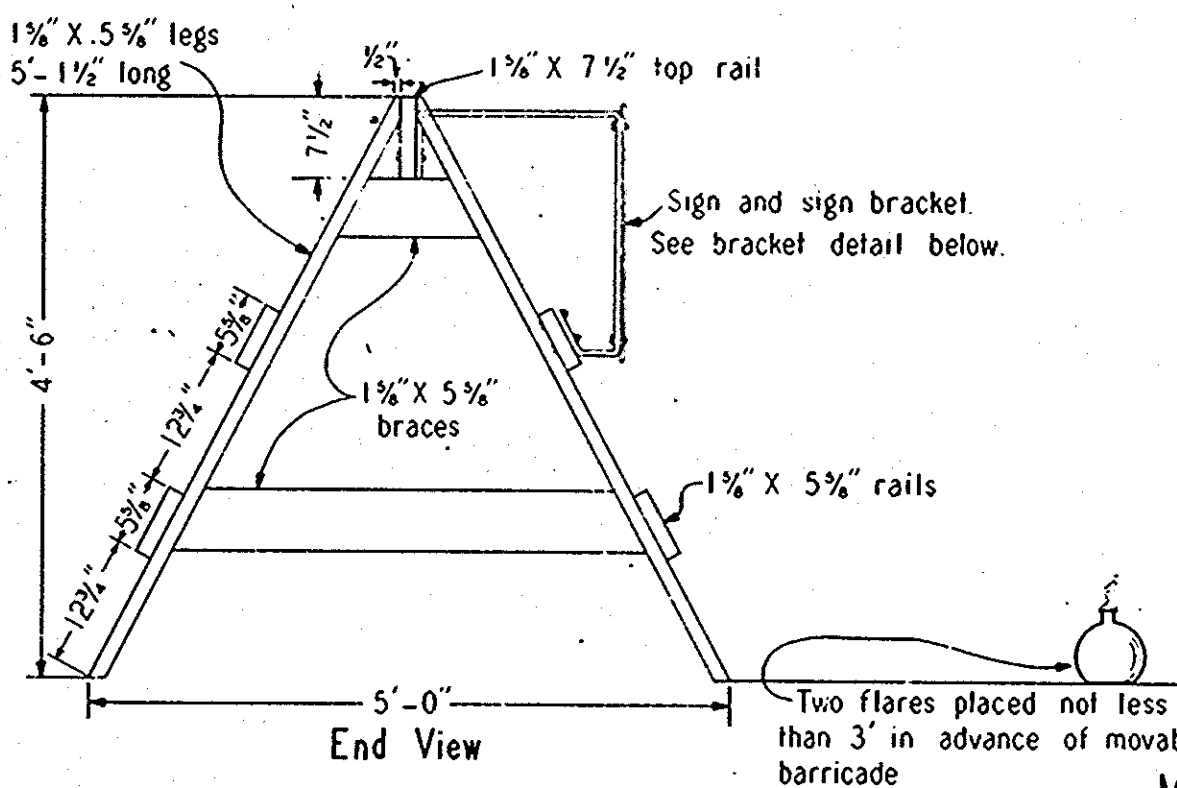
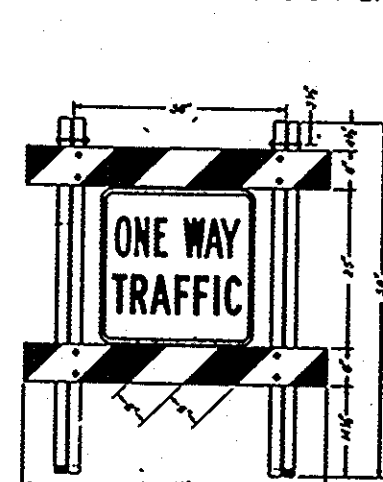


STANDARD SIGN EASEL

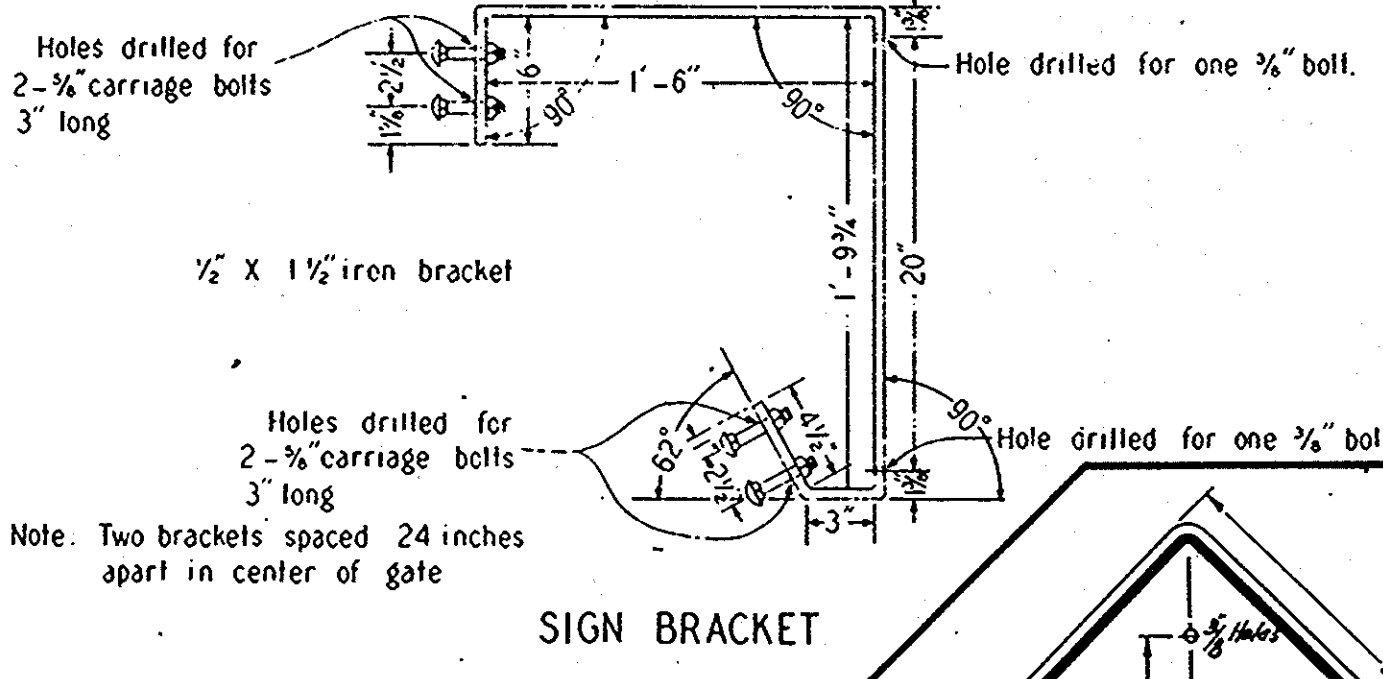
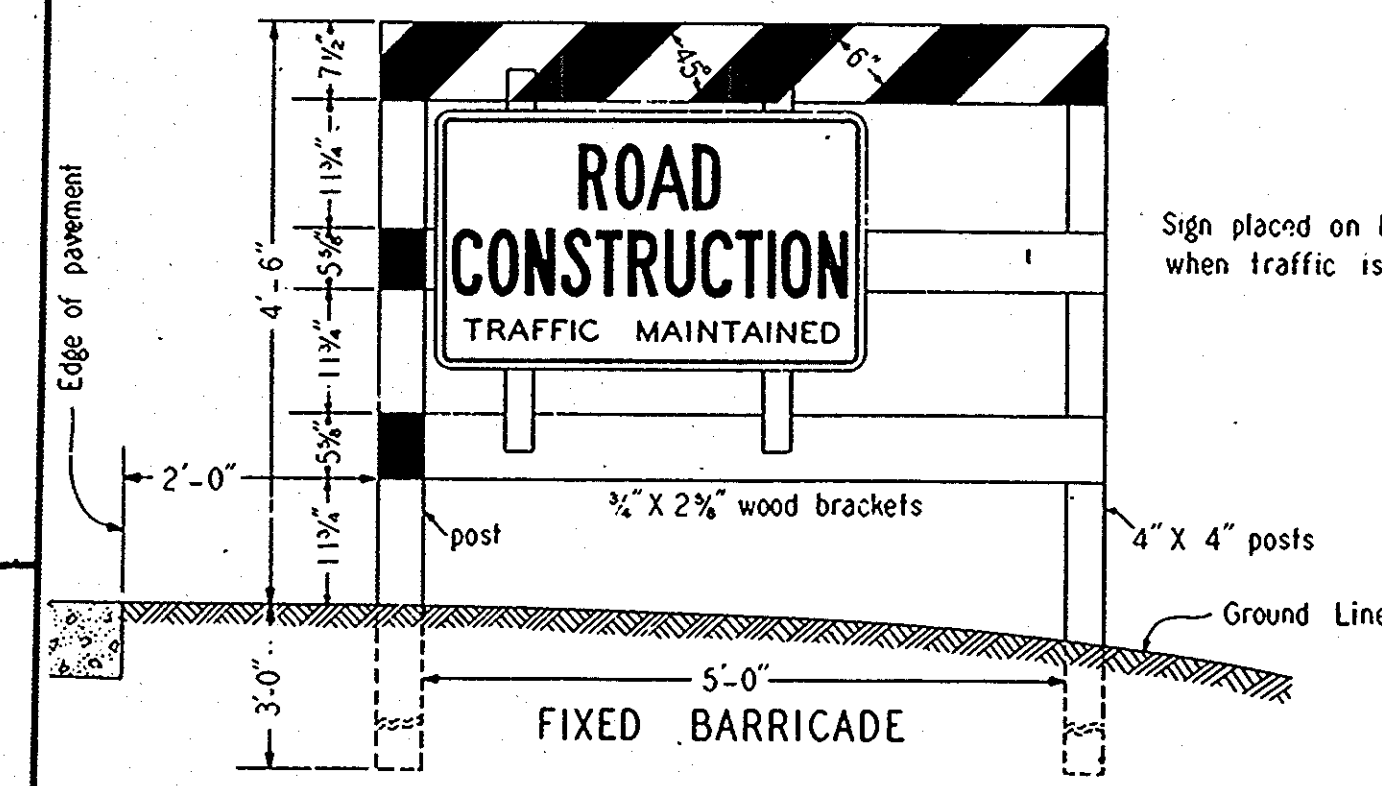
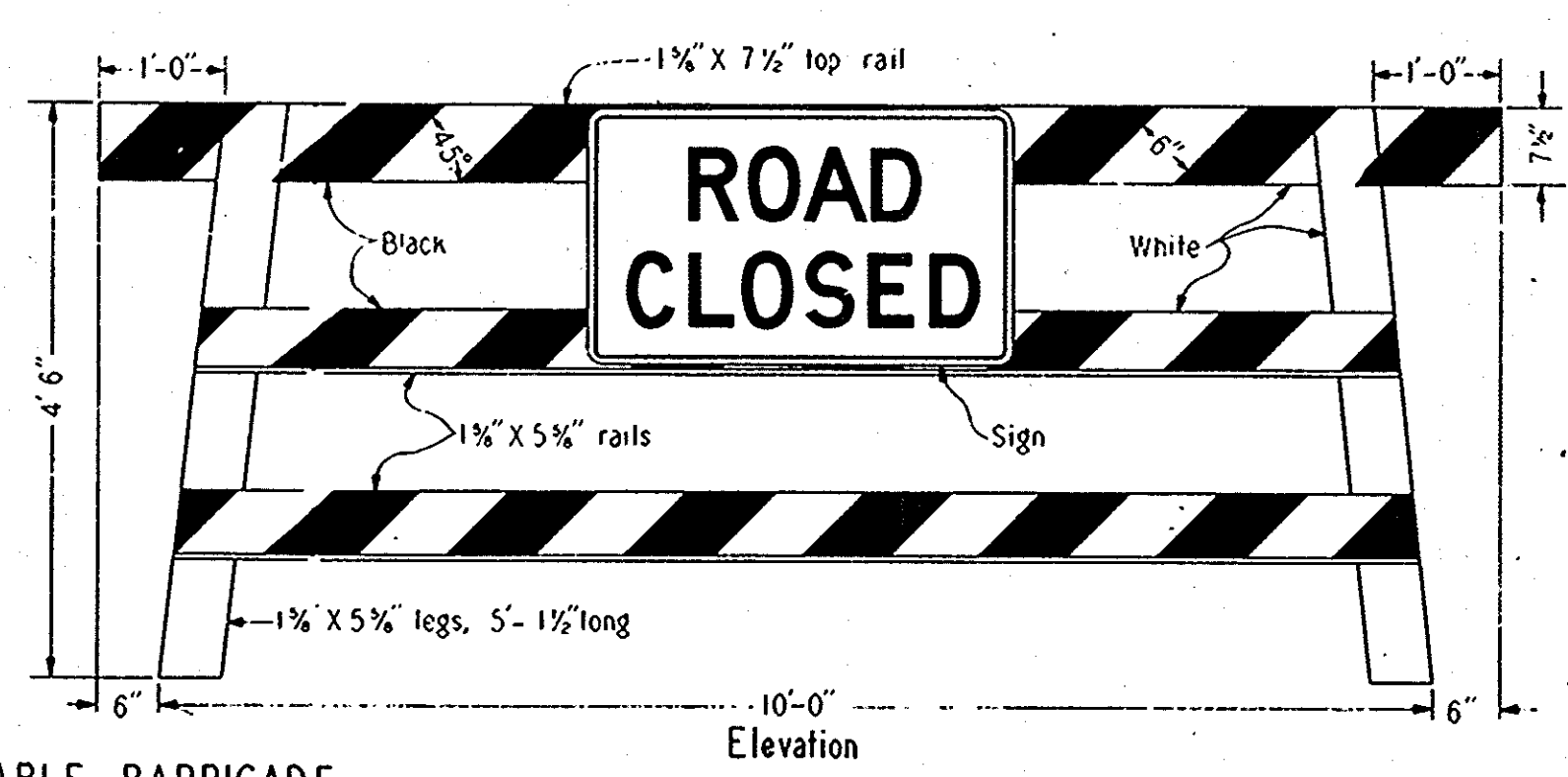
SWINGING TYPE



STANDARD PORTABLE SIGN BARRIER



MOVABLE BARRICADE



ANY CONDITIONS NOT COVERED BY DETAILS AND SIGNS OF THIS DRAWING SHALL CONFORM TO THE LATEST S. C. STANDARD SPECIFICATIONS AND TO THE LATEST S. C. STANDARD AND SPECIFICATIONS FOR UNIFORM TRAFFIC CONTROL DEVICES. THE LOCATION OF TYPICAL MARKINGS SHOWN HEREIN MAY BE VARIED TO CONFORM TO FIELD CONDITIONS.

THE CONTRACTOR SHALL PROVIDE AND MAINTAIN PROPER SIGNS AND BARRICADES THE FIRST DAY WORK IS PERFORMED OR AT THE TIME HE MOVES ANY MATERIAL OR EQUIPMENT ON TO THE PROJECT, WHETHER IT IS FIRST. HE SHALL MAINTAIN THESE SIGNS THROUGHOUT THE LIFE OF THE PROJECT UNTIL FINAL ACCEPTANCE OF THE CONTRACT, AT WHICH TIME THEY SHALL BE REMOVED.

WHENEVER SURFACING WORK IS BEING PERFORMED ON THE ROADWAY AND ONE-WAY TRAFFIC IS BEING MAINTAINED THROUGH THE SECTION BEING SURFACED, THE STANDARD SIGNS SHALL BE PLACED AND, ALSO, PLACED SHALL BE POSTED AT EACH END OF THE SECTION OF ROAD BEING SURFACED EXCEPT IN CASES WHERE TRAFFIC VOLUMES IS LIGHT AND HIGH SPEEDS DO NOT PREVAIL; OR IN CASES WHERE THE SECTION OF ROAD BEING SURFACED IS NOT MORE THAN 100 FEET IN LENGTH AND THE SIGNS ARE CLEARLY VISIBLE FOR A DISTANCE OF 500 FEET.

THE DEPARTMENT WILL ERECT AND MAINTAIN PROPER SIGNS IN ACCORDANCE WITH THE MANUAL FOR UNIFORM CONTROL DEVICES OF ALL DETOURS OR TEMPORARY ROUTES THAT THE CONTRACTOR IS NOT REQUIRED TO MAINTAIN. THE CONTRACTOR WILL BE REQUIRED TO PROVIDE AND MAINTAIN PROPER DETOUR SIGNS AT AND ALONG ALL DETOURS FOR WHICH HE IS RESPONSIBLE.

THE CONTRACTOR WILL BE REQUIRED TO MAINTAIN AND RELOCATE, WHERE NECESSARY, ALL EXISTING, WARNING AND GUIDE SIGNS IN PLACE, OR THOSE THAT MAY BE ERECTED BY THE DEPARTMENT, WITHIN THE LIMITS OF HIS CONTRACT.

BETWEEN THE HOURS OF SUNSET AND SUNRISE, THE CONTRACTOR WILL BE RESPONSIBLE FOR PROVIDING AND MAINTAINING TWO FLARES OR RED LANTERNS AT EACH BARRICADE, "ROAD CLOSED" SIGN, OBSTRUCTION OR AT SUCH OTHER POINTS AS ARE NECESSARY TO PROTECT THE TRAVELING PUBLIC.

ALL SIGNS SHALL BE REPLICATED EXCEPT THOSE TEMPORARY SIGNS THAT ARE USED ONLY DURING DAYLIGHT HOURS. DRAWINGS SHOWING SIZES OF SIGNS, LETTERS AND NUMERALS ARE DETAIL HEREIN. ALL SIGNS SHALL HAVE BLACK LETTERS OR NUMERALS ON A WHITE BACKGROUND EXCEPT THE "ROAD WORK" (W-6), "ROAD CONSTRUCTION - 600 FT." (C-6) AND "END OF CONSTRUCTION" (C-7) SIGNS WHICH SHALL HAVE A YELLOW BACKGROUND.

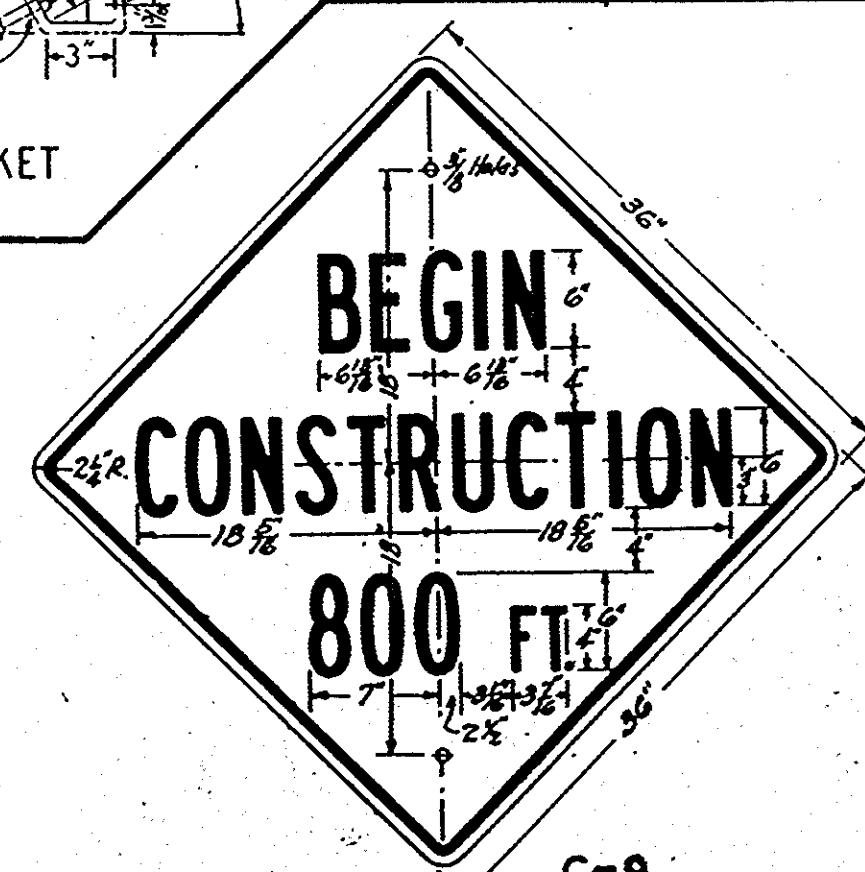
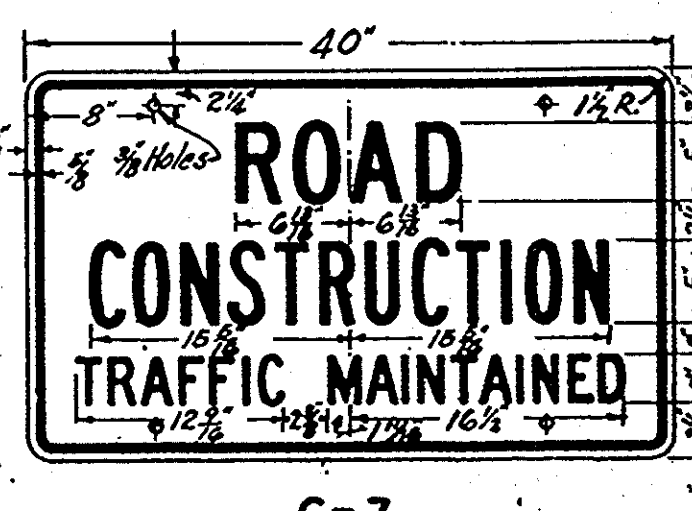
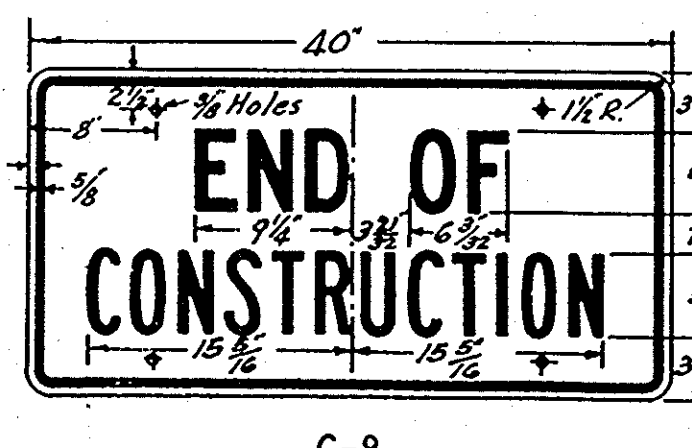
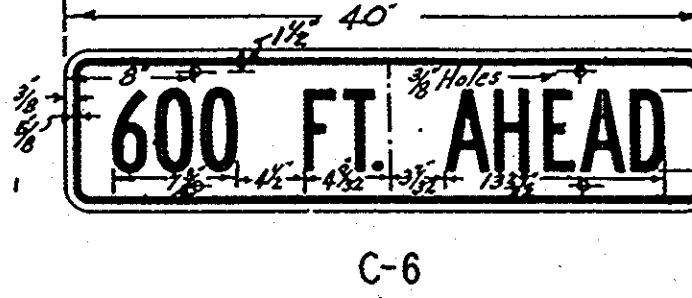
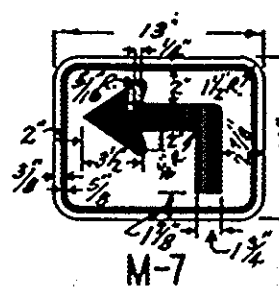
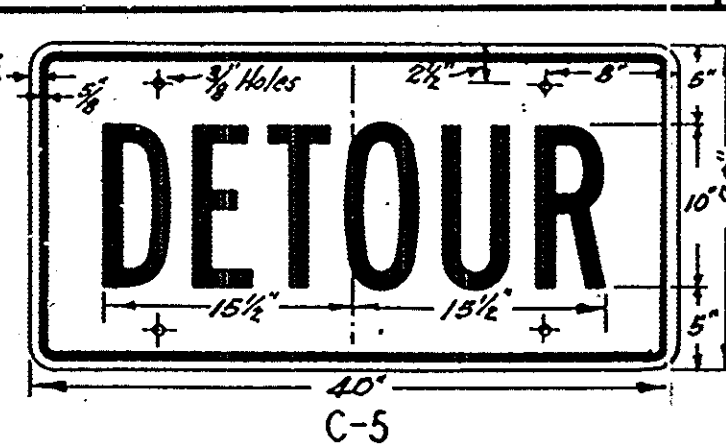
THE "ROAD CONSTRUCTION - TRAFFIC MAINTAINED" (C-7) SIGN SHALL BE MOUNTED ON A BARRICADE ON EACH SIDE OF THE INTERSECTION FACING TRAFFIC AT ALL IMPROVED ROAD INTERSECTIONS. ON MAJOR ROUTES BEING CONSTRUCTED, THE BARRICADE SHALL BE ON BOTH SIDES OF THE ROAD AT THE EXTREME LIMITS OF THE PROJECT BUT THE SIGN MAY BE OMITTED ON THE BARRICADE ON THE LEFT SIDE OF ROAD FACING TRAFFIC. THE "END OF CONSTRUCTION" (C-8) SIGN MAY BE PLACED ON THE BACK OF THIS BARRICADE INSTEAD OF ON A POST.

WHEN A BRIDGE IS UNDER CONSTRUCTION AND TRAFFIC IS MAINTAINED, THE WORD "BRIDGE" SHALL BE SUBSTITUTED FOR "ROAD" ON THE "ROAD CONSTRUCTION - TRAFFIC MAINTAINED" SIGN AND THE SIGN ERECTED IN A LIKE MANNER.

INFORMATION ONLY

DETAILS SHOWING STANDARD SIGNS, BARRIERS, LIGHTS, AND BARRICADES TO BE FURNISHED, ERECTED, AND MAINTAINED BY THE CONTRACTOR WHERE APPLICABLE ON ALL ROAD OR BRIDGE CONTRACTS

DRAWINGS SHOWING DIMENSIONS OF SIGNS



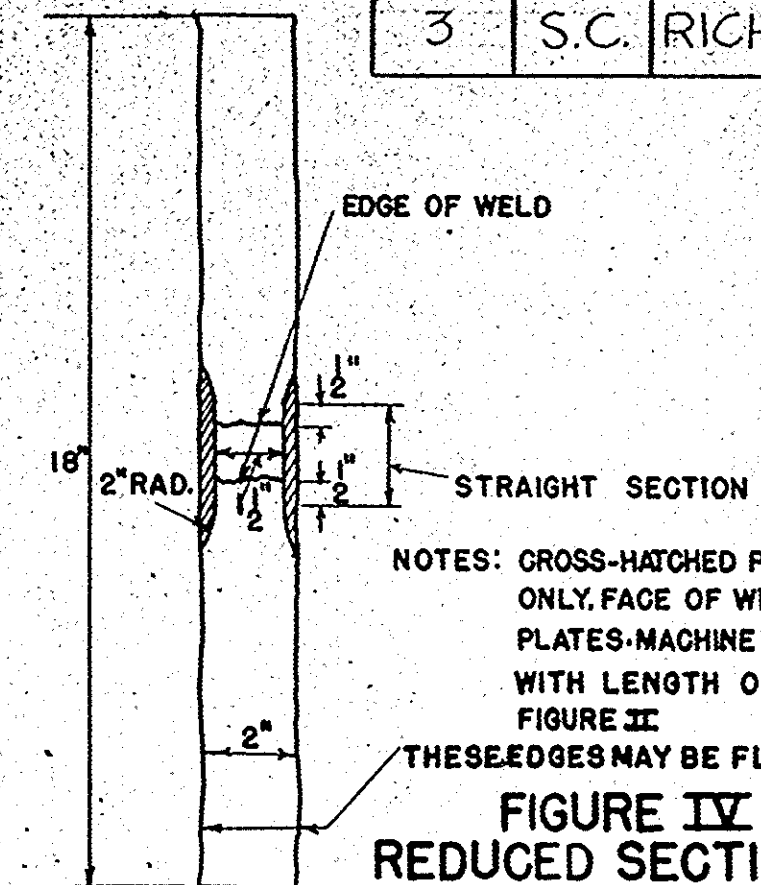


FIGURE IV
REDUCED SECTION TENSION TEST PIECE

WELDING SYMBOLS											
TYPE OF WELD											
BEAD	FILLET	GROOVE						PLUG & SLOT	FIELD WELD	WELD ALL AROUND	FLUSH
		SQUARE	V	BEVEL	U	J					
LOCATION OF WELDS											
ARROWS (OR NEAR) SIDE OF JOINT				OTHER (OR FAR) SIDE OF JOINT				BOTH SIDES OF JOINT			
<p>FIELD WELD</p> <p>SIZE</p> <p>FLUSH</p>				<p>OTHER (OR FAR) SIDE OF JOINT</p> <p>SIZE</p> <p>ROOT OPENING</p> <p>SEE NOTE 5</p>				<p>BOTH SIDES OF JOINT</p> <p>SIZE</p> <p>INCREMENT</p> <p>LENGTH</p> <p>WELD ALL AROUND</p> <p>OFFSET IF STAGGERED</p> <p>PITCH OF INCREMENTS</p>			

1. THE SIDE OF THE JOINT TO WHICH THE ARROW POINTS IS THE ARROW (OR NEAR) SIDE.
2. BOTH SIDES WELDS OF SAME TYPE ARE OF SAME SIZE UNLESS OTHERWISE SHOWN.
3. SYMBOLS APPLY BETWEEN ABRUPT CHANGES IN DIRECTION OF JOINT OR AS DIMENSIONED (EXCEPT WHERE ALL AROUND SYMBOL IS USED).
4. ALL WELDS ARE CONTINUOUS AND OF USUALLY STANDARD PROPORTIONS, UNLESS OTHERWISE SHOWN.
5. TAIL OF ARROW USED FOR SPECIFICATION REFERENCE (TAIL MAY BE OMITTED WHEN REFERENCE NOT USED).
6. DIMENSIONS OF WELD SIZES, INCREMENTS, LENGTHS AND SPACINGS, IN INCHES.

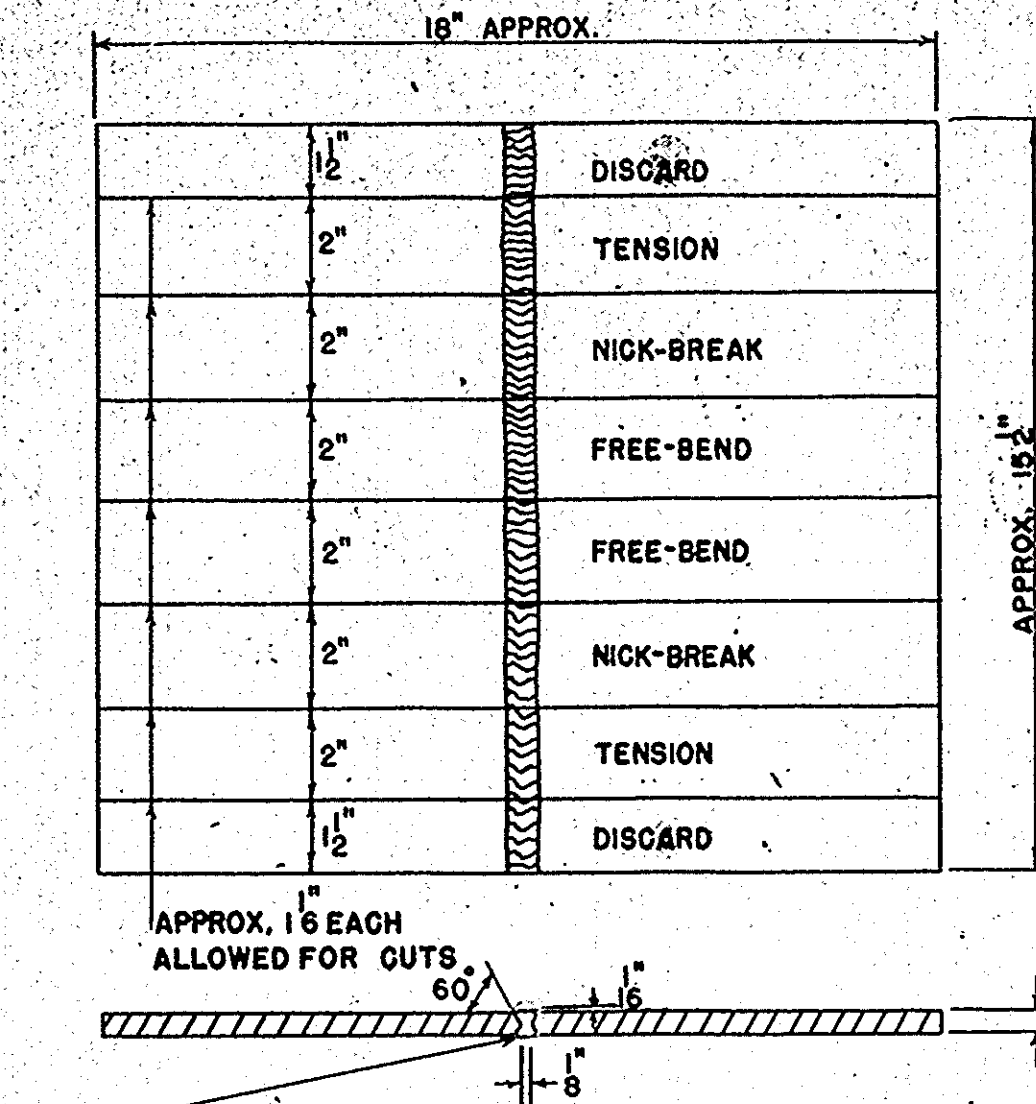


FIGURE II
BUTT WELD SPECIMEN

SPECIMEN TO BE CUT AS SHOWN AND SUBMITTED TO S.C.H.D. TESTING LAB.

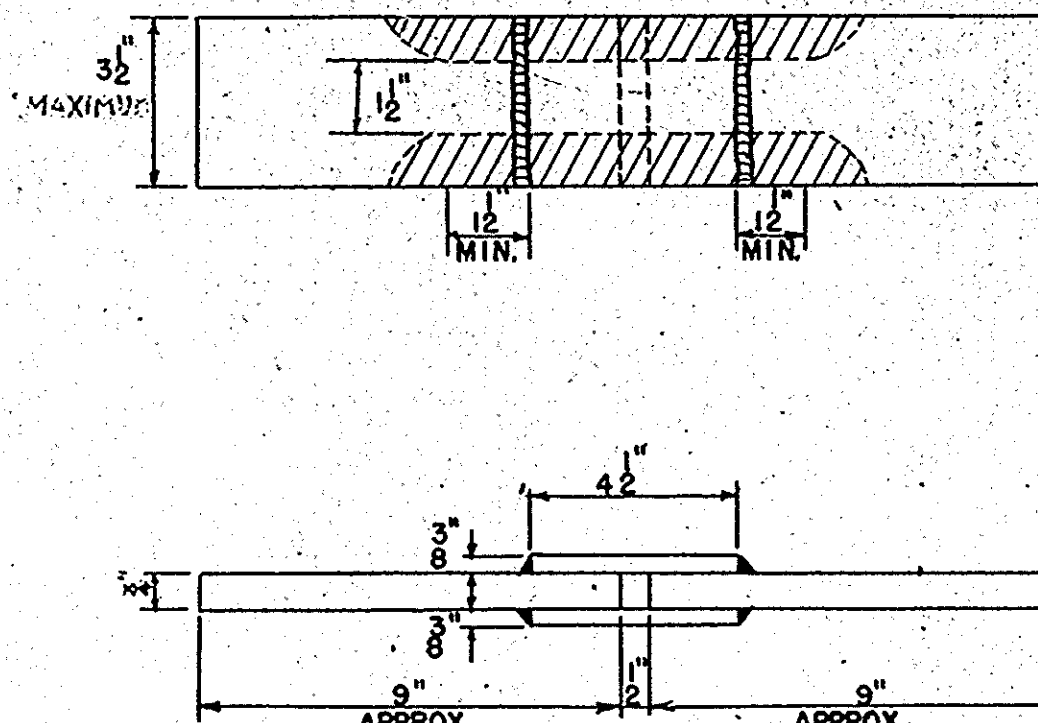


FIGURE III
TRANSVERSE FILLET WELD TEST SPECIMEN

SPECIMEN AS SHOWN (UNCUT) TO BE SUBMITTED TO S.C.H.D. TESTING LAB.

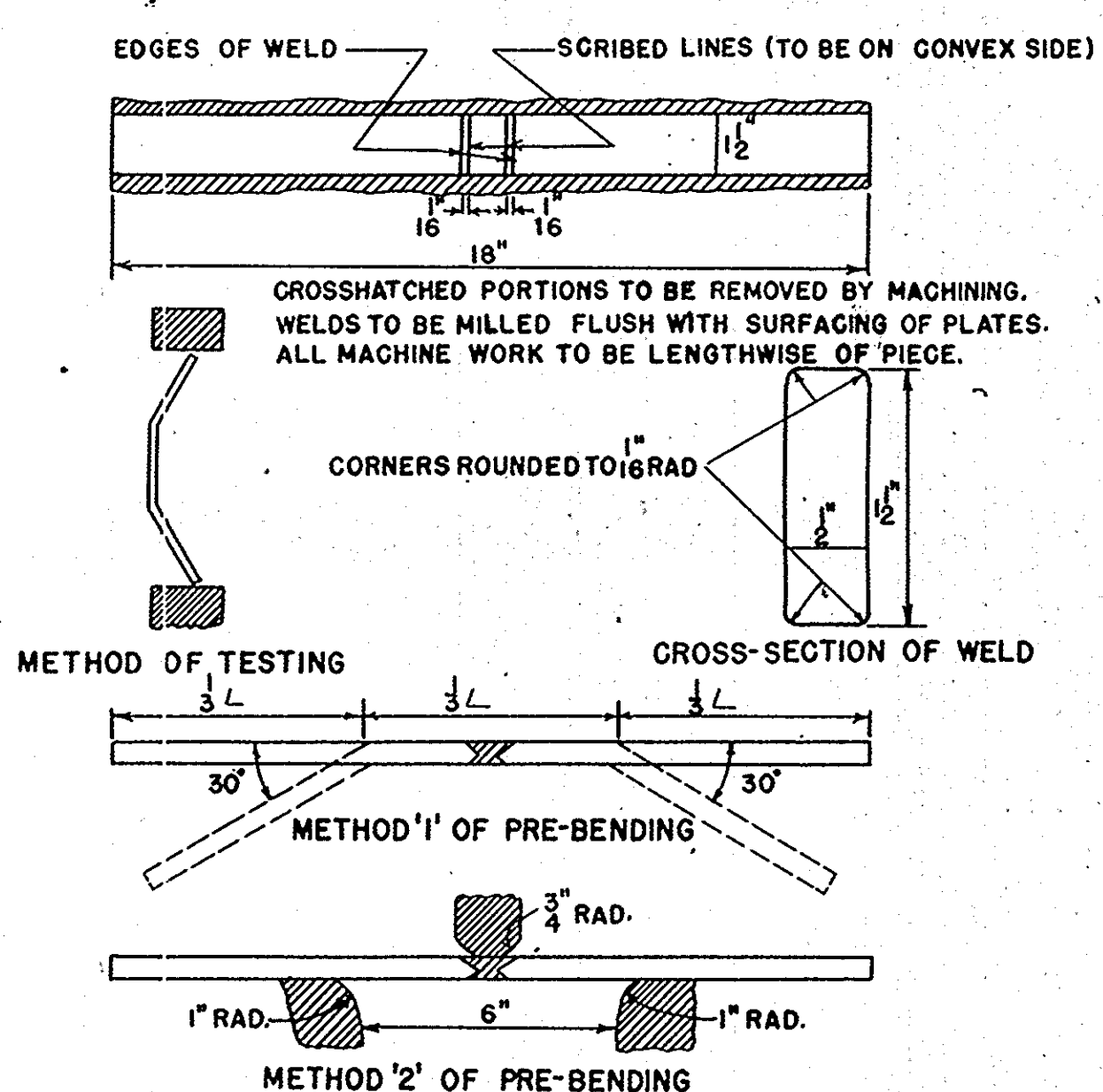


FIGURE V
FREE BEND TEST PIECE

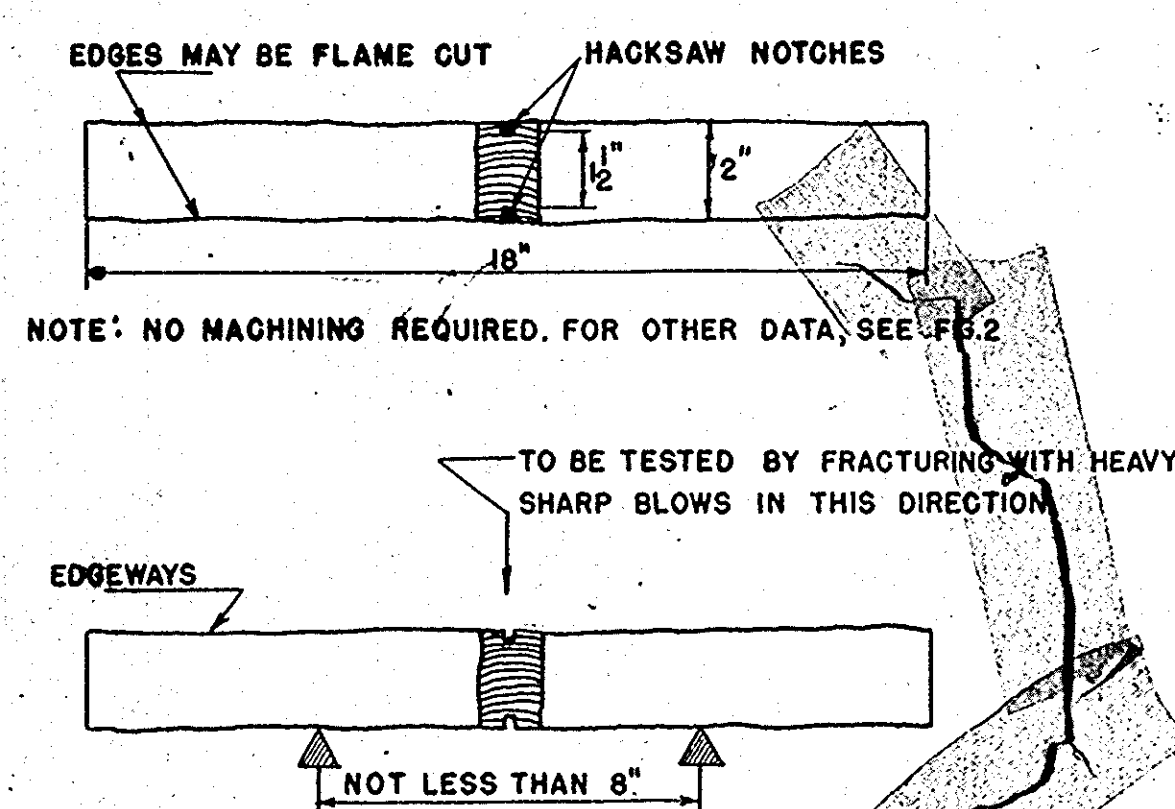
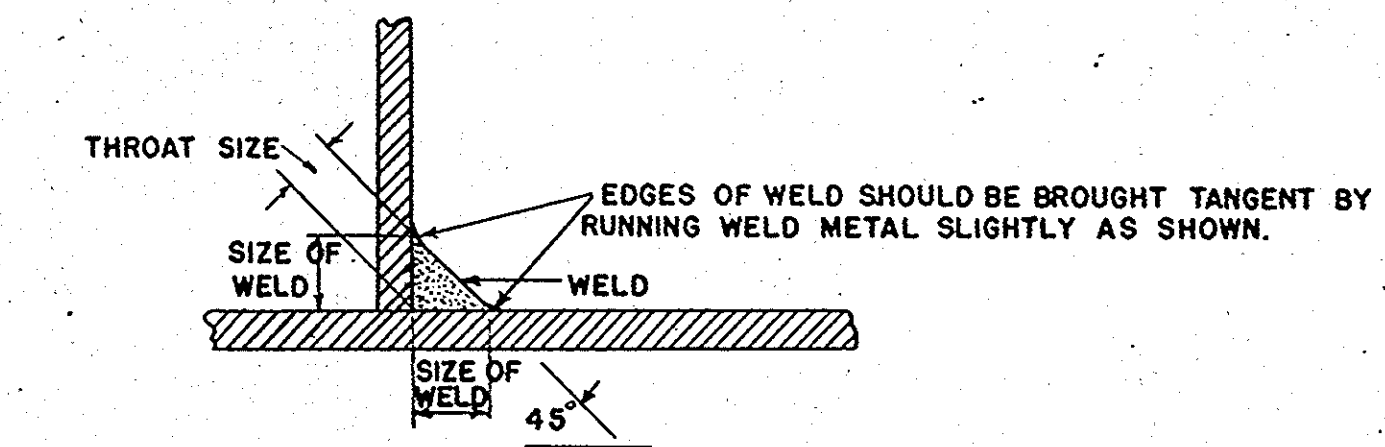


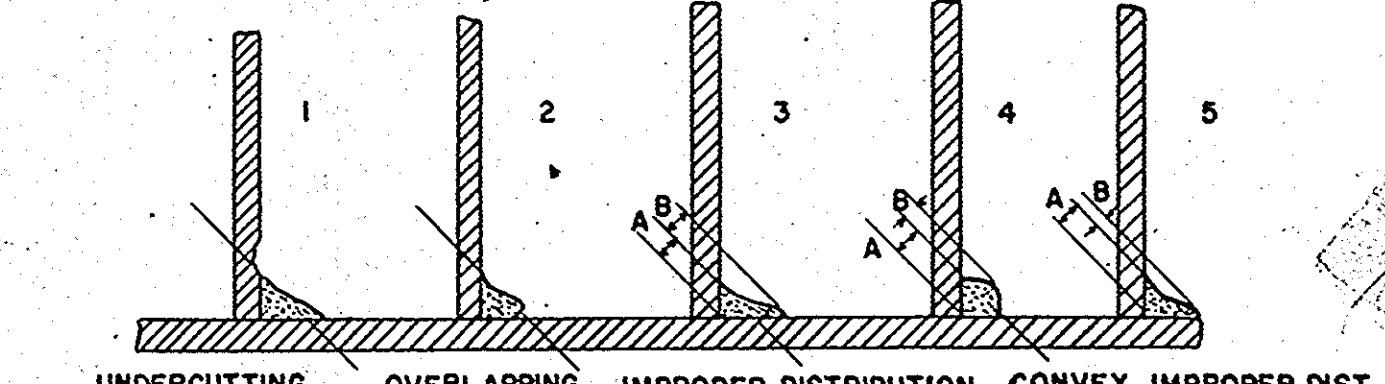
FIGURE VI
NICK-BREAK TEST PIECE

INFORMATION ONLY



DESIRABLE FILLET WELD CONTOUR

NOTE: THE DESIRABLE FILLET WELD CONTOUR SHOWN SHALL BE CONSTRUCTED UNLESS THE PLANS OR SPECIAL PROVISIONS CALL FOR A SPECIAL CONTOUR.



UNDESIRABLE FILLET WELD CONTOUR

1 AND 2 ARE NOT PERMITTED. 3, 4 AND 5 PERMITTED IF RATIO A/B IS NOT OVER 40% (CONVEXITY RATIO) AND DIMENSIONS ARE WITHIN TOLERANCES ALLOWED.

FIGURE VIII

S.C. STATE HIGHWAY DEPARTMENT
COLUMBIA

WELD SYMBOLS AND TEST SPECIMENS

DOCKET NO. 40.565.1 ROUTE NO. I-20
COUNTY RICHLAND DATE 4-62

DATE	10-11-55
BY	CHERRY
DATE	

WIDENING EXISTING CONCRETE STRUCTURES

Existing structure is indicated on the plans by light lines, new structure by heavy lines.

All dimensions of new construction are subject to existing conditions.

Connecting surfaces of the old concrete shall be thoroughly roughened, cleaned of loose material, wetted and flushed with 1:2 cement mortar immediately before pouring new concrete, except as noted on other sheets of these plans.

All reinforcing steel protruding beyond surface after chipping shall be left in place and imbedded in new concrete if feasible. Reinforcing steel which can not be imbedded in new concrete shall be cut off flush with surface of concrete where asphalt surfacing will cover. Where exposed the old reinforcing shall be cut off 1/2" below the exposed concrete surface and the hole patched with dry 1:3 mortar to the satisfaction of the Engineer.

The Contractor shall repair or replace at his own expense, and in a manner satisfactory to the Engineer, any portion of the existing structure damaged as a result of his carelessness or negligence.

The entire cost of the above work including all drilling and chipping, and removing and disposing of portions of old structure necessary to construct new structure, shall be included in the unit price bid for Class "A" Concrete.

If expansion anchor bolts are called for they shall be similar and equal to Rawl's Multi-Galk Anchor or American Exp. Bolt and shall be installed in accordance with the manufacturer's directions.

Expansion anchor bolts will be paid for at unit price bid for reinforcing steel.

Unless otherwise specified in these plans or Special Provisions the Contractor shall provide necessary temporary supports for utilities attached to the bridge to maintain service during construction.

The owner will make all necessary changes in alignment and elevation of the utility and furnish permanent supports which shall be placed in the concrete by the Contractor.

All costs of the work to be performed by the Contractor shall be included in the unit price bid for Class "A" Concrete.

SPECIAL NOTE

Generally, in case of discrepancy, this standard sheet of notes shall govern over the Specifications, but the remainder of the plans shall govern over notes hereon, and Special Provisions shall govern over all. See Standard Specifications paragraph 504.

EXCAVATION FOR PILE TYPE END BENT

All cost of excavation necessary to construct end bents and to remove material under superstructure to an elevation 1'-0" below tops of end bent caps shall be included in the unit price bid for Class "A" Concrete.

EXCAVATION FOR CONCRETE FTG. END BENT

If a concrete footing is used for the end bent the excavation below that included for the cap and berm in the above paragraph will be paid for at the unit price bid for excavation. Excavation above this shall be included in the unit price bid for Class "A" Concrete.

DRIVING PILES THROUGH FILL

Where piles occur in fill exceeding 10 ft. in height, the fill shall be in place before piles are driven.

HAMMER FOR STEEL PILES

Steel piles where required bearing exceeds 37 Tons shall be driven with a diesel, steam or air hammer having a minimum energy of 14,000 Ft.-lbs.

ALLOWANCE FOR DEAD LOAD DEFLECTION AND SETTLEMENT

Bridges shall be built on the grade or vertical curve shown on plans. Handrails, slabs and curbs shall conform to the grade or curve.

In setting forms for structural steel or prestressed concrete beam bridges, an allowance shall be made for dead load deflections in addition to the elevations shown.

In setting falsework and forms for reinforced concrete spans an allowance shall be made for dead load deflections, settlement of falsework, and permanent camber which shall be provided for in addition to the elevations shown. After removal of the falsework, the finished structure shall conform to the elevations shown plus the allowance for permanent camber specified by the Engineer.

BRONZE EXPANSION PLATES

Bronze P's to be self-lubricating Exp. P's. Manufactured from rolled bronze alloy complying with A.S.T.M. B108 - Alloy 1, or A.S.T.M. B22 - Gr. B casting, and to have special inserts consisting of graphite and metallic substances with a lubricating binder in top face only. Installation of P's to be in accord with manufacturer's directions. The Coef. of friction shall not exceed 0.1. The Bronze P's shall be similar to those manufactured by Merriman Bros., Inc., 183 Amory St., Boston 30, Mass., or Spadone - Alfa Corp., South Norwalk, Conn., or an approved equal.

STRUCTURAL STEEL

Beams shall be cambered for vertical curve and dead load deflection either in mill or shop.

Layout dimensions and standard lengths of beams shown are horizontal dimensions and must have the additional lengths added for lengths along grade.

All rivets shall be 7/8" ϕ unless noted.

All high-tensile-strength bolts shall be 7/8" ϕ unless noted.

All holes shall be 1 1/8" ϕ unless noted.

Holes in all main member splices shall be sub-punched, the connecting members shop assembled in their proper positions, and the holes reamed to full size while assembled.

Floor beam connections shall be reamed to a metal template.

All stiffeners at floor beams and at pier reactions shall have fills. All interior stiffeners between floor beams shall be crimped or filled.

Shims shall be placed between beam flange and rocker plate where required and shall be adjusted to bring top of beam to theoretical grade.

Bearing plates and rocker plates to be rolled steel.

Nuts on Anchor Bolts at Expansion Ends to be tightened 1/8" clear to allow for movement.

Anchor bolt assemblies will be paid for as reinforcing steel and are included in the bent quantities, unless specifically stated elsewhere as included in the structural steel quantities.

Mill and shop inspection of the structural steel will be performed by Froehling & Robertson, Inc., 814 West Cory St., Richmond, Virginia. The contractor shall notify that company of the name and address of the fabricator of the structural steel as soon as the fabricator has been given the contract to fabricate so that the inspection procedure can be set up. The contractor shall also stipulate in his order to the fabricator that Froehling & Robertson, Inc., will perform the mill and shop inspection of the structural steel.

COMPOSITE BEAMS

A 5 day interval shall be allowed between time of pouring slab and sidewalk.

Tops of beam flanges shall not be painted.

All equipment, materials and workmanship for electric arc welded stud shear connectors shall be in accordance with the recommendations of the manufacturer and Special Provisions.

Alternate for welded studs: an approved alternate method of securing composite action between beams and slab may be used, at no additional cost to the Dept. Details must be submitted for approval in advance of making the change.

3/4" ϕ studs may be substituted for 3/4" ϕ studs. The 3/4" ϕ studs shall be placed with the same number in each transverse row as the 3/4" ϕ studs. The pitch of the 3/4" ϕ studs shall be equal to 1.36 times the pitch of the 3/4" ϕ studs. The 3/4" ϕ studs must be welded within the recommended area of an approved arc stabilizer cart.

PRESTRESSED BEAMS

Tops of beams shall be rough floated.

At the approximate time of initial set, entire top of beam shall be scrubbed with a coarse wire brush to remove all laitance, and to produce a roughened surface for bonding slab.

Membrane curing compound shall not be used on tops or ends of beams.

Concrete in prestressed beams shall be class "X" as described in the Special Provisions.

The prestressing strands, wire or bars, must be thoroughly cleaned of any loose rust dirt, grease, form lubricant, or other deleterious substances, to the satisfaction of the Engineer, before the concrete is placed.

Beams shall not be transported to the bridge site until concrete has cured for at least 6 days.

CONCRETE

All concrete shall be Class "A" unless noted below or on other sheets of these plans.

Build-ups on bent caps shall be cast monolithic with cap unless shown or noted elsewhere on these plans.

Top of each build-up shall be level.

Payment for Concrete in slab will be based on theoretical plan quantity.

Any necessary adjustment for Camber shall be at the Contractor's expense.

All exposed edges shall be chamfered 3/4" unless otherwise noted.

For simple spans over 70 Ft. in length, the center portion (approximately 50 Ft. in length) of the slab shall be poured first and allowed to cure for not less than 4 days before the remaining end sections are poured. However, when the temperature permits (in the opinion of the engineer) the entire slab may be poured provided a suitable retarding agent is used in such amounts that the slab concrete shall not have had its initial set prior to the completion of the casting of the slab concrete.

BEARINGS

For concrete beams bearing on concrete, the top of caps, or tops of build-ups, under bearing areas of beams shall receive a steel trowel finish to insure a smooth and level bearing surface. See Standard Specifications paragraph 4D22.

DESIGN DATA

SPECIFICATIONS: A.A.S.H.O. 1961 with rev. ~~1961~~

LIVE LOAD: H20-S16-44 Includes provision for alternate loading of 2 axles 4' apart with each axle weighing 75% of rear loading for spans under 40'.

UNIT STRESSES

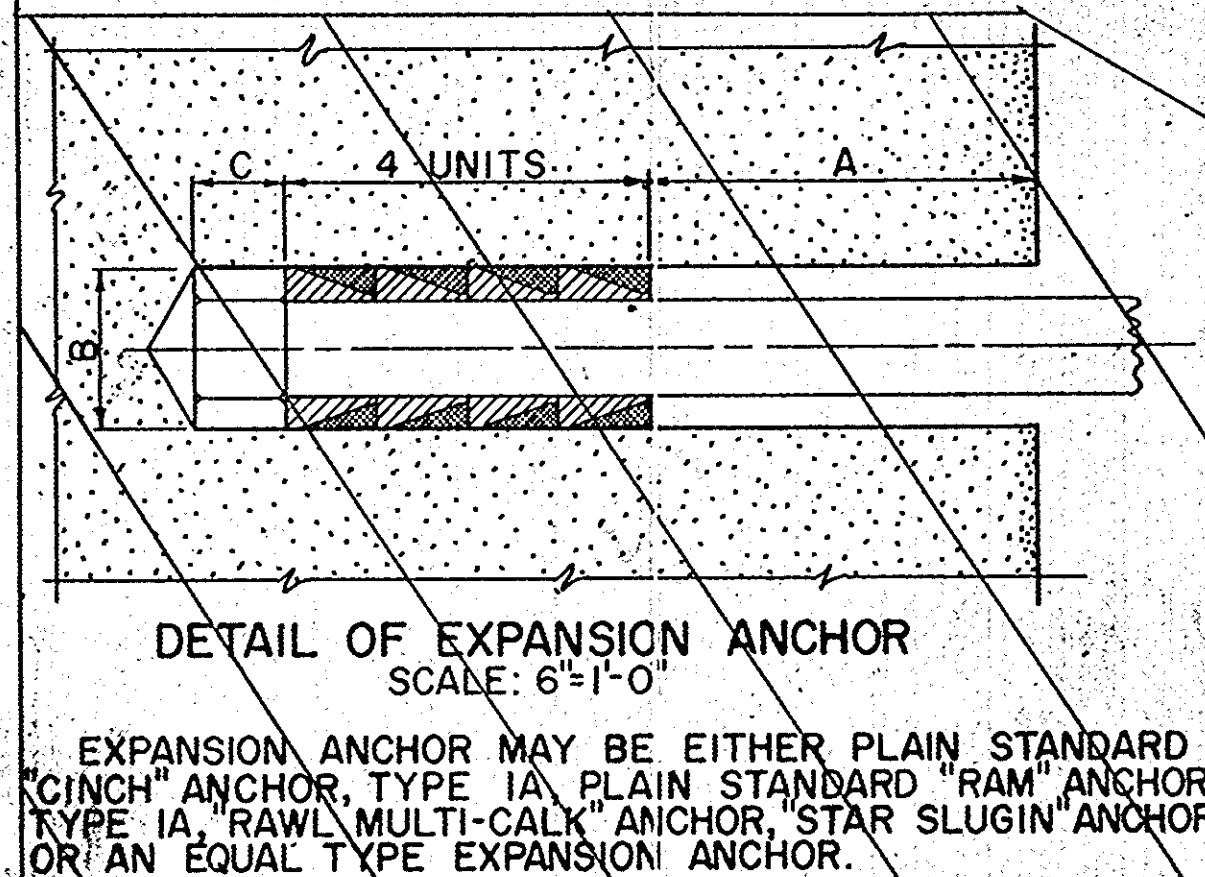
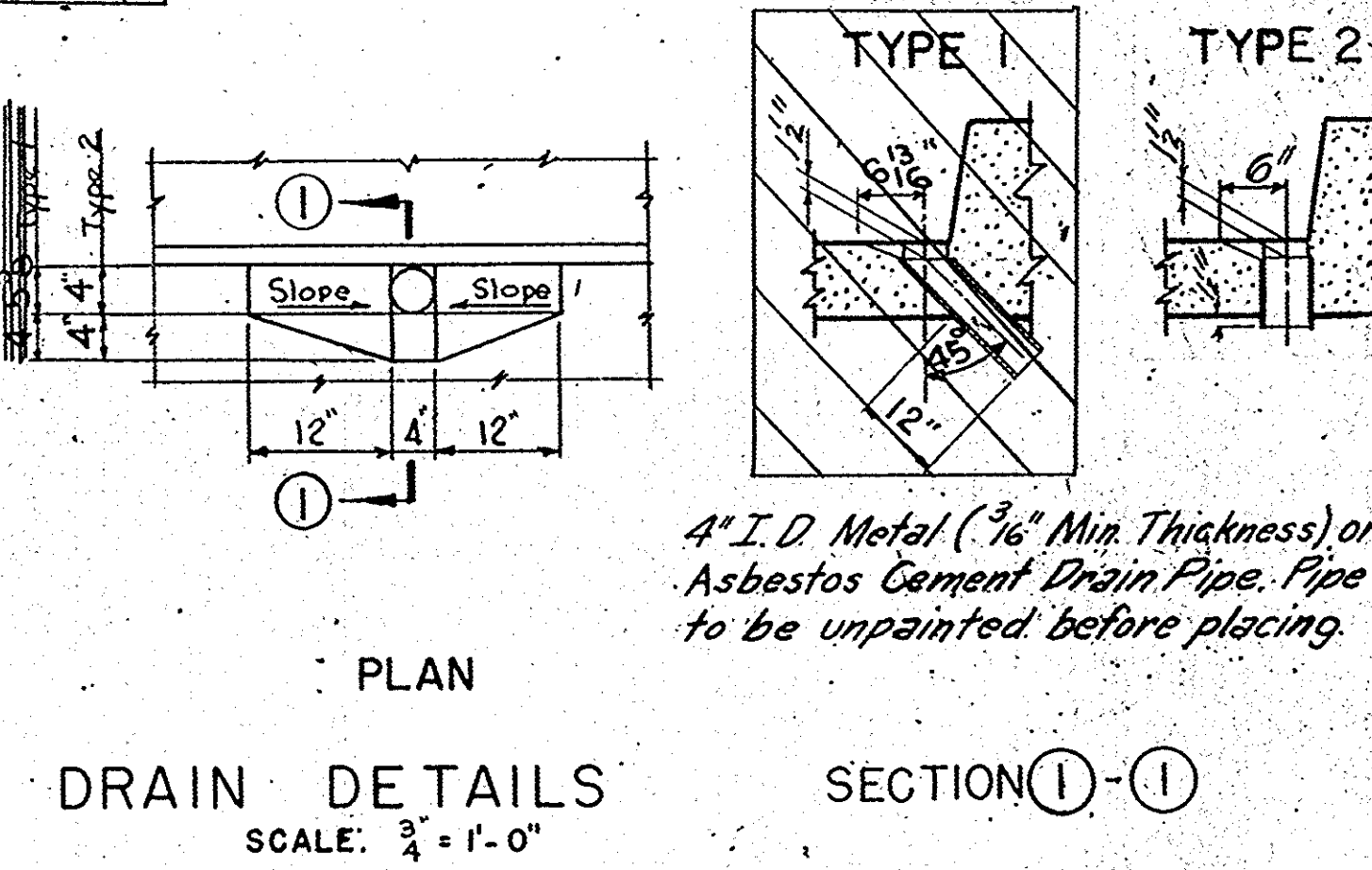
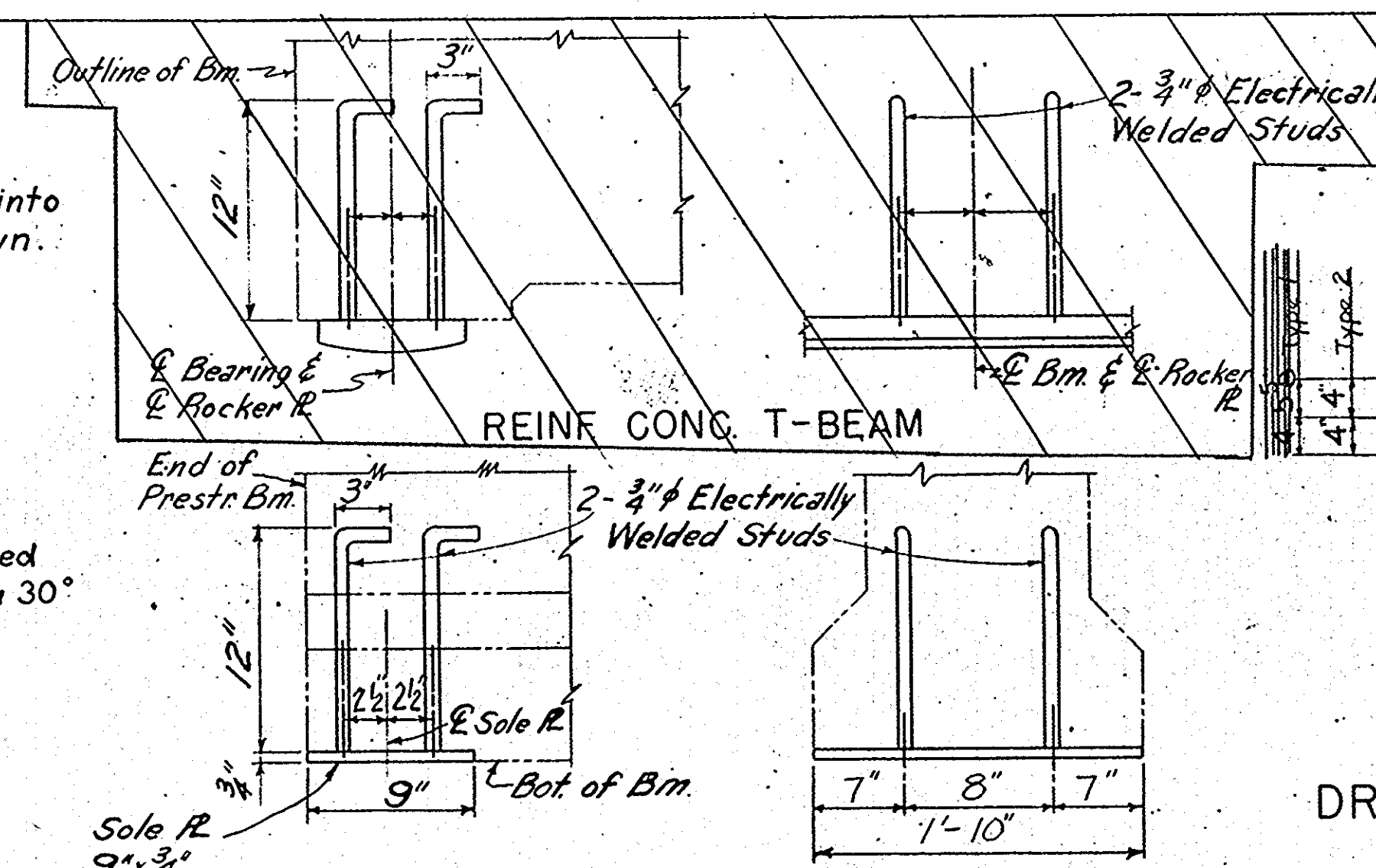
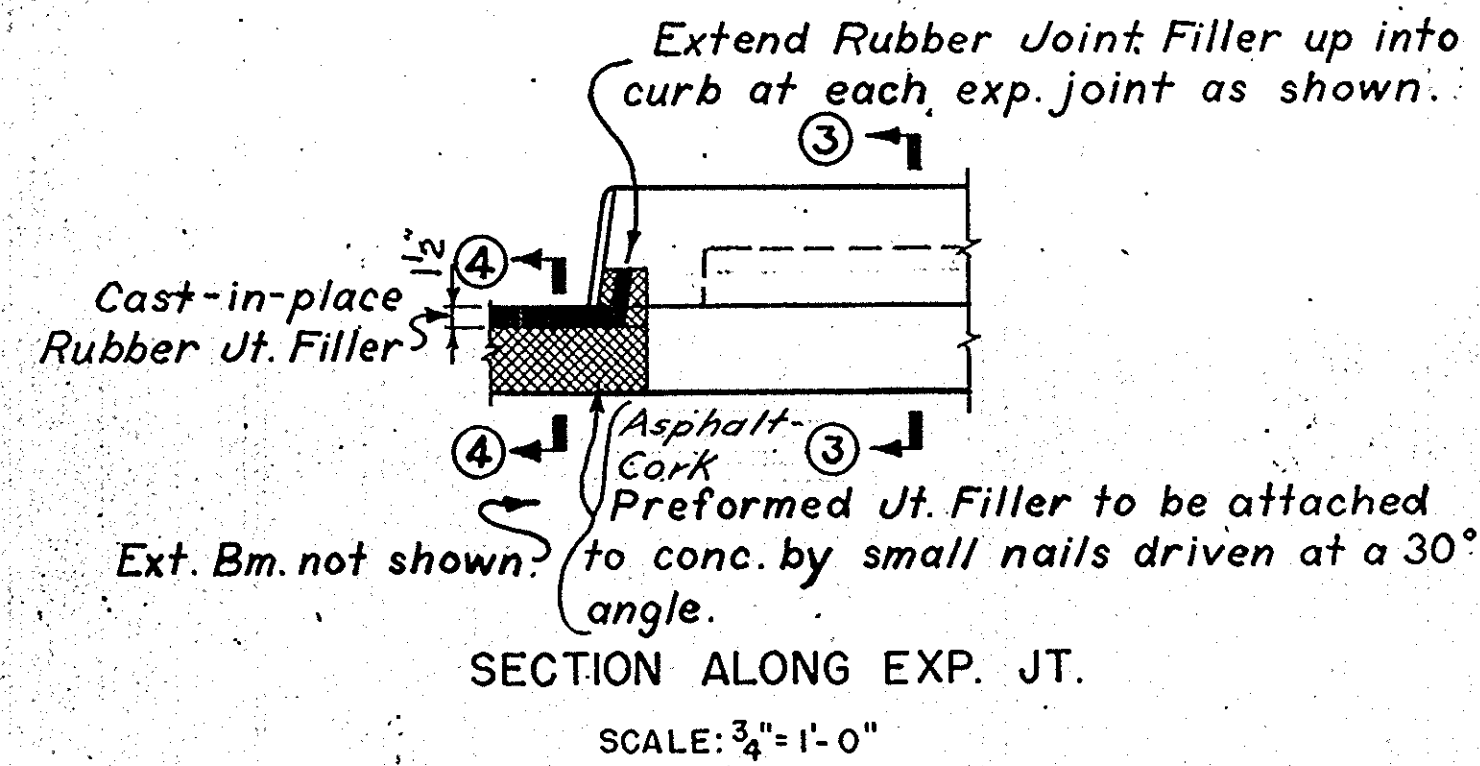
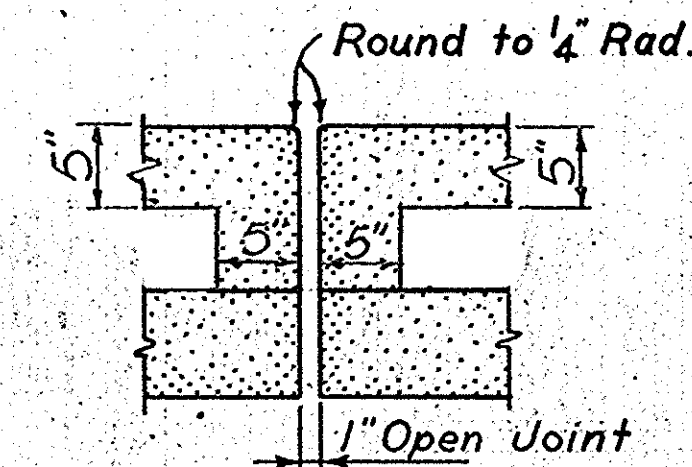
STRUCTURAL STEEL & REINFORCED CONCRETE:
f_s (struct.) = 18,000 psi
f_s (reinf.) = 20,000 psi
CLASS "A" CONCRETE:
f_c = 1200 psi; n = 10; v = 225 psi; u = 300 psi
~~CLASS "X" CONCRETE:
f_c = 2,000 psi; n = 6; v = 375 psi; u = 350 psi~~
PRESTRESSED CONCRETE:
f_c = 5,000 psi; f_{ci} = 4,000 psi; f_c = 2,000 psi
PRESTRESSING STEEL:
f_s = 250,000 psi; f_{si} = 175,000 psi

MATERIAL AND WORKMANSHIP

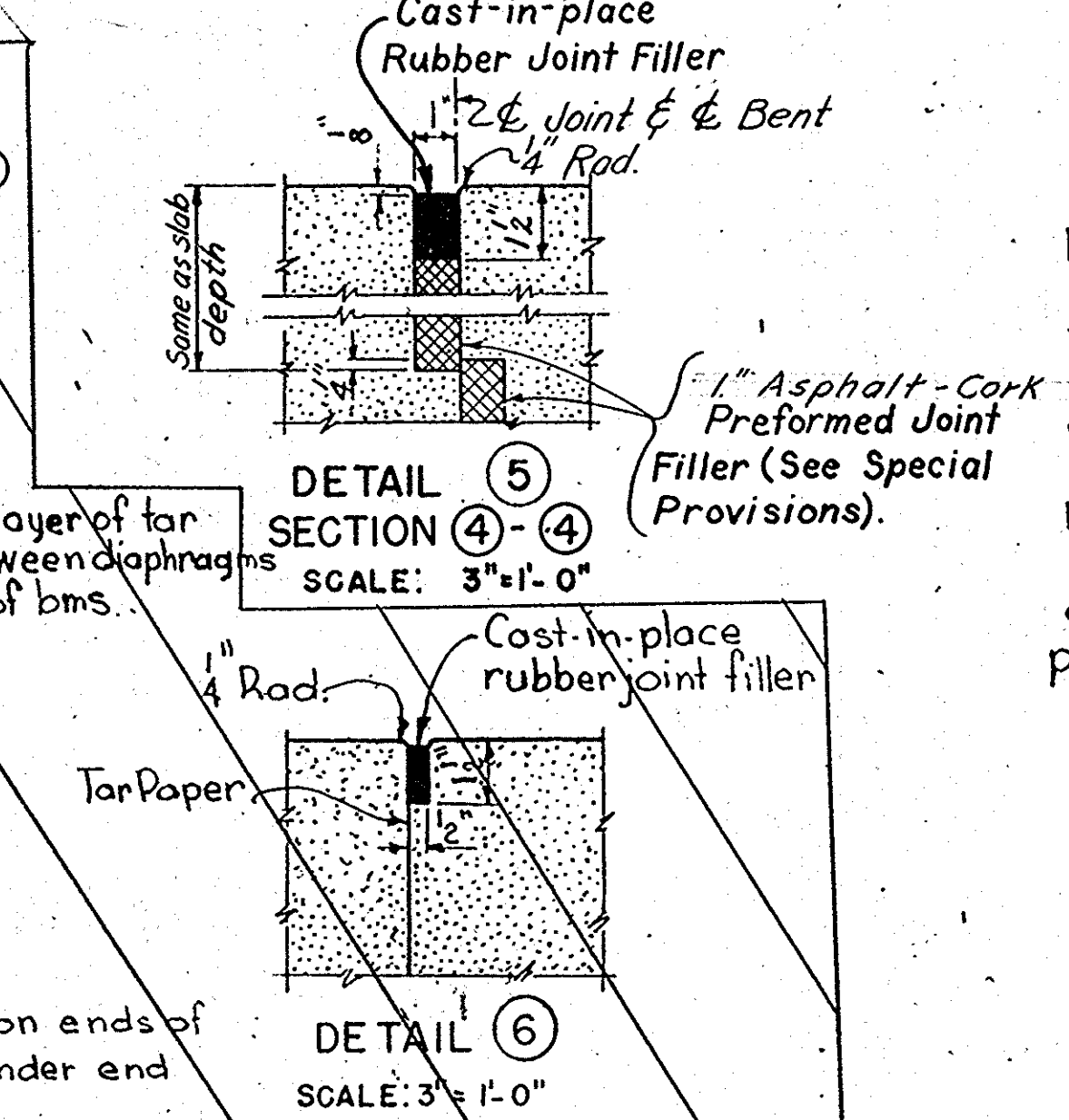
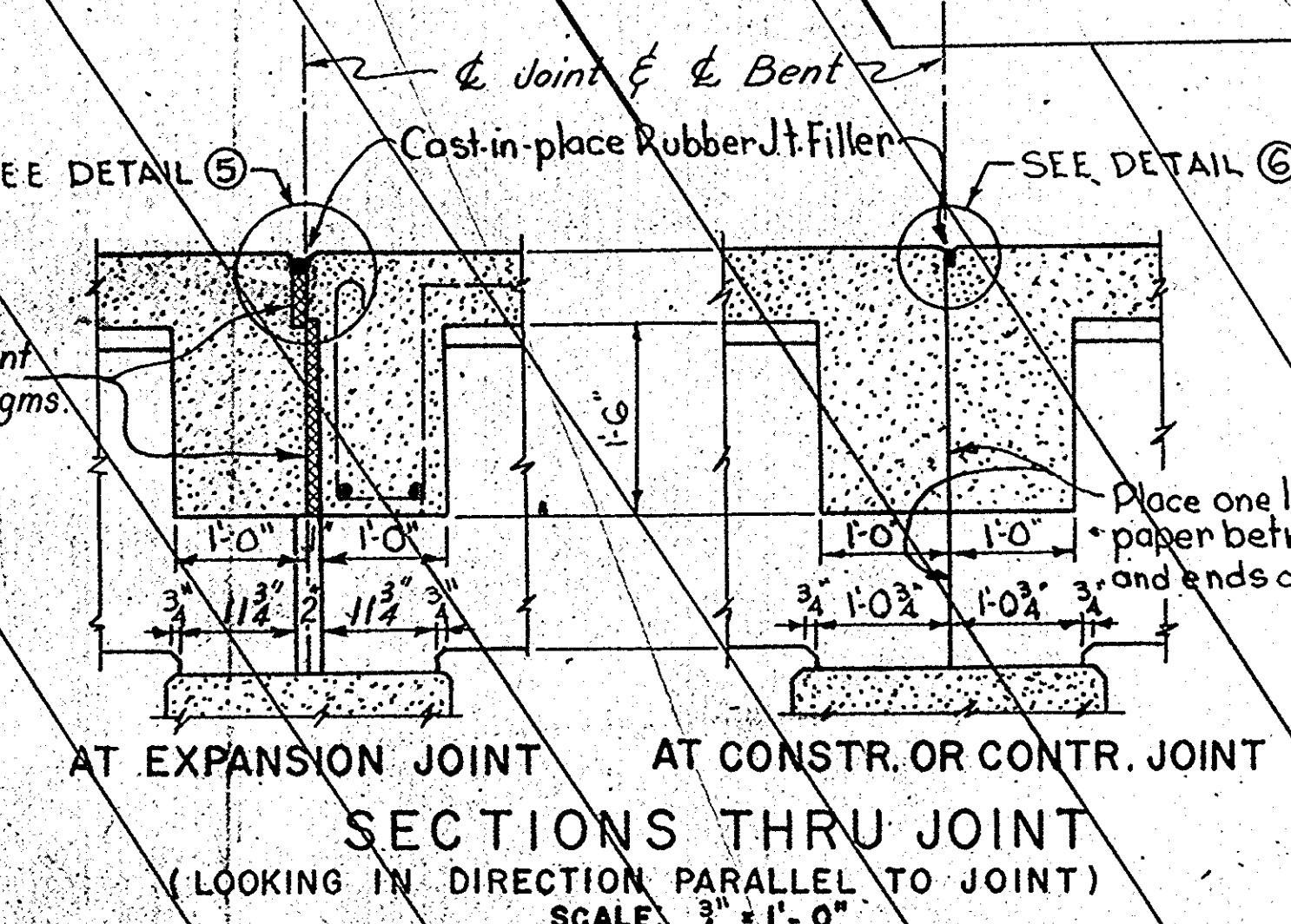
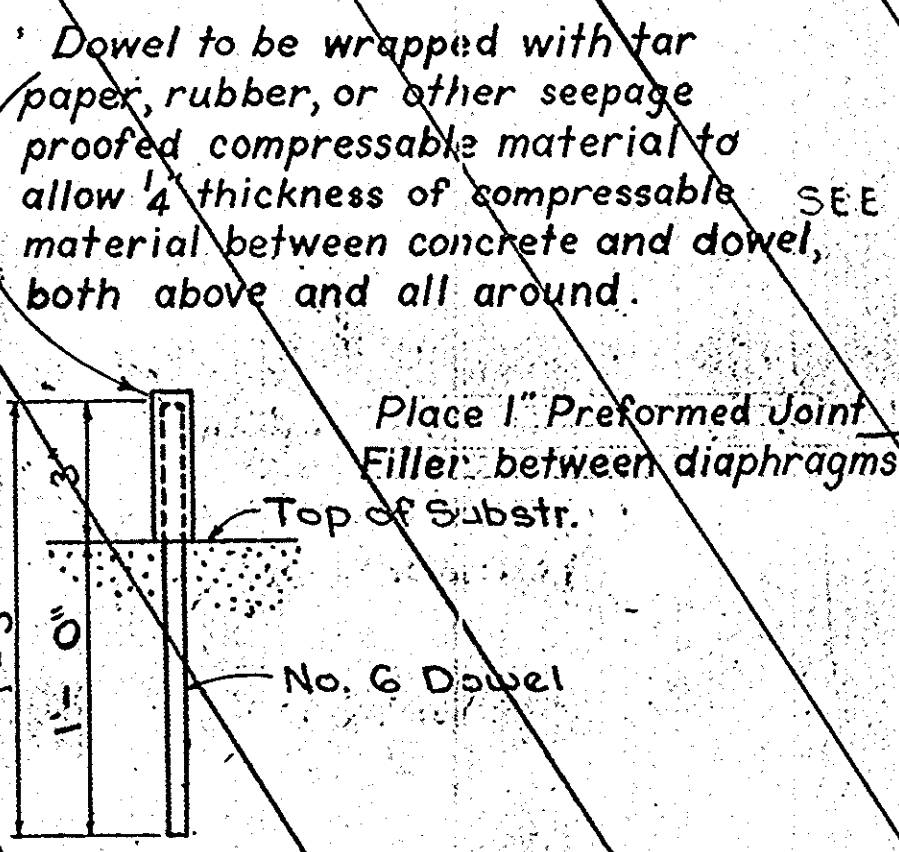
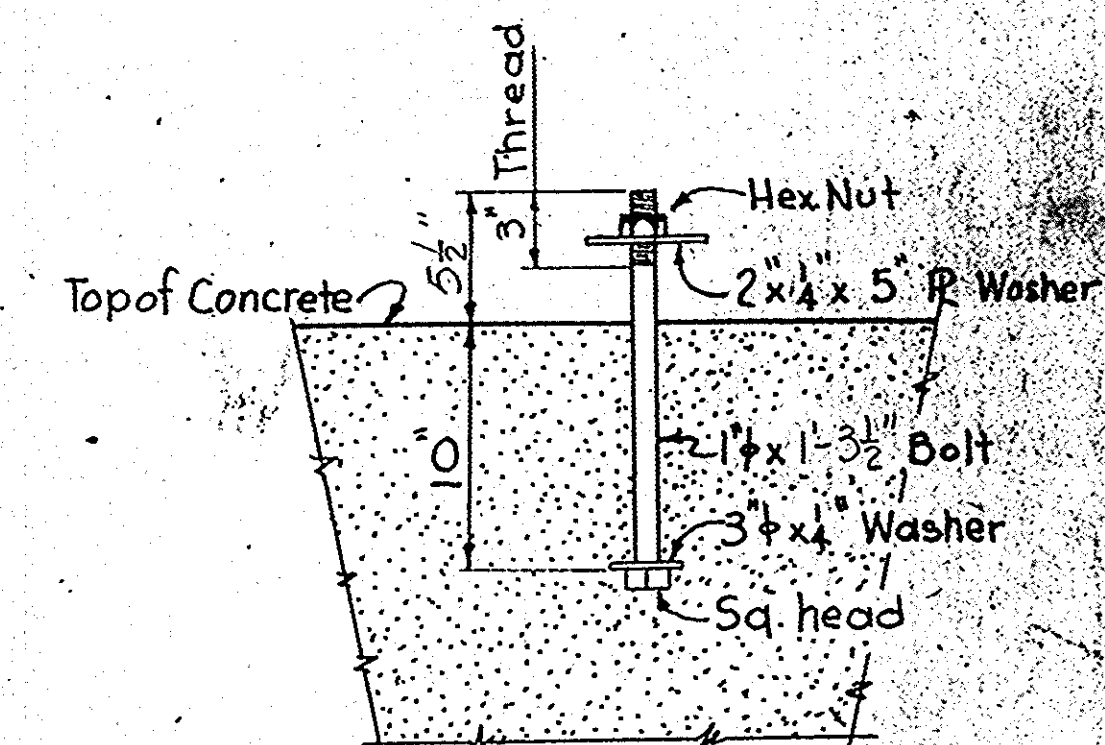
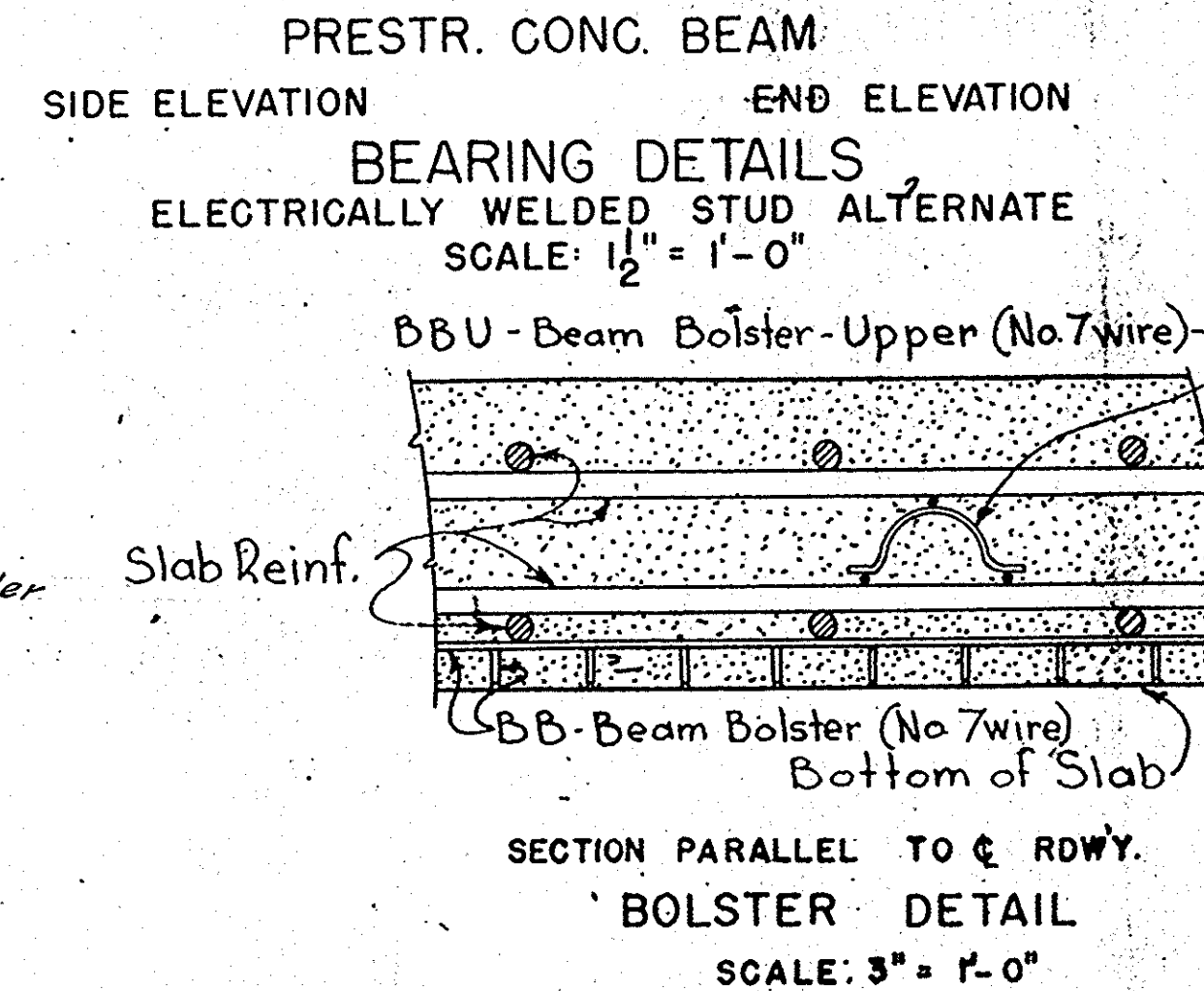
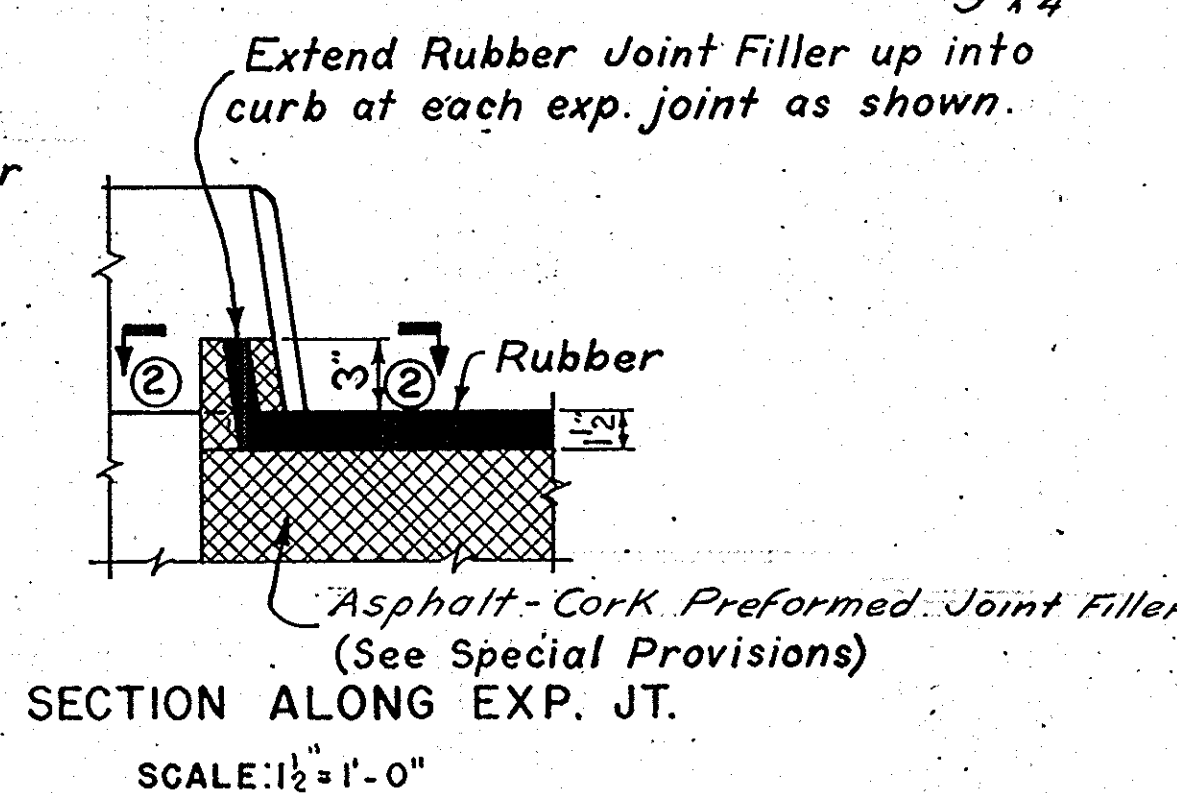
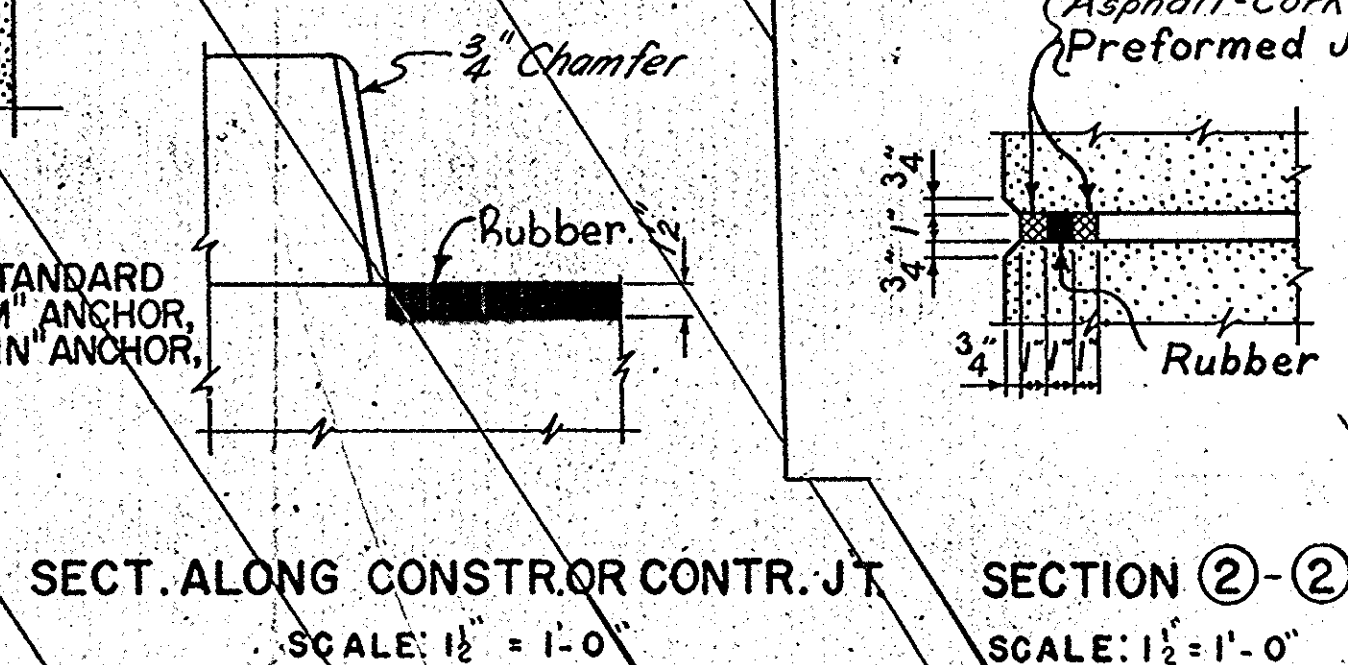
Except as may otherwise be specified on plans or in the Special Provisions, all material and workmanship shall be in accordance with the South Carolina Highway Department Standard Specifications for Highway Construction dated November 1, 1955.

INFORMATION ONLY

REV.		S.C. STATE HIGHWAY DEPARTMENT BRIDGE DIVISION COLUMBIA, S. C.			
REV.		STANDARD NOTES			
REV.					
REV.	WAH:DPD:3-62 For DK 40.565.1				
REVIEWED:	DPD				
IN CHARGE		DOCKET NO.	COUNTY	ROUTE NO.	DATE
TR. APD:RWH:4-61		40.565.1	RICHLAND	I-20	4-62
DR. APD:RWH:4-61		APPROVED BY:		APPROVED BY:	
DES.		BY CHODATE		BRIDGE ENGINEER	



BOLT DIAMETER	A	B	C	HEIGHT OF HEAD
3/4"	4"	1 3/8"	1 5/8"	1 1/2"
1"	4"	1 5/8"	1 5/8"	1 1/2"



Note:
Bolsters shall be spaced so that they provide adequate support for the slab reinforcing steel. The BBU bolsters shall be spaced at approx. 3'-0" cirs. The BB bolsters shall be placed with one row near each edge of slab & with a max. spacing of approx. 3'-0" between.
Bolsters shall be equal to beam bolsters BB and BBU as Mfg'd by Meadow Steel Co. or Richmond Screw Anchor Co.
The lengths of bolsters shown in reinforcing steel schedules are approximate. Weights are included in the reinforcing steel quantities and payment will be made at the unit price bid for Reinforcing Steel.

Bent No.	No. per Bent	Size	Length	*Wt. per Bent Lbs.
1	20	1"φ	1'-3 1/2"	104
2	40	1"φ	1'-3 1/2"	208
3	40	1"φ	1'-3 1/2"	208
4	40	1"φ	1'-3 1/2"	208
5	20	1"φ	1'-3 1/2"	104

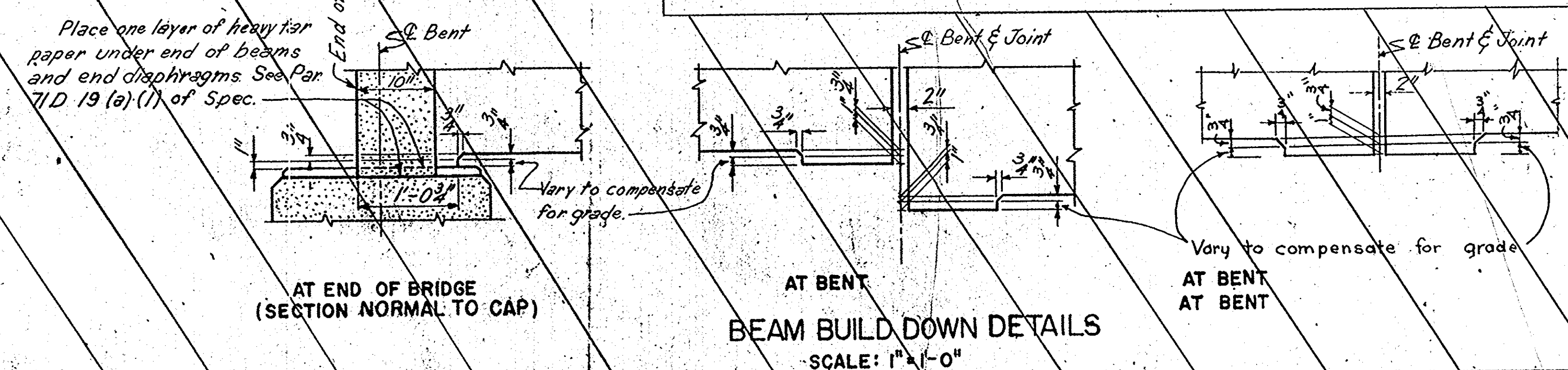
* Complete Assembly

Note:
Anchor bolt assemblies will be paid for as reinforcing steel and are included in the bent quantities, unless specifically stated elsewhere as included in the structural steel quantities.

1 1/2"	2 1/2"	For No. 4 and Smaller add 6" per hook
2"	3 1/2"	For No. 5 and No. 6 add 8" per hook
3 1/2"	4 1/2"	For No. 7 and larger add 12" per hook

HOOK DETAILS
FOR STEEL REINFORCING BARS

JOINT DETAILS



INFORMATION ONLY

REV	AMZ	HD 14-59	Bearing Detail
REV	WEB	MDS 1258	Drain Detail
REV	AMZ	VWH 1-58	Build-down Detail
REV	RWH	VEH 1-57	Add Detail
REVISED	DFD		IN CHARGE
QUAN			
REV	C.D.R.	EAS 4-62	UT Details & New Foil
REV	C.D.K.	MDS 4-60	DES.
EXP. ANCHOR DETAIL	BY	CHK DATE	BRIDGE DESIGN & PLANS ENG
APPROVED BY:			BRIDGE ENGINEER

S.C. STATE HIGHWAY DEPARTMENT
BRIDGE DIVISION
COLUMBIA, S.C.

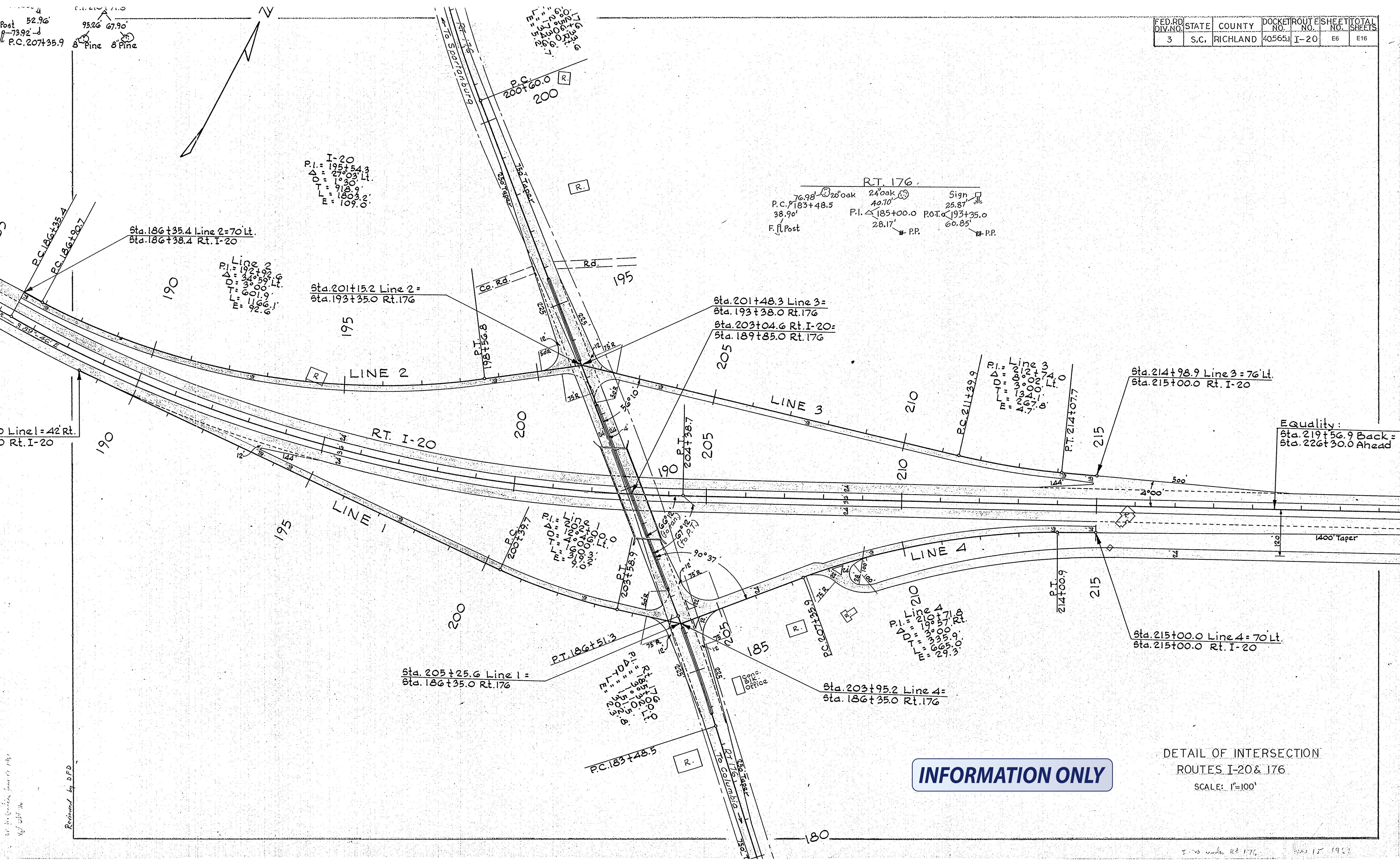
STANDARD DETAILS

DOCKET NO.	COUNTY	ROUTE NO.	DATE
40.565.1	RICHLAND	I-20	4-62

APPROVED BY: *[Signature]*
BY: CHK DATE: *[Signature]*

Post 52.96'
P.C. 207+35.9
Pine 8" Pine 8" Pine

FED. RD. DIV. NO.	STATE	COUNTY	DOCKET NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
3	S.C.	RICHLAND	40565J	I-20	E6	E16



INFORMATION ONLY

DETAIL OF INTERSECTION
ROUTES I-20 & 176
SCALE: 1"=100'

Reviewed by DFD

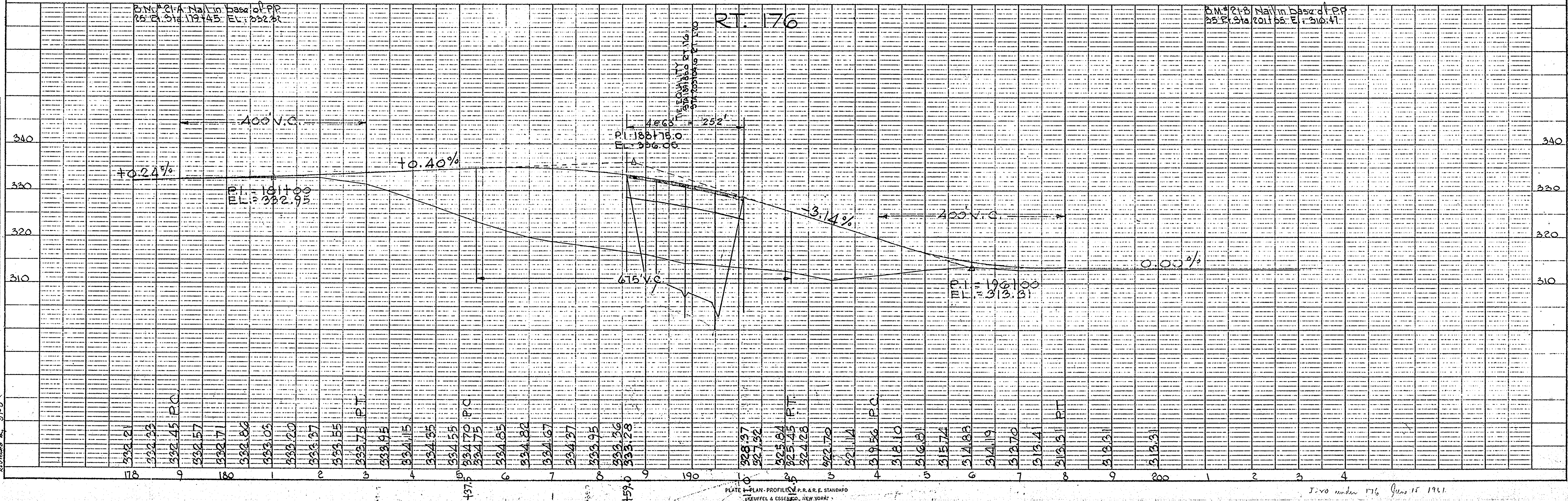
FED. ROAD DIV. NO.	STATE	COUNTY	DOCKET NO.	PROJECT NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
3	S. C.	RICHLAND	40,565.1	—	I-20	E7	E16

PLAN	DATE	BY	CHECKED
NO.			

SUMMARY OF QUANTITIES								
	No. Wet's Dry Excavation	Concrete Class 'A' C.Y.	Reinforcing Steel Lbs.	Creosoted Timber Piling L.F.	8" Galv. C. M. Pipe Slope Drain Assembly L.F.	Intake Spillway Assembly Ea.	63' Prest. Concrete Beams Ea.	Fabricated Metal (Alum.) Handrail L.F.
End Bents 1 & 5	2	31.0	5,502	800	—	—	—	—
Int. Bent 2	1	150	93.2	10,415	—	—	—	—
Int. Bent 3	1	120	93.5	10,415	—	—	—	—
Int. Bent 4	1	145	95.8	10,687	—	—	—	—
63' End Span	2	253.4	71,508	—	—	—	20	252
63' Int. Span	2	240.0	71,294	—	—	—	20	252
TOTAL		415	806.9	179,821	800	—	40	504

INFORMATION ONLY

PROFILE	DATE	BY	CHECKED
NO.			

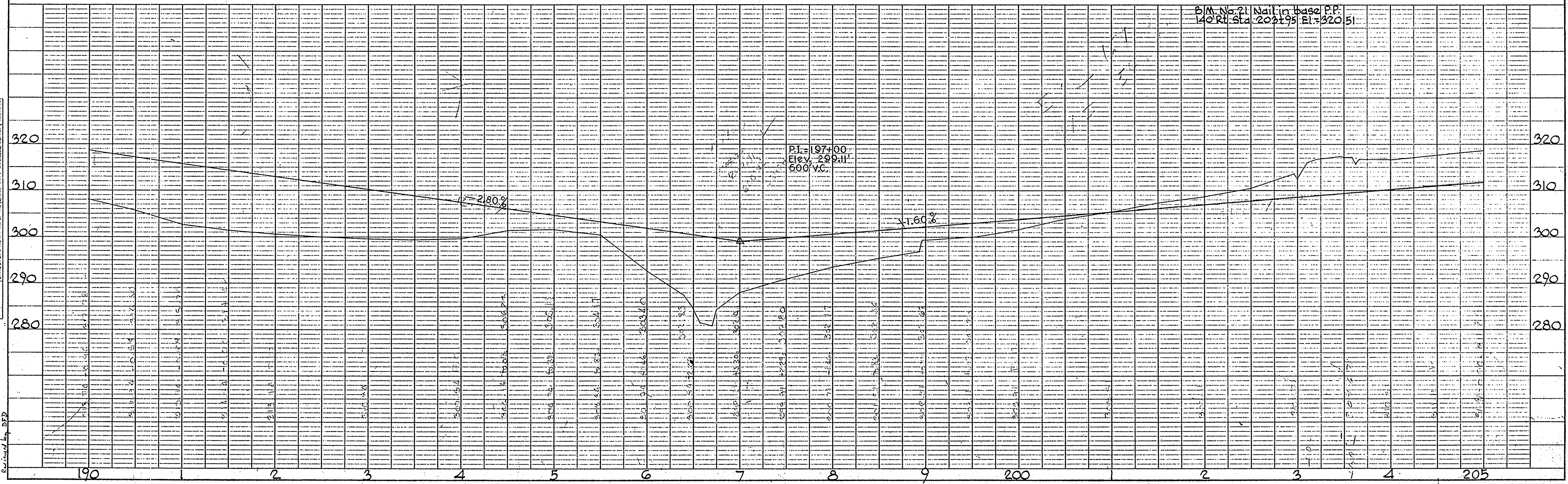


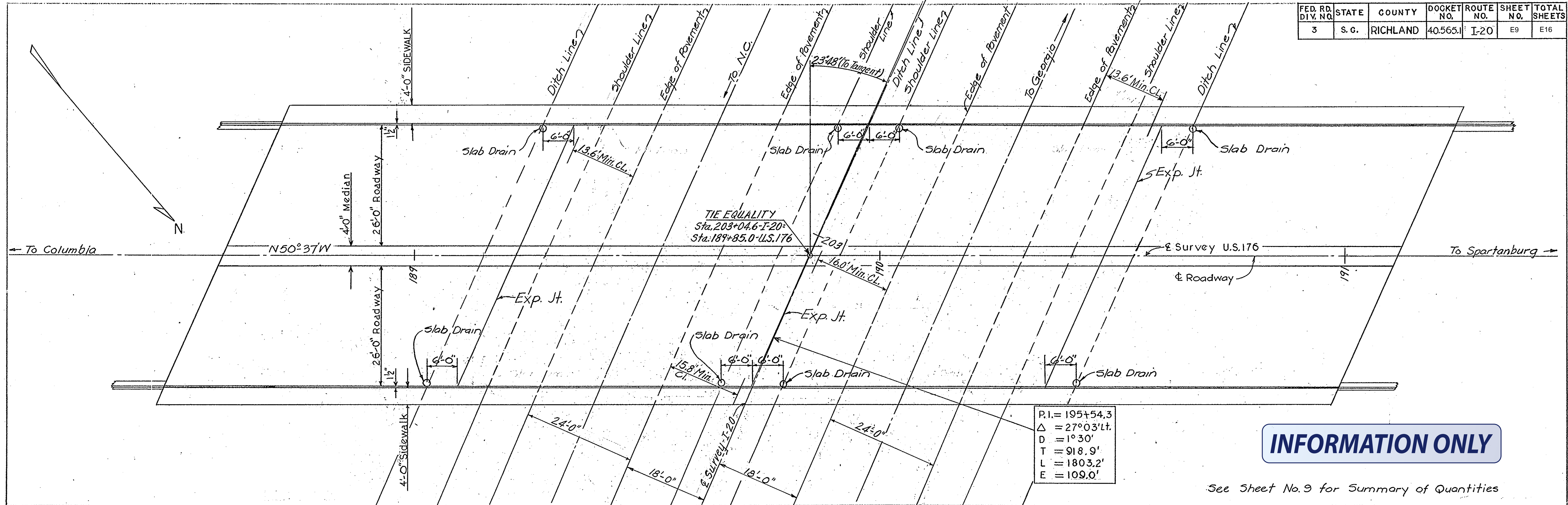
FED. ROAD DIV. NO.	STATE	COUNTY	DOCKET NO.	PROJECT NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
3	S. C.	RICHLAND	40.565.1		1-20	E8	E16

PLAN	NO.	DATE	BY	CHKD.
NO.				

INFORMATION ONLY

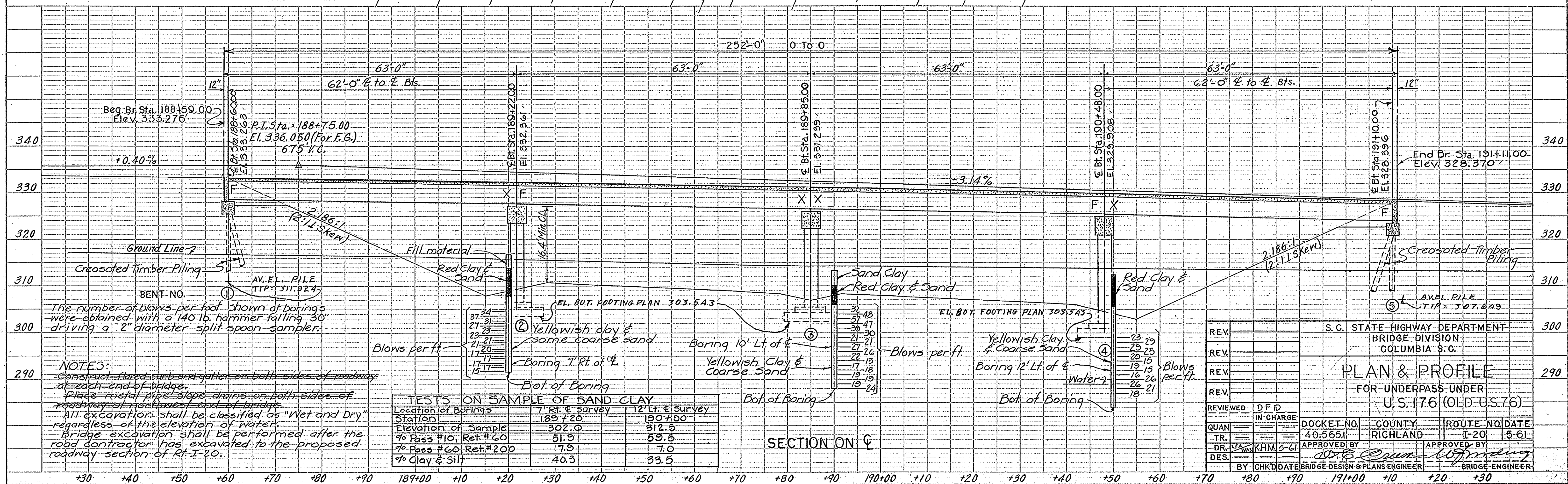
PROFILE	NO.	DATE	BY	CHKD.
NO.				

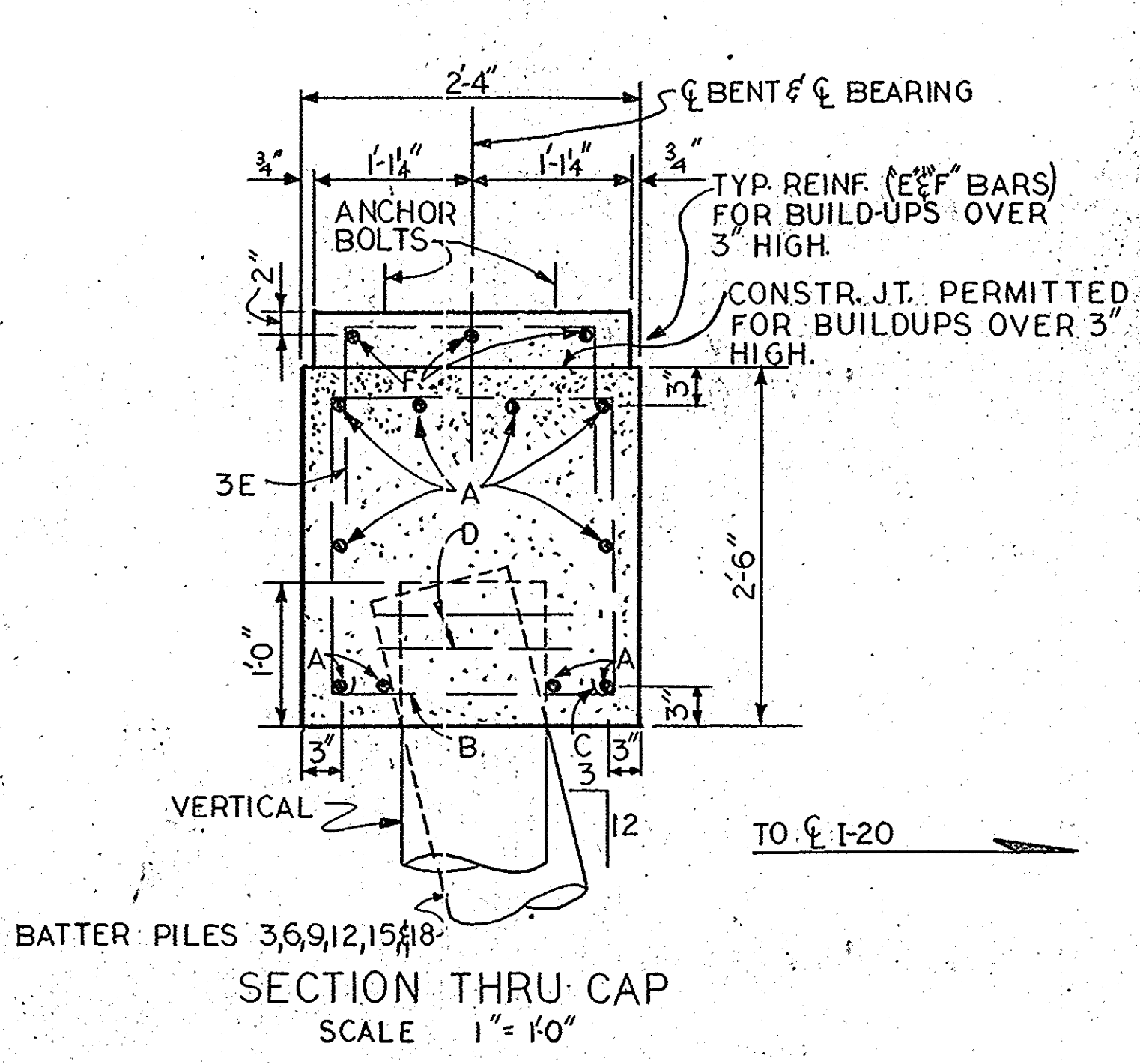
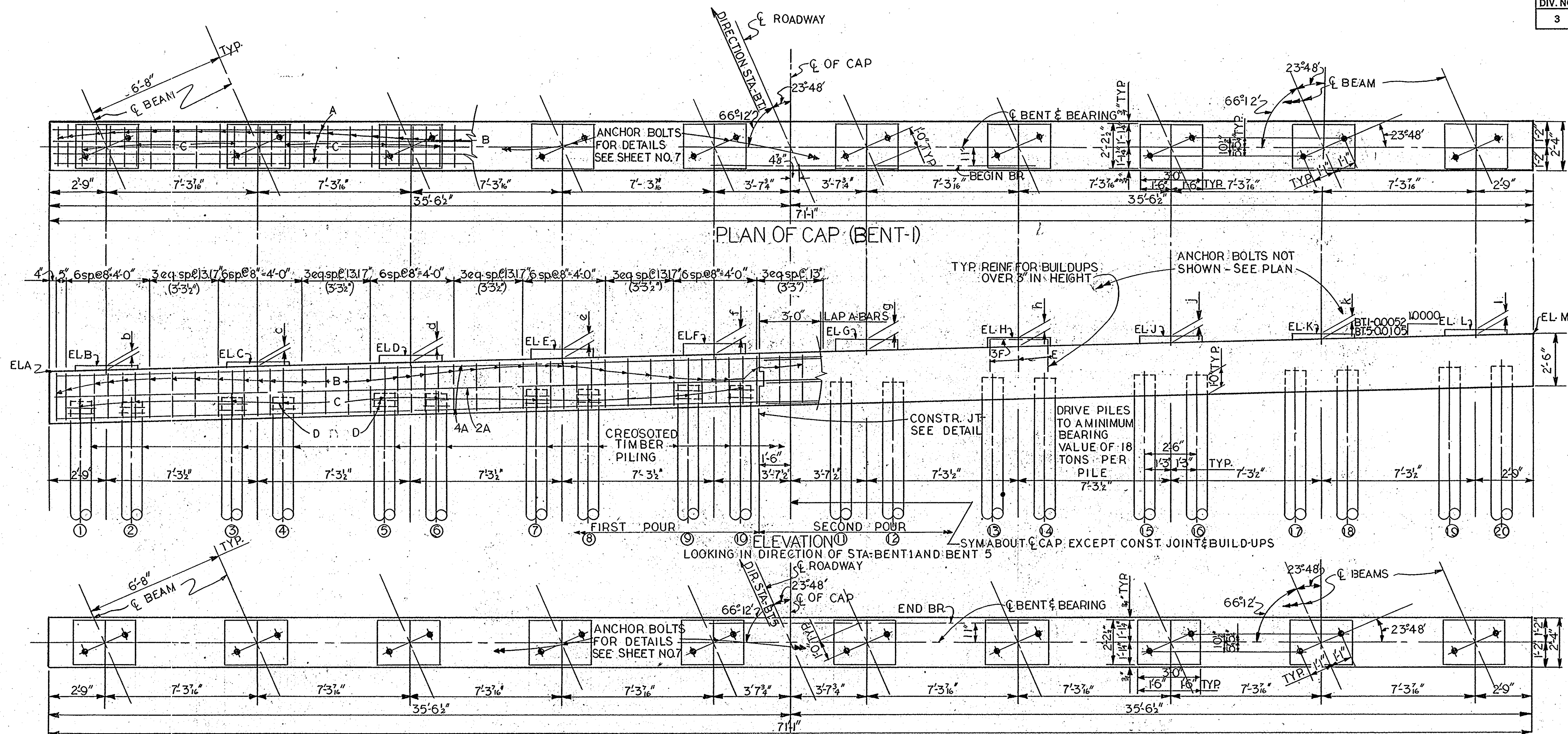


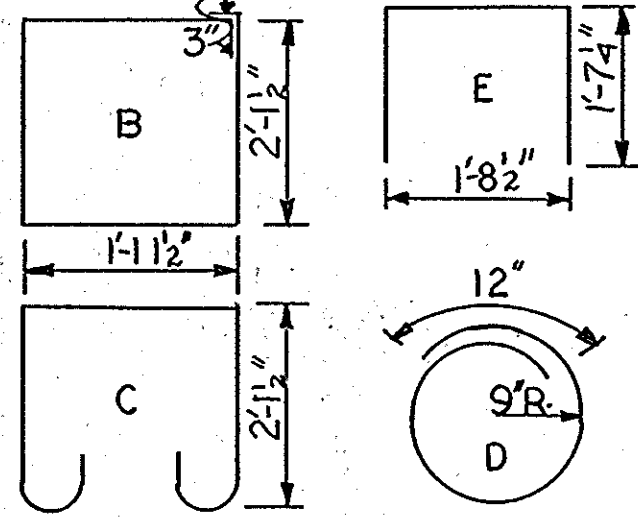


INFORMATION ONLY

See Sheet No. 9 for Summary of Quantities

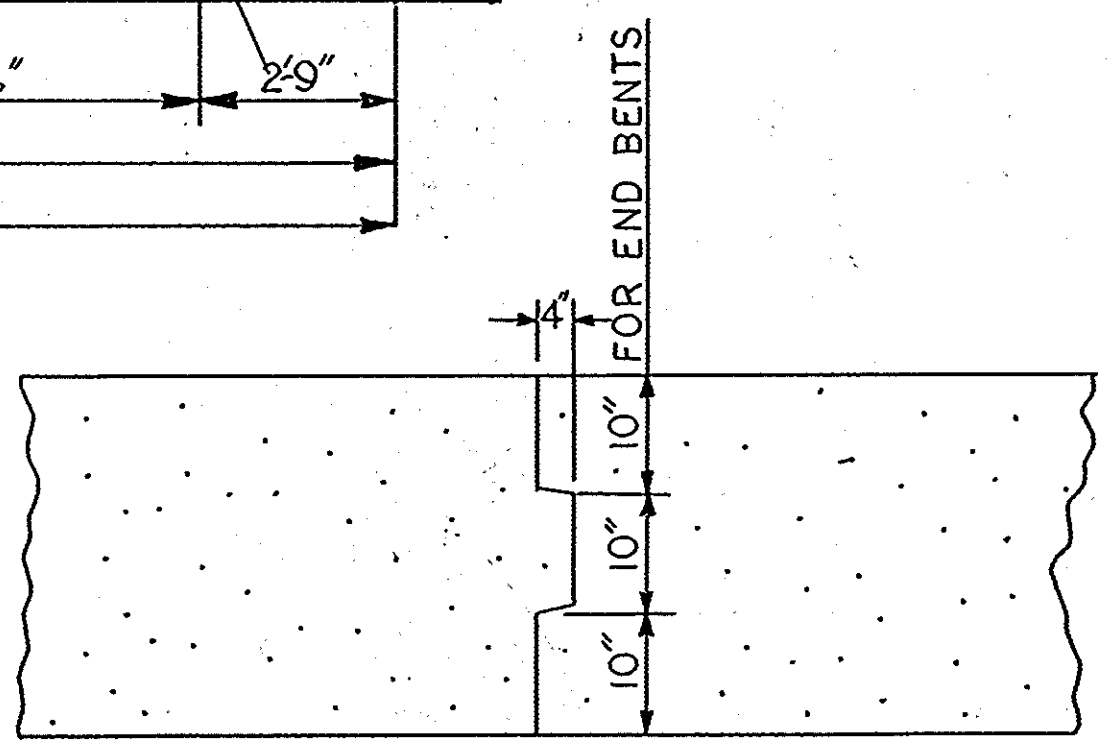




ELEVATIONS		DIMENSIONS		REINFORCING STEEL SCHEDULE									
	BENT 1	BENT 5		BENT 1	BENT 5	MARK	SIZE NO.	NO. REQUIRED BENT 1	BENT 5	LENGTH	D	BENDING DETAILS	
A	327.886	322.830		—	—								
B	328.004	322.963	b	14"	14"	A	8	20	20	36'-10"	S		
C	328.148	323.146	c	2 1/2"	2 1/2"	B	4	70	70	8'-8"	B		
D	328.291	323.328	d	3 13/16"	3 13/16"	C	4	20	20	7'-3"	B		
E	328.434	323.509	e	5 1/8"	5 1/8"	D	3	40	40	5'-9"	B		
F	328.577	323.691	f	6 5/8"	6 5/8"	E	4	18	18	4'-11"	B		
G	328.615	323.767	g	6 5/8"	6 5/8"	F	4	18	18	2'-8"	S		
H	328.548	323.739	h	5 1/8"	5 1/8"								
J	328.481	323.710	j	3 13/16"	3 13/16"								
K	328.414	323.681	k	2 1/2"	2 1/2"								
L	328.346	323.652	l	14"	14"								
M	328.256	323.577		—	—								
					</								

SUMMARY OF QUANTITIES		
ITEM	BENT 1	BENT 5
CONCRETE, CLASS A	155 C.Y.	155 C.Y.
REINFORCING STEEL	*2751 LBS	*2751 LBS
CREOSOTED TIMBER PILING	See Summary on Sheet 9	

*INCLUDES 104 LBS. FOR ANCHOR BOLT ASSEMBLIES



CONSTR. JT. DETAIL
SCALE 3/4" = 1'-0"
NOTES:
For Standard Notes See Sh. No. 6
For Standard Details See Sh. No. 7
SCALE 3/8" = 1'-0", OR AS NOTED

INFORMATION ONLY

REV.		S.C. STATE HIGHWAY DEPARTMENT BRIDGE DIVISION COLUMBIA S.C.							
REV.		END BENTS 1 & 5 FOR UNDERPASS UNDER ROUTE 176							
REV.									
REV.									
REVIEWED	DFD								
IN CHARGE	RCH/KHM								
QUAN.	262	DOCKET NO.	40.565.1	COUNTY	RICHLAND	ROUTE NO.	I-20	DATE	262
TR.									
DR.	RCH/KHM	APPROVED BY				APPROVED BY			
DES.	DFD	BRIDGE DESIGN & PLANS ENGINEER				BRIDGE ENGINEER			
BY	CHK/D	DATE							

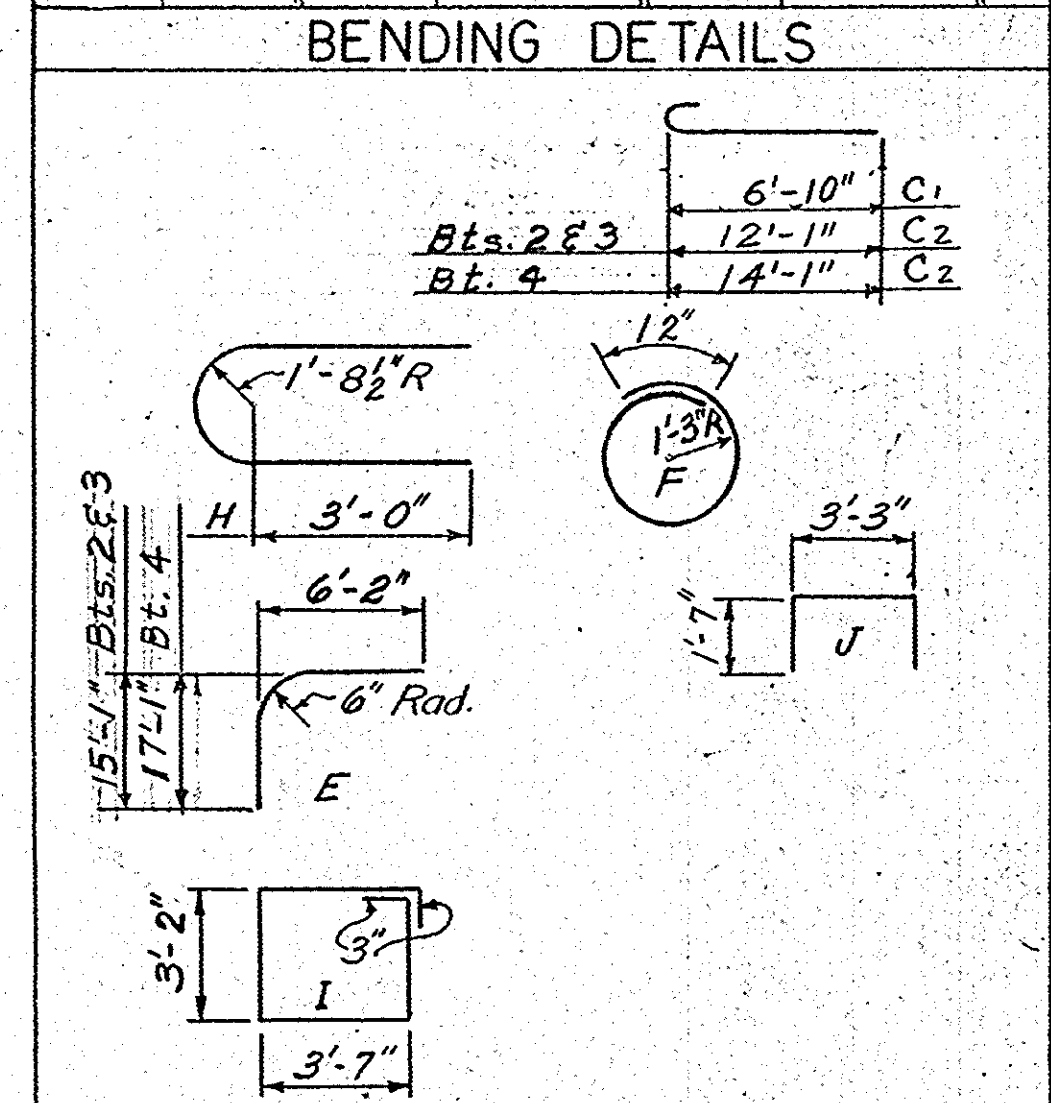
LL H2O 5/6
fc = 1200 psi
fs = 20000 psi
n = 10

FED. ROAD DIV. NO.	STATE	COUNTY	DOCKET NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
3	S.C.	RICHLAND	40.565.1	I-20	E11	E16

ELEVATIONS			
	BENT 2	BENT 3	BENT 4
B	327.196	326.037	324.669
C	327.350	326.200	324.841
D	327.502	326.362	325.013
E	327.655	326.524	325.185
F	327.702	326.581	325.252
G	327.645	326.534	325.215
H	327.588	326.487	325.177
I	327.530	326.438	325.138
J	327.472	326.390	325.100
K	327.043	325.873	324.496
L	303.543	302.373	298.996

DIMENSIONS			
	BENT 2	BENT 3	BENT 4
b	1 1/8"	1 1/8"	2 1/8"
c	3 1/2"	3 1/2"	4 1/8"
d	5 1/2"	5 3/8"	6 3/8"
e	7 5/8"	7 1/2"	8 1/4"
f	7 1/2"	8 1/2"	9 1/8"
g	7 1/4"	7 1/2"	8 5/8"
h	6 9/16"	7 3/8"	8 3/16"
i	5 3/8"	6 3/8"	7 1/4"
j	5 3/8"	6 3/16"	7 1/4"

REINFORCING STEEL SCHEDULE						
		BENT 2 or 3		BENT 4		
MARK	SIZE NO.	NO. REQD.	LENGTH	NO. REQD.	LENGTH	D
A	5	48	8'-6"	48	8'-6"	S
B	6	88	11'-0"	88	11'-0"	S
C ₁	9	26	7'-10"	26	7'-10"	B
C ₂	9	6	13'-1"	6	15'-1"	B
D	9	26	20'-0"	26	22'-0"	S
E	9	6	21'-1"	6	23'-1"	B
F	3	48	8'-10"	52	8'-10"	B
G ₁	10	4	35'-2"	4	35'-2"	S
G ₂	10	2	46'-4"	2	46'-4"	S
G ₃	11	9	12'-0"	9	12'-0"	S
G ₄	10	8	8'-0"	8	8'-0"	S
G ₅	10	12	23'-8"	12	23'-8"	S
G ₆	10	12	16'-0"	12	16'-0"	S
G ₇	4	4	33'-9"	4	33'-9"	S
H	6	6	11'-4"	6	11'-4"	B
I	4	52	14'-0"	52	14'-0"	B
J	4	32	6'-5"	32	6'-5"	B
K	4	32	3'-8"	32	3'-8"	S
G ₈	10	4	12'-6"	4	12'-6"	S



SUMMARY OF QUANTITIES			
	BENT 2	BENT 3	BENT 4
CLASS "A" CONCRETE	93.2 C.Y.	93.5 C.Y.	95.8 C.Y.
REINFORCING STEEL	10,415 LBS.	10,415 LBS.	10,687 LBS.
NET & DRY EXCAVATION	150 C.Y.	120 C.Y.	145 C.Y.

* INCLUDES 208 LBS. FOR ANCHOR BOLT ASSEMBLIES

NOTES:
 FOR STANDARD NOTES SEE SH. NO. 6.
 FOR STANDARD DETAILS INCLUDING HOOK DETAIL, DETAIL OF ANCHOR BOLT & ANCHOR BOLT SCHEDULE SEE SH. NO. 7.
 FOOTINGS MAY BE LOWERED A MAXIMUM OF 2'-0" WITHOUT PROVIDING ADDITIONAL VERTICAL COLUMN STEEL BY REDUCING LENGTH OF SPLICES.

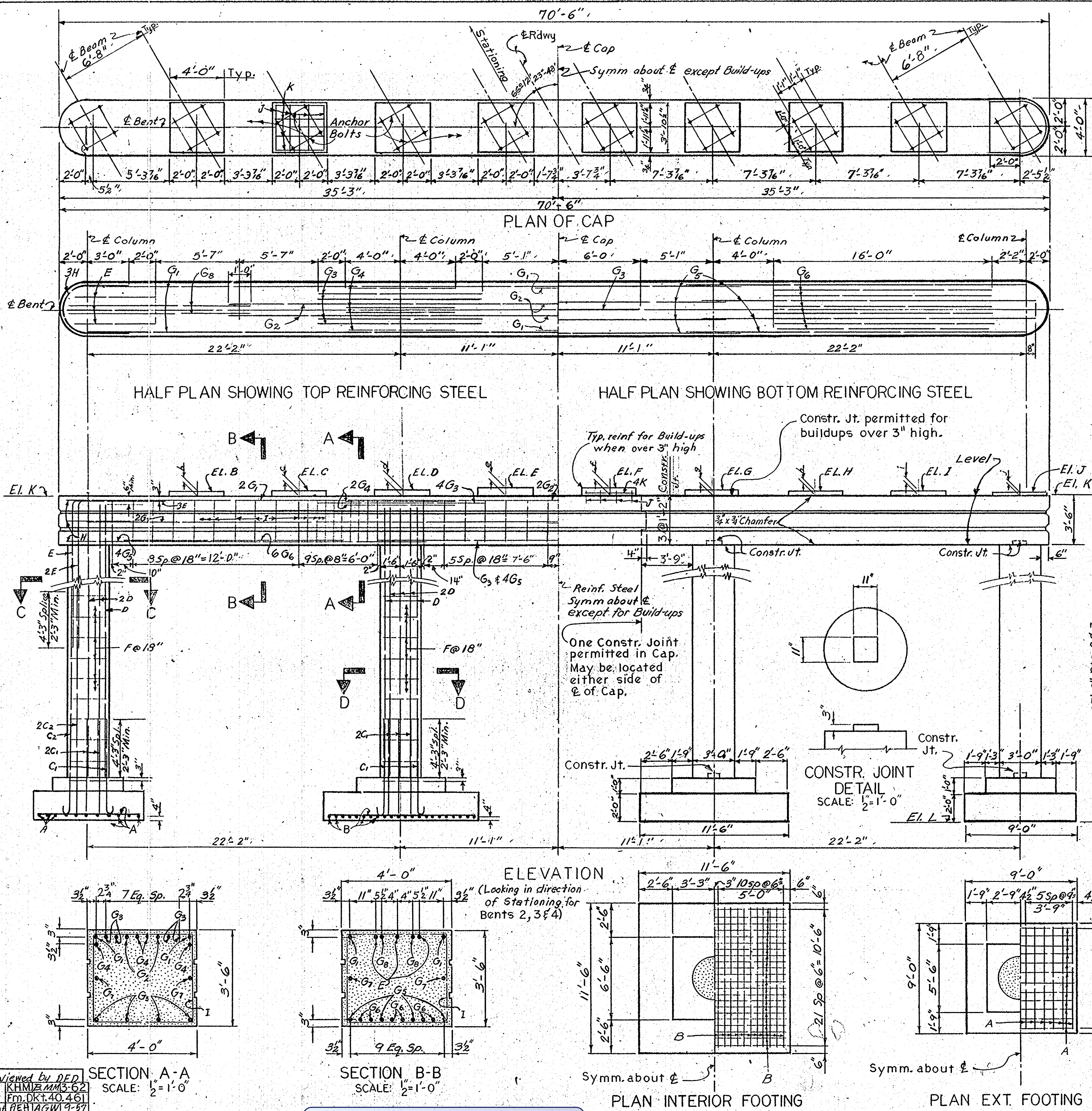
No Scale except as noted.

S.C. STATE HIGHWAY DEPARTMENT
BRIDGE DIVISION
COLUMBIA S.C.

INTERIOR BENTS 2, 3 & 4.
FOR UNDERPASS UNDER
ROUTE 176

DOCKET NO.	COUNTY	ROUTE NO.	DATE
40.565.1	RICHLAND	I-20	3-62

APPROVED BY: *[Signature]* BRIDGE DESIGN & PLANS ENGINEER
 APPROVED BY: *[Signature]* BRIDGE ENGINEER

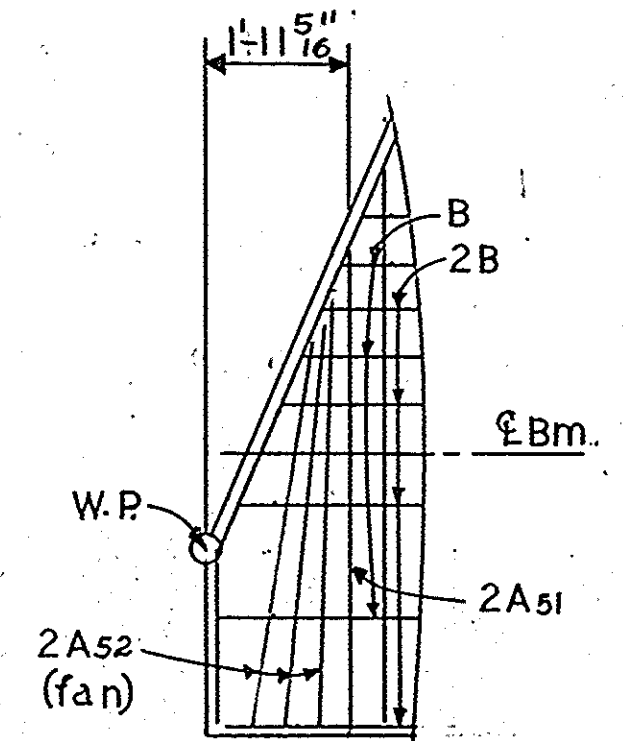


INFORMATION ONLY

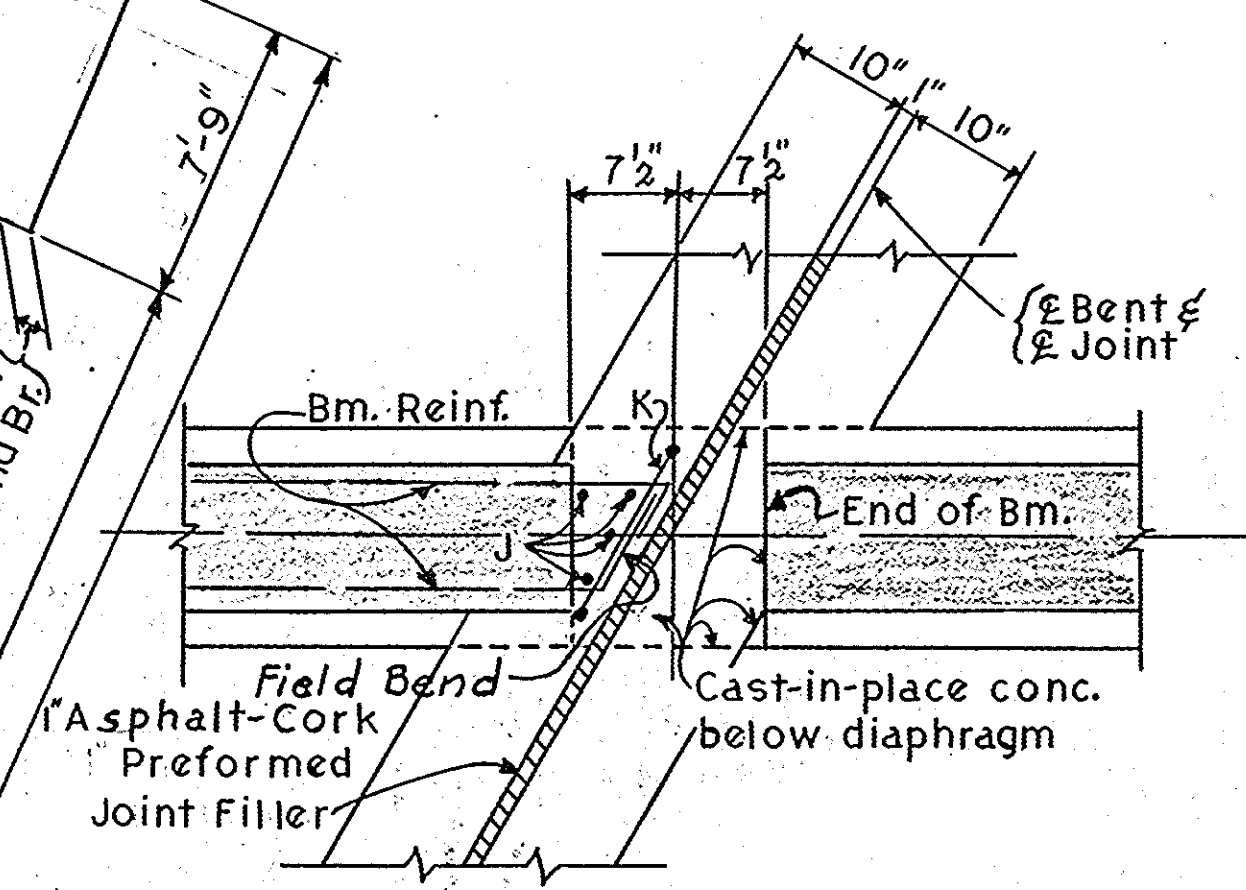
Reviewed by	DEP
Rev.	KHM/AMM/3-62
Quant.	HEB/AGW/9-87
Dr.	ASW/HDL/7-57
Des.	RWH/D.F.D./6-57
By	CHK/Date

Live Load: H20-S16
 $f_c = 1200 \text{ p.s.i.}$
 $f_s = 20,000 \text{ p.s.i.}$
 $n = 10$

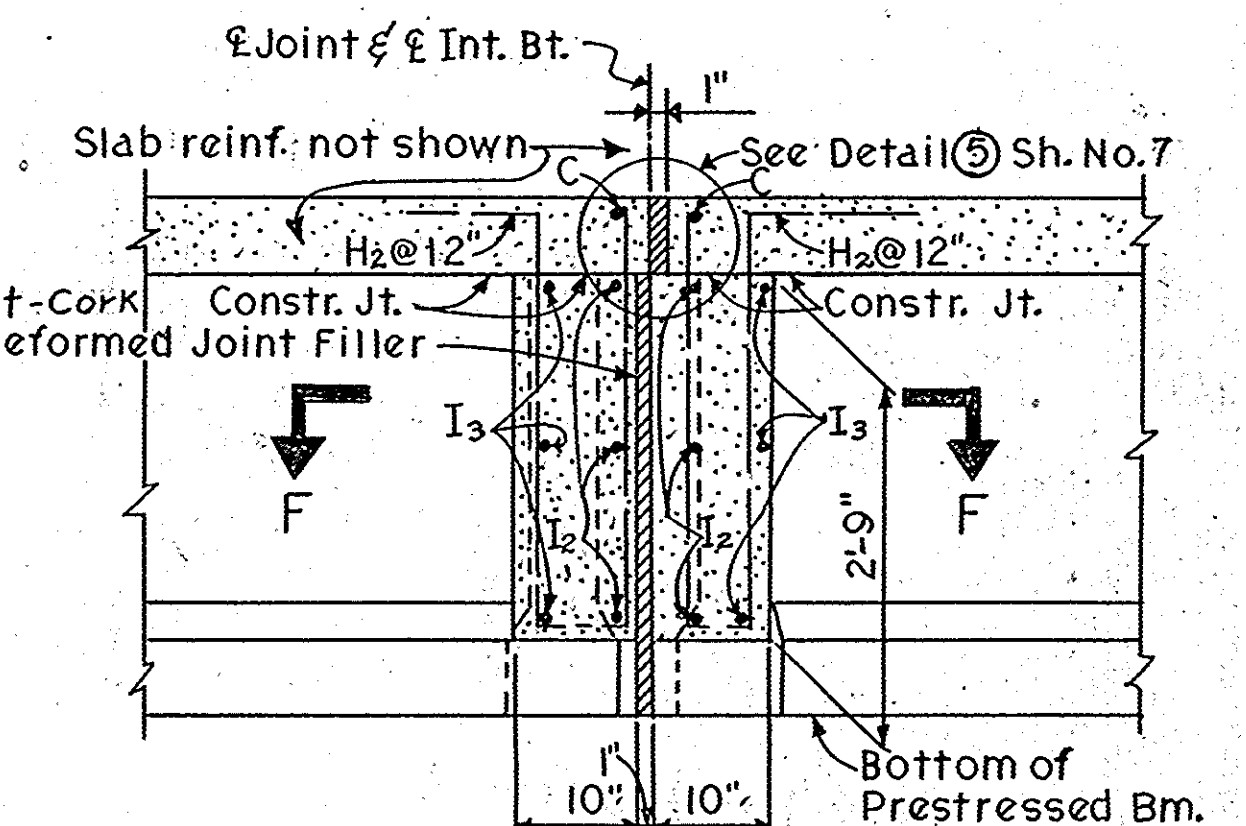
FED. RD. DIV. NO.	STATE	COUNTY	DOCKET NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
3	S. C.	RICHLAND	40565.1	I-20	E12	E16



PART PLAN
 (Showing corner slab reinf.)
 Scale: $\frac{3}{8}'' = 1'-0''$
 Stationing Span 4
 Stationing Span 1



SECTION F-F
Scale: $\frac{3}{4}'' = 1'-0''$



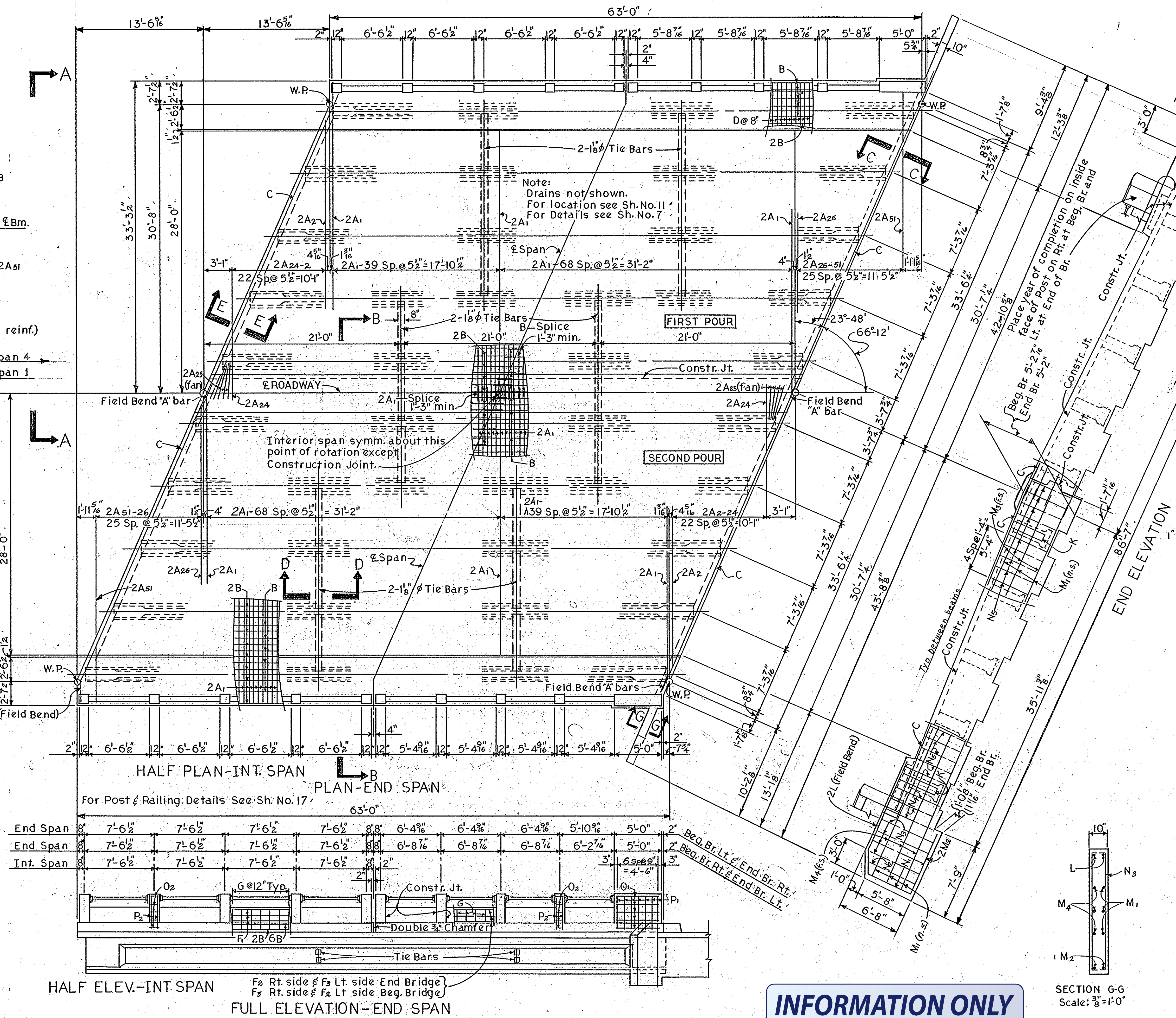
SECTION E-E
Scale: $\frac{3}{4}'' = 1'-0''$

Notes:
For Standard Notes see Sh. No. 6
For Standard Details see Sh. No. 7
For Details of Prestressed Conc. Bm. see Sh. No. 16
Wings below constr. jt. shall be cast monolithic with End Diaphragm.
Allow a five day waiting period after pouring slab before pouring sidewalk.

This sheet to accompany Sh. No.15,16 & 17.

Scale: $\frac{3}{16}'' = 1'-0''$ Or as noted.

REV.			S.C. STATE HIGHWAY DEPARTMENT BRIDGE DIVISION COLUMBIA S.C.	63' END SPAN & 63' INT. SPAN SUPERSTRUCTURE FOR UNDERPASS UNDER ROUTE 176
REV.				
REV.				
REV.				
REV.				
REVIEWED <u>DFD</u> IN CHARGE			DOCKET NO. <u>40.565.1</u> COUNTY <u>RICHLAND</u> ROUTE NO. <u>I-20</u> DATE <u>2-62</u>	
QUAN.	<u>K.H.M.</u>	<u>2-62</u>		
TR.	<u> </u>	<u> </u>		
DR.	<u>K.H.M.</u>	<u>RAB 2-62</u>		
DES.	<u> </u>	<u> </u>		
BY <u>CHK'D</u> DATE <u> </u>			APPROVED BY <u><i>[Signature]</i></u> BRIDGE DESIGN & PLANS ENGINEER	
			APPROVED BY <u><i>[Signature]</i></u> BRIDGE ENGINEER	



SECTION G-G
Scale: $\frac{3}{8}'' = 1'-0''$

INFORMATION ONLY

H 20-S16LL.

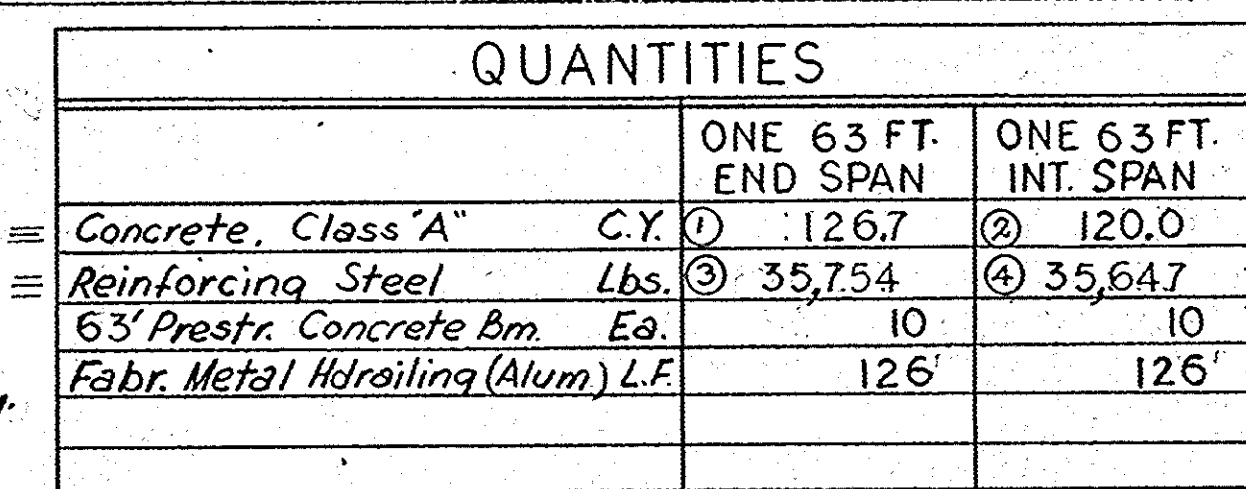
Class "A" Concrete

$$\left\{ \begin{array}{l} f_c = 1200 \text{ p.s.i.} \\ f_s = 20,000 \text{ p.s.i.} \\ n = 10 \end{array} \right.$$

H 20-S16 L.L.

Class "A" Concrete

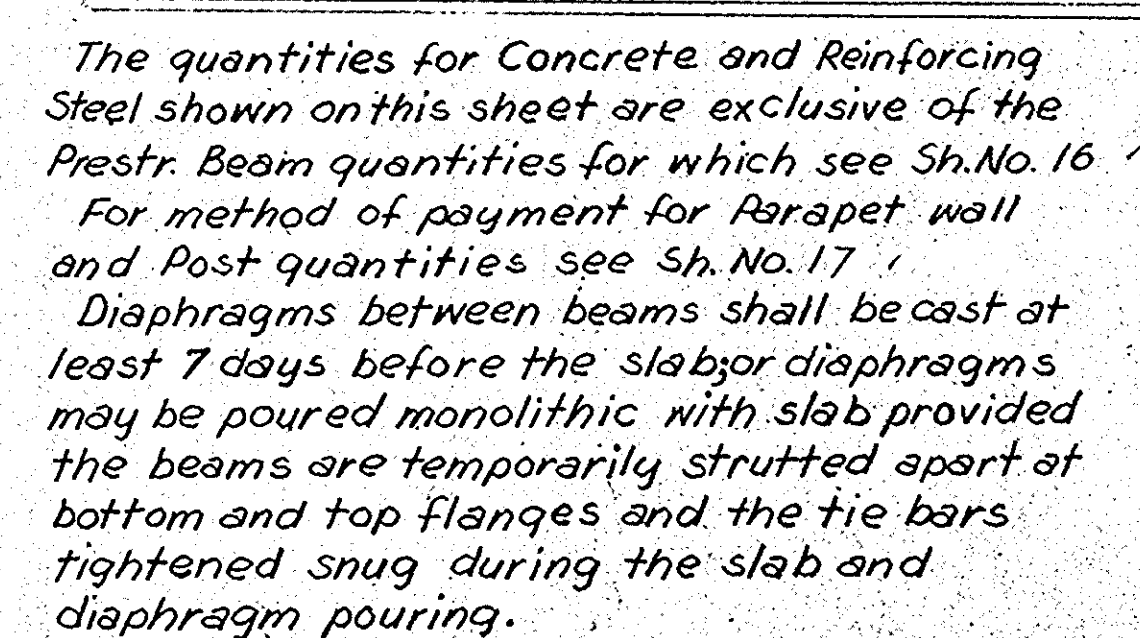
$\left\{ \begin{array}{l} f_c = 1,200 \text{ p.s.i.} \\ f_s = 20,000 \text{ p.s.i.} \\ n = 10 \end{array} \right.$



MARK	SIZE	D	63' END SPAN		63' INT. SPAN	
			NO. REQ'D	LENGTH	NO. REQ'D	LENGTH
A ₁	5' S	S	432	33'-9"	432	33'-9"
A ₂₋₂₄	5 S	S	4 ea.	7'-5" to 30'-4" Vary by 1'-0"	4 ea.	7'-5" to 30'-4" Vary by 1'-0"
A ₂₅	5 S	S	16	6'-4"	16	6'-4"
A ₂₆₋₅₁	5 S	S	4 ea.	6'-8" to 32'-8" Vary by 1'-0"	4 ea.	6'-8" to 32'-8" Vary by 1'-0"
A ₅₂	5 S	S	12	5'-8"	12	5'-8"
B	5 S	S	304	32'-0"	304	32'-0"
C	5 S	S	4	36'-10"	4	36'-10"
D	4 B	B	190	5'-6"	190	5'-6"
E	5 S	S	128	0'-10"	128	0'-10"
F ₁	4 S	S	24	6'-2"	48	6'-2"
G	5 B	B	104	2'-10"	112	2'-10"
H ₁	4 B	B	108	7'-9"	108	7'-9"
H ₂	4 B	B	54	7'-2"	108	7'-2"
I ₁	5 S	S	72	5'-8"	72	5'-8"
I ₂	5 S	S	6	34'-9"	12	34'-9"
I ₃	5 S	S	27	5'-9"	54	5'-9"
J	4 S	S	40	3'-1"	80	3'-1"
K	4 B	B	20	5'-6"	20	5'-6"
M ₁	4 S	S	6	43'-9"	—	—
M ₂	4 S	S	4	7'-5"	—	—
M ₃	4 S	S	27	5'-6"	—	—
N ₁	4 B	B	2	11'-2"	—	—
N ₂	4 B	B	2	11'-10"	—	—
N ₃	4 B	B	8	13'-2"	—	—
N ₄	4 B	B	8	10'-8"	—	—
N ₅	4 B	B	43	9'-2"	—	—
O ₁	2 B	B	10	11'-9"	—	—
O ₂	2 B	B	90	3'-6"	100	3'-6"
P ₁	4 B	B	14	9'-10"	—	—
P ₂	4 B	B	36	9'-3"	40	9'-3"
F ₂	4 S	S	12	5'-0"	—	—
F ₃	4 S	S	12	5'-4"	—	—
L	4 S	S	4	12'-6"	—	—
Wire mesh			Req'd.	63'-0"	Req'd.	63'-0"
1/8" Tie Bar Assemblies			12	21'-0"	12	21'-0"

QUANTITIES	
------------	--

SCALE $3/8" = 1' - 0"$. OR AS NOTED

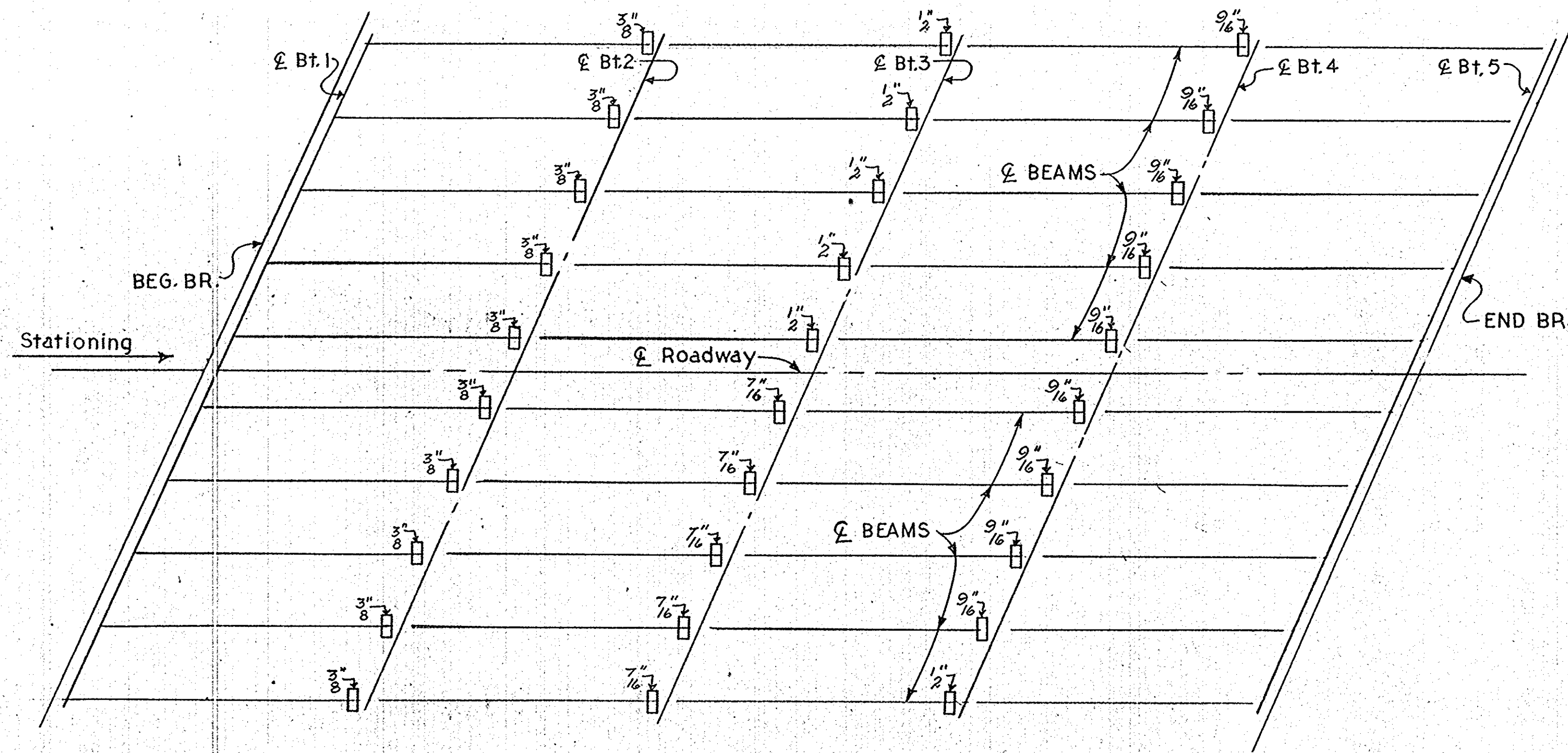


REV.				SCALE 1" = 10' OR AS NOTED	
REV.				S.C. STATE HIGHWAY DEPARTMENT	
REV.				BRIDGE DIVISION	
REV.				COLUMBIA S.C.	
REV.		K.H.M. <i>PAB 2-62</i>		63' END SPAN & 63' INT. SPAN	
REV.		Frm Dkt. 10.487		SUPERSTRUCTURE DETAILS	
REVIEWED		J.F.D.		FOR UNDERPASS UNDER	
		IN CHARGE		ROUTE 176	
QUAN.	K.H.M.	DOCKET NO.	COUNTY	ROUTE NO.	DATE
TR.	<i>RCB 2-62</i>	40.565.1	RICHLAND	I-20	2-62
DR.	BAM	APPROVED BY	APPROVED BY		
DES.	RWH HDL 10-61	<i>W.D. Evans</i>	<i>W.D. Evans</i>		
	BY: CHKD 10-61	BRIDGE DESIGN & PLANS ENGINEER	BRIDGE ENGINEER		

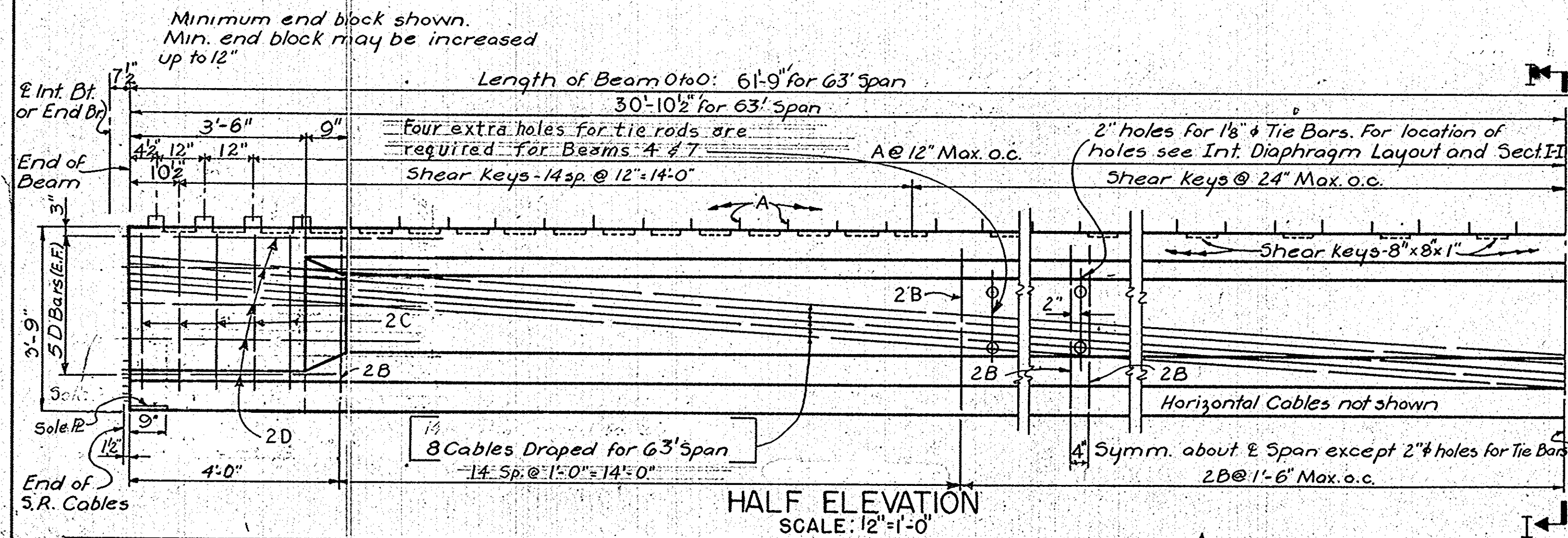
PRESTRESSED CONCRETE
Prestressing Steel: $f_s = 250,000$ psi, $f_{si} = 175,000$ psi
 $f_c = 5,000$ psi, $f'_{ci} = 4,000$ psi, $f_c = 2,000$ psi

PRESTRESSED CONCRETE
 $f_s = 250,000$ psi
 $f_c = 5,000$ psi, $f'_{ci} = 4,000$ psi, $f_c = 2,000$ psi

H20-S16-44 LL

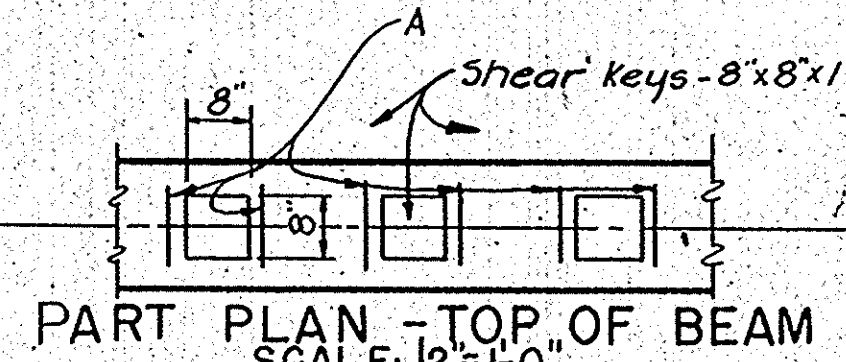


BOOSTER LAYOUT
No Scale

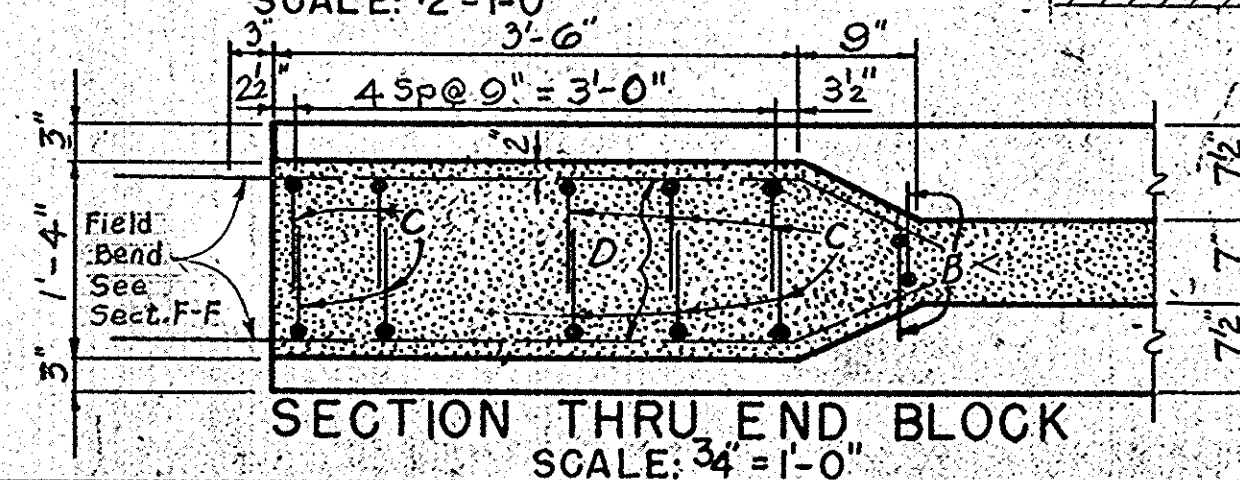


HALF ELEVATION
SCALE: 1/2" = 1'-0"

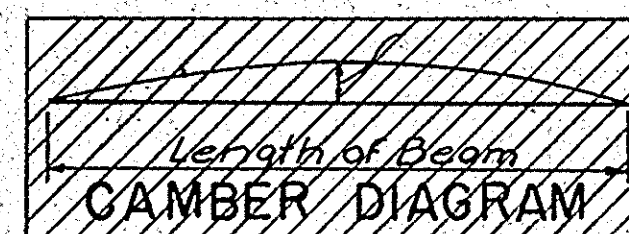
BEAM DEFLECTION AND CAMBER	
EST. DEFLECTION OF TOP SURFACE OF BM. WHEN CABLES ARE RELEASED	63' SPAN
EST. DEF. OF TOP SURFACE OF BM. DUE TO WT. OF SLAB & DIAPH. WHEN POURED	7/8" DOWN



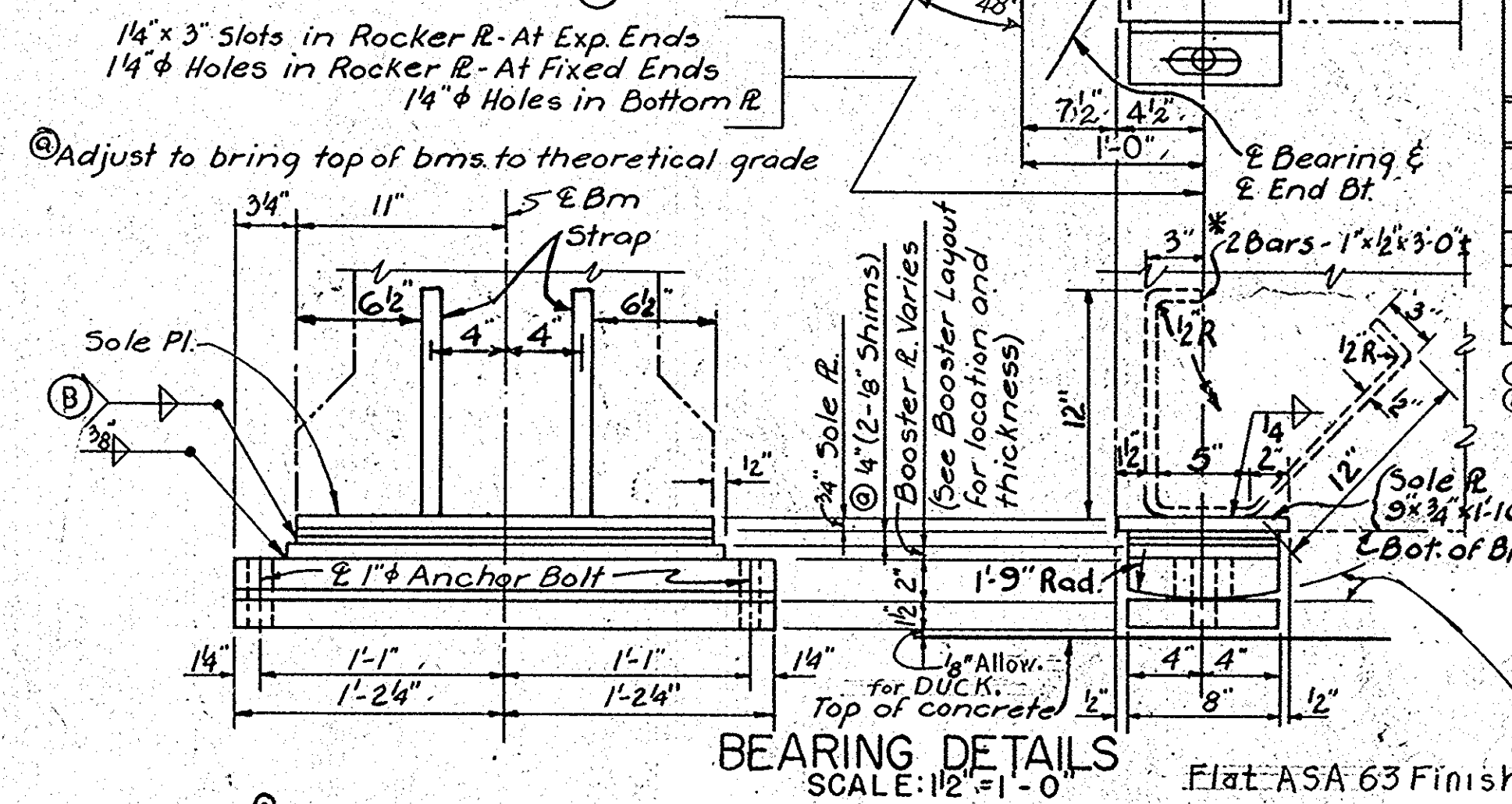
PART PLAN - TOP OF BEAM
SCALE: 1/2" = 1'-0"



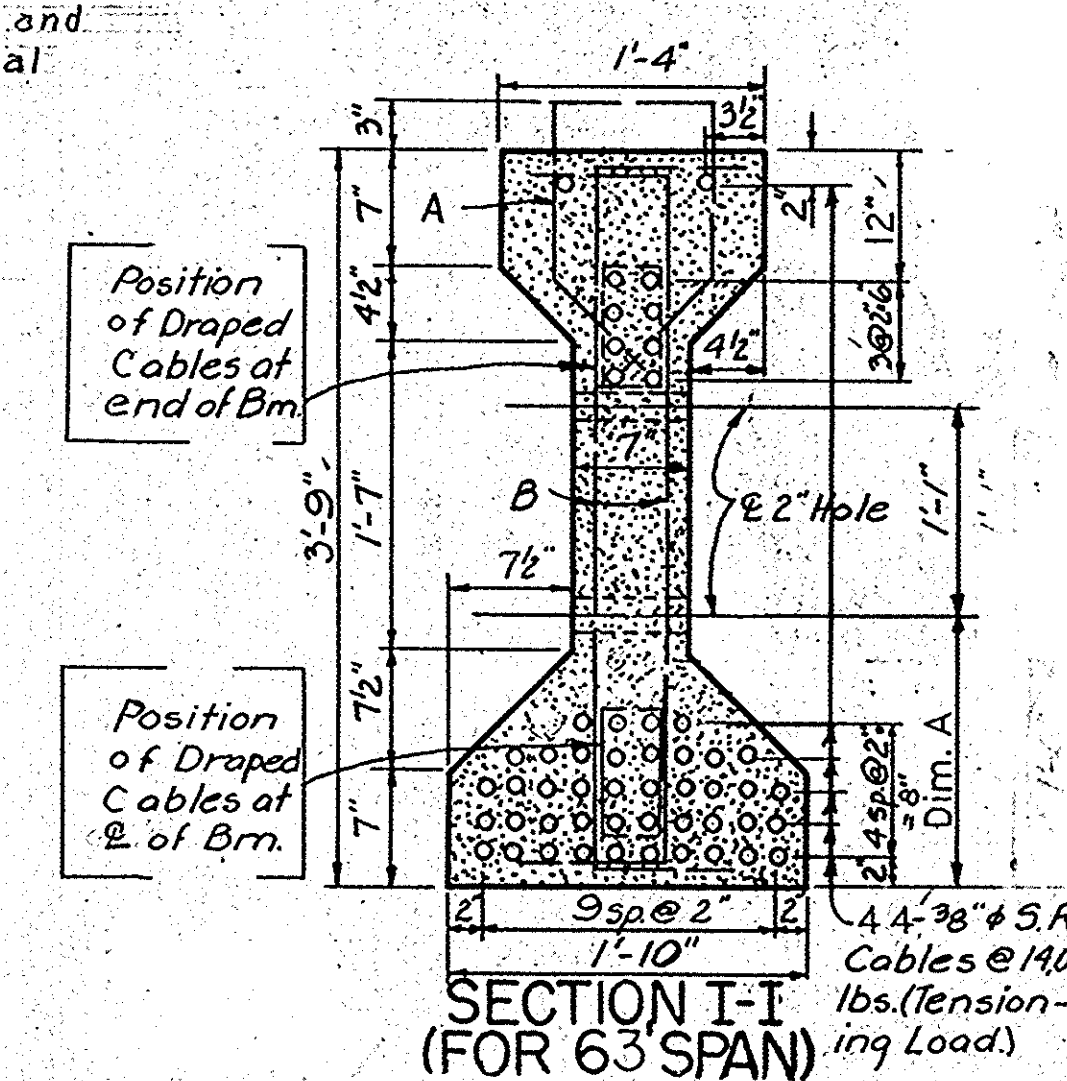
SECTION THRU END BLOCK
SCALE: 3/4" = 1'-0"



CAMBER DIAGRAM



BEARING DETAILS
SCALE: 1/2" = 1'-0"



SECTION I-I
(FOR 63' SPAN)

Beam	Dim. A
1	1'-5 3/4"
2	1'-5 3/4"
3	1'-5 3/4"
4	1'-5 3/4"
5	1'-4 1/2"
6	1'-5 3/4"
7	1'-5 3/4"
8	1'-5 3/4"
9	1'-5 3/4"
10	1'-5 3/4"

FED. DIV. NO.	STATE	COUNTY	DOCKET NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
3	S.C.	RICHLAND	40.565.1	I 20	E14	E16

REINFORCING STEEL SCHEDULE - I BEAM	
MARK	SIZE
A	5
B	4
C	4
D	5

BENDING DETAILS	
A	10"
D	4'-8"
B	1'-3"
C	1'-3"

QUANTITIES - ONE BEAM	
CONCRETE - CLASS "X"	C.Y.
REINFORCING STEEL	771
PRESTRESSING CABLES	2,772
STRUCTURAL STEEL	579

- ① INCLUDES SOLE PLATE ASSEMBLIES AND BEARING ASSEMBLIES.
- ② INCLUDES 18 LBS. FOR BOOSTERS (APPROX. AV. WT. PER BN)

NOTES:
THE PRICE BID FOR PRESTRESSED CONCRETE BEAMS SHALL INCLUDE S.R. CABLES, SOLE PLATE ASSEMBLIES, BEARING ASSEMBLIES (INCLUDING SHIMS AND BOOSTERS), REINFORCING STEEL, LIFTING DEVICES, AND ALL OTHER MATERIAL (EXCEPT ANCHOR BOLT ASSEMBLIES) COMPLETE IN PLACE.

PARTIAL PAYMENT FOR PRESTRESSED BEAMS:
WHEN PRESTRESSED CONCRETE BEAMS ARE DELIVERED TO THE BRIDGE SITE, THE ENGINEER WILL ENTER 80% OF THE CONTRACT UNIT PRICE ON THE CURRENT ESTIMATE, AND AFTER ERECTION 100% OF THE CONTRACT UNIT PRICE. SUCH PERCENTAGES SHALL BE SUBJECT TO THE USUAL RETAINAGE.
THE PRESTRESSED BEAMS MUST BE ALWAYS MAINTAINED IN AN UPRIGHT POSITION WHEN BEAMS ARE HANDLED. THEY SHALL BE LIFTED BY DEVICES PROVIDED AT ENDS OF BEAMS. A SUGGESTED LIFTING DEVICE MAY UTILIZE A 2" DIAMETER PIPE WITH A 1/2" DIAMETER MILD STEEL PIN THROUGH THE END BLOCK LOCATED APPROXIMATELY 1/3 TO 1/2 THE DEPTH OF THE BEAM BELOW THE TOP. OTHER TYPES OF LIFTING DEVICES MAY BE USED PROVIDED THEY MEET WITH THE APPROVAL OF THE ENGINEER. PICK-UP POINTS MUST BE WITHIN THE EXTENT OF THE END BLOCKS. WHEN BEING STORED, CARE MUST BE TAKEN TO ELIMINATE INTERIOR SUPPORTS WHICH WOULD CAUSE NEGATIVE MOMENTS.

FOR STANDARD NOTES SEE SHEET NO. 6
NOTE THAT A TOTAL FORCE OF 14" IS REQUIRED IN EACH CABLE AT THE TIME OF CASTING. THEREFORE IF THE DRAPED CABLES ARE MADE TO ASSUME THE DRAPED POSITION BY FIRST ANCHORING THE ENDS AT THEIR FINAL LOCATION AND THEN DEPRESSING THE MIDPOINT TO ITS FINAL LOCATION THE TENSIONING LOAD REQUIRED ON THE CABLE IN THE INITIAL (HORIZONTAL) POSITION WILL BE 9842 LBS. FOR THE 63' BEAM.
VERTICAL LOAD REQUIRED TO DEPRESS EACH CABLE TO ITS FINAL LOCATION WILL BE 1734 LBS. FOR THE 63' BEAM.
ALL CABLES WHICH ARE TO REMAIN HORIZONTAL MUST BE TENSIONED TO 14" EACH. REQUIRED DRAPING FORCES SHOWN ABOVE ARE FOR SINGLE ISOLATED BEAM PULLS. FOR LONGER LENGTH SETUPS ADJUSTMENTS MUST BE MADE FOR THE ADDITIONAL CABLE LENGTHS.

THE DEFLECTING DEVICE SHALL BE ROUNDED TO A MINIMUM RADIUS OF 1/2".
THEORETICAL SLAB THICKNESS TO BE RETAINED BY LOWERING BOTTOM OF SLAB BELOW TOP OF BEAM IF NECESSARY.
③ If a plate is used it shall have a minimum thickness of 3/8".
THE INITIAL STRESS IN ALL 3/8" CABLES AFTER DRAPING SHALL BE 14,000 LBS.

Concrete in Prestressed Beams shall be Class "X" as described in the Special Provisions.

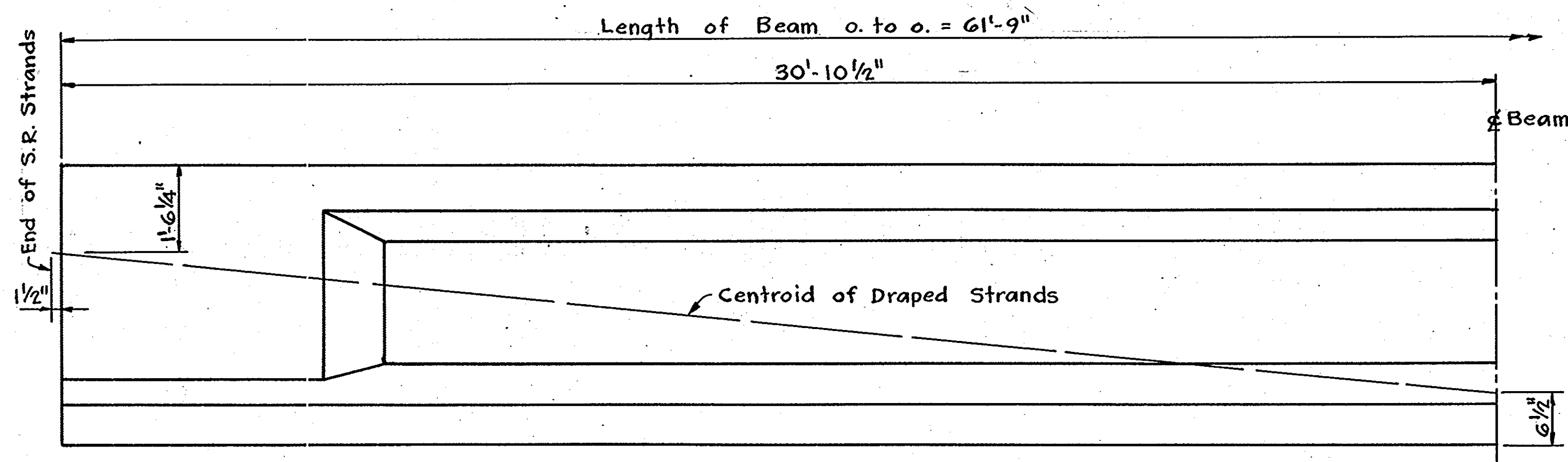
THIS SHEET TO ACCOMPANY SHEET NO. 14 & 15

S.C. STATE HIGHWAY DEPARTMENT BRIDGE DIVISION COLUMBIA S.C.	
SUPERSTRUCTURE DETAILS 63' END SPAN & 63' INT. SPAN	
FOR UNDERPASS UNDER ROUTE 176	
REV.	DESCRIPTION
1	K.H.M. 3-62
2	W.A.H. 5-59
3	W.A.H. 5-59
4	W.A.H. 5-59
5	W.A.H. 5-59
6	W.A.H. 5-59
7	W.A.H. 5-59
8	W.A.H. 5-59
9	W.A.H. 5-59
10	W.A.H. 5-59

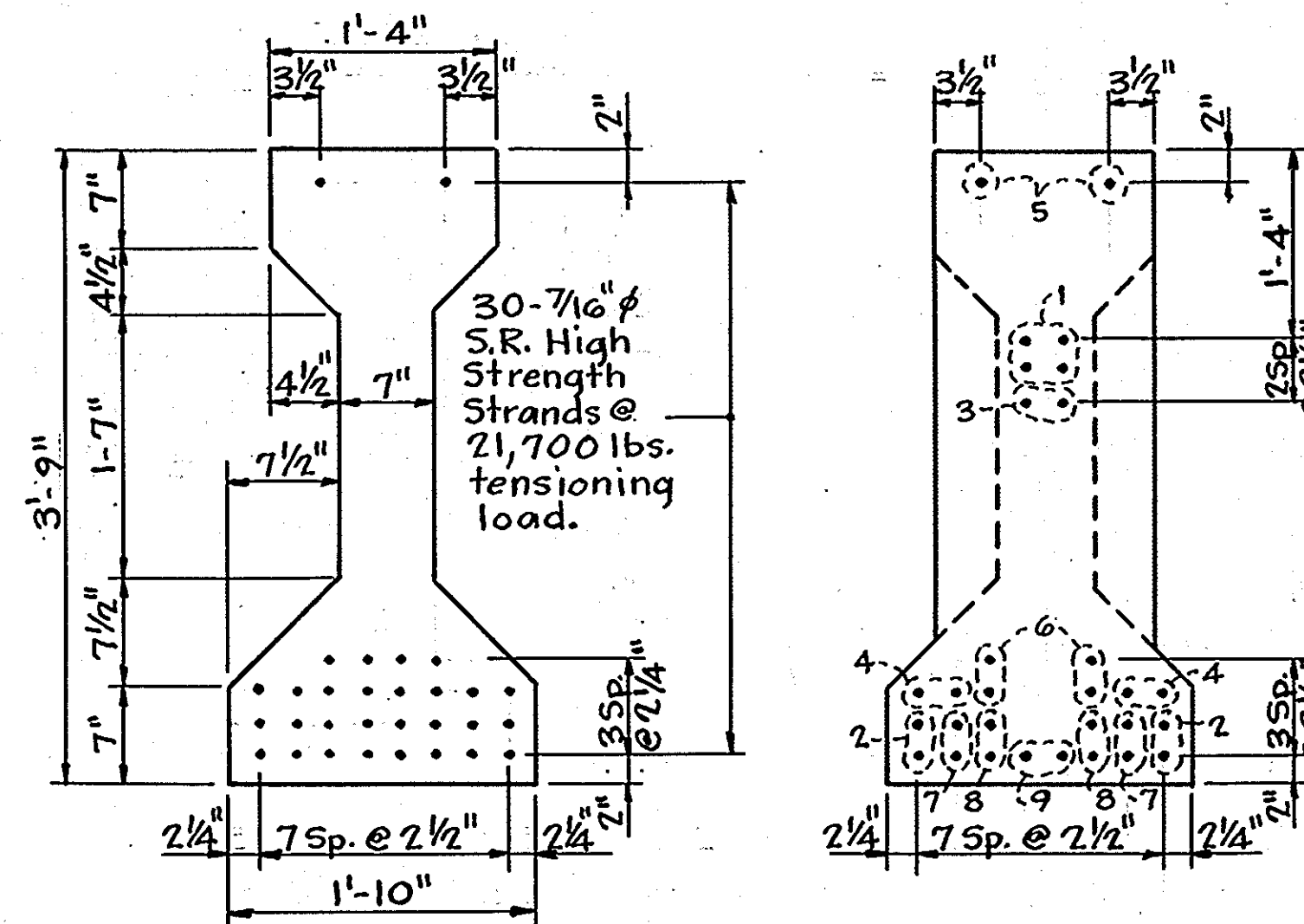
INFORMATION ONLY

Note: Numbers on strands indicate order of burning. All strands must be completely burned for entire bed in order shown.

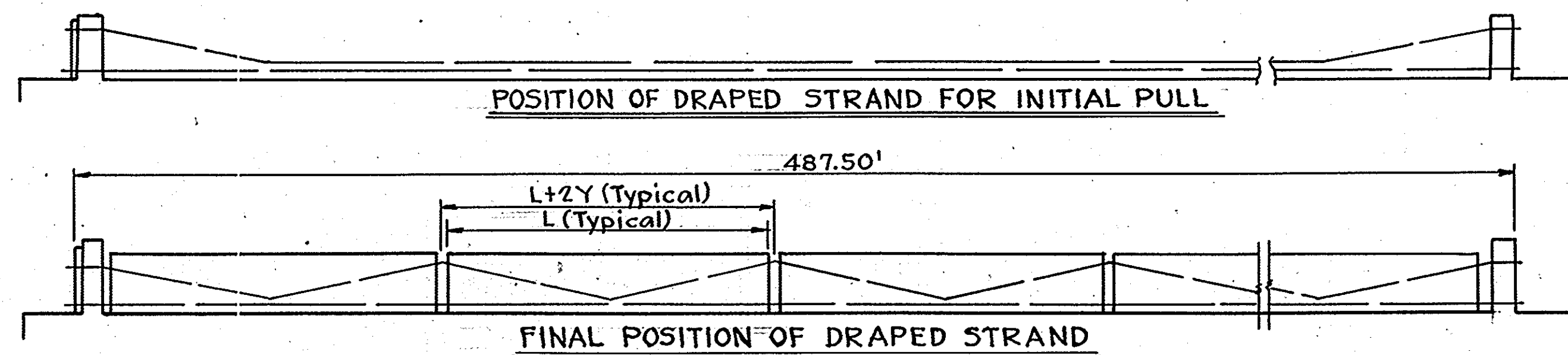
FED. RD. DIV. NO.	STATE	COUNTY	DOCKET NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
3	S.C.	RICHLAND	40.565.1	I-20	E15	E16



HALF ELEVATION
(Showing Draped Strands Only)



SECTION AT 1/2 END ELEVATION
FOR 63 FT. SPAN



NOTES:
Other procedures to be in accordance with the Special Provisions.
Lift strands in increments of 4".
The increment shall be completed in all beams of a pour before the succeeding increment is begun.
Strands shall be cut simultaneously by two operators, working from each end of the bed toward the center.
Hold-down anchors for strands to be 1" min. diameter roller type manufactured by Superior Concrete Accessories, Inc., Franklin Park, Ill.

TABLE OF DIMENSIONS									
BEAM LGTH L	Y	2Y	L+2Y	b1	b2	a1	a2	C	C-b2
61'-9"	19.50"	39.00"	78.00"	370.50"	390.00"	20.25"	21.3158"	390.5820"	.5820"

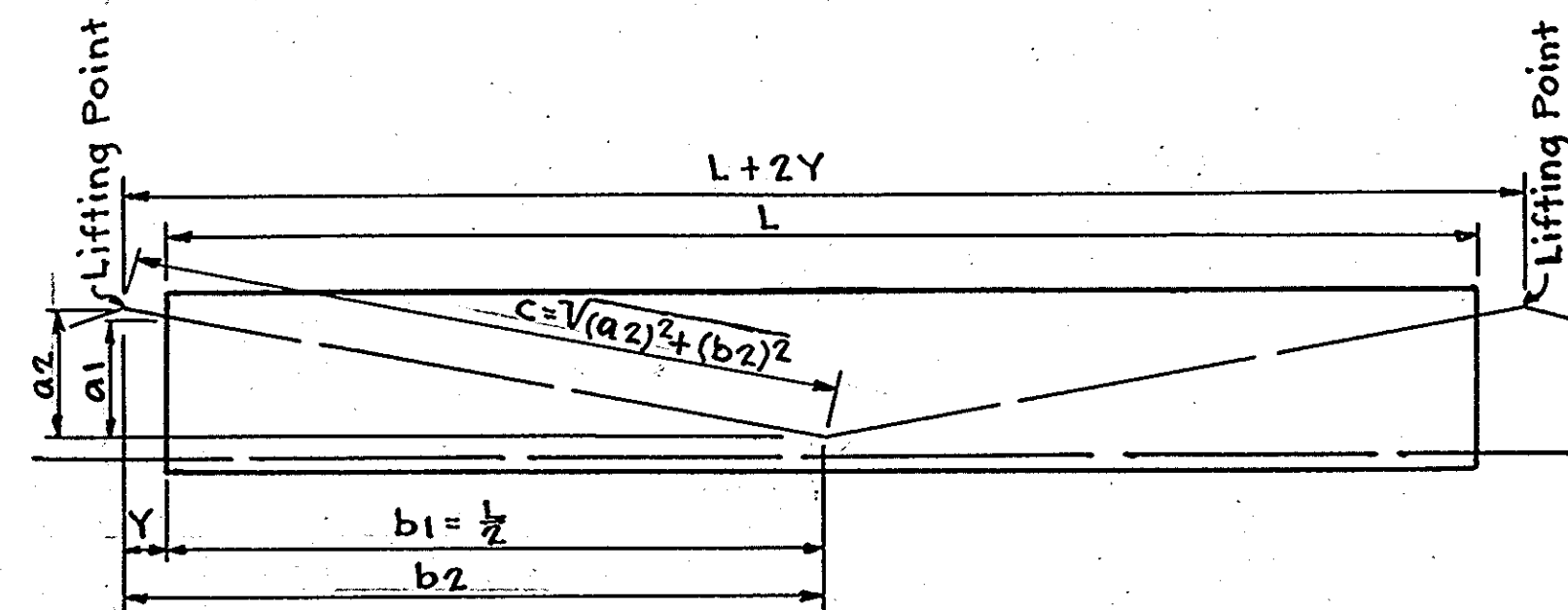
STRAND COMPUTATIONS:

Using 7/16" S.R. High Strength Strand
Strand Mfr.: Sumitomo Electric Industries, Ltd., Japan
Strand Elongation: .0828" per ft. @ 21,700 lbs.
Casting bed length: 487.50' Strandvice to Strandvice
Initial pull: 2,000 lbs. per strand.

- (1) Straight Strand Elongation: $\frac{19,700}{21,700} \times 487.50' \times .0828 = 36.6447"$
+ 1/4" for strandvice slippage .2500
Elongation after initial pull = 36.8947" or 36 7/8"
- (2) Draped Strand Elongation:

Pour No. 1 thru No. 5: 7 Beams at 61'-9"
Length of draped strand in position for initial pull = $487.50' + (2 \times .5820 \div 12) = 487.5970'$
 $487.5970' \times .0828 = 40.3730"$
Initial pull $\frac{2,000}{21,700} \times 40.3730 = -3.7210$
6 Lifts $\times \frac{2,000}{21,700} (.5820 \times 2) = -6.9840$
29.6680"
+ 1/4" for strandvice slippage .2500
Elongation after initial pull = 29.9180" or 29 15/16"

Pour No. 6: 5 Beams at 61'-9"
Length of draped strand in position for initial pull = $487.50' + (2 \times .5820 \div 12) = 487.5970'$
 $487.5970' \times .0828 = 40.3730"$
Initial pull $\frac{2,000}{21,700} \times 40.3730 = -3.7210$
4 Lifts $\times \frac{2,000}{21,700} (.5820 \times 2) = -4.6560$
31.9960"
+ 1/4" for strandvice slippage .2500
32.2460" or 32 1/4"



SKETCH OF DRAPED STRAND IN BEAM

Note: For details not shown, See Sheet No. 16 of S.C.H.D. Plans.

CASTING DETAILS

INFORMATION ONLY

S.C. STATE HIGHWAY DEPARTMENT BRIDGE DIVISION COLUMBIA, S.C.		
PRESTR. BEAM DETAILS FOR UNDERPASS UNDER ROUTE 176		
DOCKET NO. 40.565.1	COUNTY RICHLAND	ROUTE NO. I-20
SUBMITTED BY: SOUTHEASTERN CONCRETE SALES, INC. CAYCE, S.C.		
AUG. 1964		

